Students’ emotional experiences in assessed, online, group activities

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Abstract

This thesis concerns students’ emotional experiences when undertaking assessed, online, group activities. It reports research investigating: the range of emotions experienced by students; the causes of these emotions; their impact on students’ participation and performance; and how and why students regulated their emotions.

Three empirical studies were conducted. The first study explored the experiences of 294 students, using an online survey. The second employed an online diary to investigate the emotional experiences of 46 students at various stages throughout an assessed, online, group activity. The third explored tutor perspectives of students’ emotional experiences, gathering data via online discussion forum threads (12 tutors) and semi-structured interviews (16 tutors).

Findings revealed that students experienced a wide variety of pleasant and unpleasant emotions when undertaking these learning activities, with the emotions of anxiety (before collaboration), frustration (during collaboration), and relief (after collaboration) being particularly pervasive. Emotions were primarily caused by: other students (e.g., their participation and performance); the outcomes of the activity (e.g., the grade or result); or the students themselves (e.g., self-belief). Other causes were: the group; the task; the learning model; technology; and external factors. Students largely perceived pleasant emotions to have positive impacts on their participation and performance and unpleasant emotions to have negative impacts. However, several unpleasant emotions (e.g., anxiety, frustration) were also reported to have facilitative effects by some students. Students used many strategies to regulate their emotions, and these were categorised into five general dimensions (social support; changing or directing thoughts; active task-related behaviour; modifying emotional response; and evasion or avoidance). Emotions were primarily regulated to enhance performance (of self, others, or the group) in the activities, to improve wellbeing, and foster relationships with fellow group members.

This research represents an original and essential contribution to a nascent field of investigation. As well as informing future research inquiry, recommendations can be used by practitioners to help create positive and supportive group learning environments.
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Finally, I would also like to make a special mention to my son, Archie, who was born in the final stages of writing this thesis.
Declaration of Authorship

During the completion of my PhD, I have disseminated parts of my research at various conferences. A list of conference papers and presentations are provided below.

Publications from Thesis

Conference papers


Conference presentations


# Table of Contents

Abstract.......................................................................................................................... i
Acknowledgements........................................................................................................ ii
Declaration of Authorship................................................................................................ iii
Table of Contents .............................................................................................................. iv
List of Tables ................................................................................................................... viii
List of Figures .................................................................................................................. x

1 Introduction .................................................................................................................. 1
   1.1 Overall Purpose, Research Questions, and Research Plan ................................. 4
   1.2 MRes Research Project ......................................................................................... 6
   1.3 Thesis Structure ..................................................................................................... 7
   1.4 Chapter summary ................................................................................................... 8

2 Literature Review .......................................................................................................... 10
   2.1 Emotion and Learning ........................................................................................... 10
      2.1.1 Conceptualisation of emotion ...................................................................... 10
      2.1.2 Academic emotions ...................................................................................... 14
      2.1.3 Functions of emotions for learning ................................................................. 16
      2.1.4 Regulating emotion in academic settings ..................................................... 18
      2.1.5 Collective emotions and other group-level processes ..................................... 22
      2.1.6 Control-value theory ..................................................................................... 23
   2.2 Emotion and Online Collaborative Learning ....................................................... 29
      2.2.1 Online learning .............................................................................................. 29
      2.2.2 Online collaborative learning ........................................................................ 32
      2.2.3 Importance of emotions in online collaborative learning .............................. 36
      2.2.4 Current understanding of emotions in online collaborative learning ............. 37
   2.3 Chapter Summary .................................................................................................... 48

3 Methodology ................................................................................................................ 49
   3.1 Research Questions ............................................................................................... 49
   3.2 Philosophical Underpinnings ............................................................................... 49
   3.3 Methodological Approach ..................................................................................... 52
   3.4 Research Design .................................................................................................... 54
   3.5 Data Collection Methods ....................................................................................... 58
      3.5.1 Online surveys ............................................................................................... 60
3.5.2 Online diaries ......................................................... 62
3.5.3 Online discussion forums ........................................... 64
3.5.4 Qualitative interviews ............................................... 66
3.5.5 Other self-report measures considered ............................. 67
3.6 Data Analysis Approaches .............................................. 68
  3.6.1 Analysis of quantitative data ...................................... 69
  3.6.2 Analysis of qualitative data ...................................... 69
3.7 Ethical Considerations ................................................ 75
3.8 Research Project Context ............................................. 77
  3.8.1 The Open University (United Kingdom) ............................ 77
  3.8.2 Open University modules ....................................... 79
3.9 Chapter Summary ..................................................... 80
4 Study 1 (Student Survey): Methods, Results, and Interpretation .... 81
  4.1 Study Purpose and Objectives ...................................... 81
  4.2 Materials and Methods ............................................... 82
    4.2.1 Study context .................................................. 82
    4.2.2 Participants ................................................... 83
    4.2.3 Procedures .................................................... 85
    4.2.4 Data collection instrument ................................... 85
    4.2.5 Data analysis .................................................. 88
    4.2.6 Trustworthiness ............................................... 89
  4.3 Results ...................................................................... 90
    4.3.1 Emotions experienced .......................................... 90
    4.3.2 Cause of emotions ............................................. 95
    4.3.3 Impact of emotions ............................................ 106
    4.3.4 Emotion regulation ............................................. 113
  4.4 Discussion ................................................................ 119
    4.4.1 Interpretation of findings ....................................... 119
    4.4.2 Study limitations ............................................... 129
  4.5 Chapter Summary ..................................................... 130
5 Study 2 (Student Diary): Methods, Results, and Interpretation .... 131
  5.1 Study Purpose and Objectives ...................................... 131
  5.2 Materials and Methods ............................................... 132
    5.2.1 Study context ................................................... 132
    5.2.2 Participants ..................................................... 134
7.1.3 How do emotions impact students’ participation and performance in assessed, online, group activities? ................................................................. 248

7.1.4 How and why do students regulate their emotions in assessed, online, group activities? ................................................................. 254

7.2 Implications ................................................................. 261

7.2.1 Theoretical implications ............................................. 261

7.2.2 Methodological implications ...................................... 263

7.2.3 Implications for teaching practice .............................. 265

7.3 Limitations and future directions ...................................... 271

7.4 Conclusion ................................................................. 275

8 References ........................................................................ 277

9 Appendices ........................................................................ 311

Appendix A – Study 1 ethical approval ............................... 311

Appendix B – Study 2 (pilot study) ethical approval ............ 312

Appendix C – Study 2 (main study) ethical approval .......... 313

Appendix D – Study 3 ethical approval ............................... 314

Appendix E – Details of assessed, online, group activities used in this research project ................................................................. 315

Appendix F – Online survey ................................................ 317

Appendix G – Online diary (entry 3) ................................. 324

Appendix H – Online diary (entry 5) ................................. 331

Appendix I – Selected pleasant and unpleasant emotions in diary entries 1-4 336

Appendix J – Online forum threads ..................................... 337

Appendix K – The interview guide ..................................... 339

Appendix L – Initial thematic map (themes and sub-themes) ................................................................. 341
List of Tables

Table 1. Three-dimensional classification of achievement emotions. Adapted from Pekrun et al. (2018)................................................................. 15

Table 2. Steps used to conduct conventional and directed content analysis. .............. 73

Table 3. Steps used to conduct thematic analysis. .................................................. 75

Table 4. Survey respondent details....................................................................... 84

Table 5. The 20 most reported emotion-related categories by students (pleasant emotion-related categories: non-underlined; unpleasant emotion-related categories: underlined; unclassified/neutral emotion-related categories: *). ........................................... 92

Table 6. Categories of the causes of emotion in assessed, online, group activities. ...... 95

Table 7. Causes of pleasant and unpleasant emotion in assessed, online, group activities. .......................................................................................... 105

Table 8. Ways in which emotions impacted participation and/or performance when undertaking assessed, online, group activities. .................................................. 109

Table 9. Frequency of the causes of both pleasant and unpleasant emotions in each category reported by participants. Data from diary entries 1-4. ......................... 150

Table 10. Categorisation of the main pleasant and unpleasant emotions. Data from diary entry 5. ................................................................................................. 155

Table 11. Students’ perceptions of the extent to which pleasant and unpleasant emotions impacted participation. Data from diary entry 5. ............................... 156

Table 12. Students’ perceptions of the general impact of pleasant and unpleasant emotions on student participation. Data from diary entry 5. .................. 157

Table 13. Students’ perceptions of the specific impact of pleasant and unpleasant emotions on student participation. Data from diary entries 2-4.................. 159

Table 14. Frequency of emotion regulation strategies in each category reported by participants for both pleasant and unpleasant emotions. Data from diary entries 1-4. 162

Table 15. Categories of emotion regulation goals...................................................... 166
Table 16. Categories of emotion regulation goals reported by participants for both pleasant and unpleasant emotions. Data from diary entries 1-4. .................................167

Table 17. Population of tutors on each module. .................................................................187

Table 18. Interviewee details. .........................................................................................193

Table 19. The 20 most reported emotion-related categories by students (pleasant emotion-related categories: non-underlined; unpleasant emotion-related categories). 197
List of Figures

Figure 1. Affective circumplex. Adapted from Barrett and Russell (1998).................12

Figure 2. Control-value theory of achievement emotions. From Pekrun (2019)..........24

Figure 3. Online group activity. Adapted from Bates (2019)....................................34

Figure 4. Emotions investigated in online collaborative learning environments. From Reis et al. (2018)..........................................................................................38

Figure 5. Associations between ontology, epistemology, methodology, and research paradigm..................................................................................................................50

Figure 6. Comparative summary of four commonly used research paradigms. Adapted from Richardson (2018)........................................................................................................51

Figure 7. Convergent research design of mixed methods programme mapped with research questions. ..............................................................................................................57

Figure 8. Data analysis approaches............................................................................69

Figure 9. Survey items. ...............................................................................................87

Figure 10. List of example emotion-related words used in survey.............................88

Figure 11. Word cloud of the emotion-related categories used by students to describe emotions experienced when undertaking assessed, online, group activities (pleasant emotion-related categories: non-underlined; unpleasant emotion-related categories: underlined; unclassified/neutral emotion-related categories: *). ........................................91

Figure 12. Emotions reported by students before, during, and after assessed, online, group activities. ..................................................................................................................94

Figure 13. Hierarchical tree of the causes of pleasant emotions when undertaking assessed, online, group activities. .................................................................96

Figure 14. Hierarchical tree of the causes of unpleasant emotions when undertaking assessed, online, group activities. .................................................................97

Figure 15. Students’ perceptions of the impact of emotions on participation and performance in the assessed, online, group activities. .................................................106
**Figure 16.** Students’ perceived impact of emotions on participation and/or performance when undertaking assessed, online, group activities. (pleasant emotion-related categories: non-underlined; unpleasant emotion-related categories: underlined; unclassified/neutral emotion-related categories: *). ................................................................. 108

**Figure 17.** Students’ perceptions of whether they felt they were able to regulate, or manage, their emotions when undertaking assessed, online, group activities. ........... 113

**Figure 18.** Hierarchical tree of the emotion regulation strategies used by students when undertaking assessed, online, group activities. ................................................................. 114

**Figure 19.** Overview of the assessed, online, group activity, including timings of each diary entry. Group collaboration was planned to be completed between weeks 2 and 4. ........................................................................................................................................ 134

**Figure 20.** Stage of the assessed, online, group activity during each diary entry. ...... 144

**Figure 21.** Emotions experienced throughout the assessed, online, group activity. Note: The response format for emotions consisted of a 5-point Likert type scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Data from diary entries 1-4. ................. 147

**Figure 22.** Post-activity evaluation of the emotions experienced in the assessed, online, group activity. Note: The response format for emotions consisted of a 5-point Likert type scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Data from diary entry........................................................................................................................................ 148

**Figure 23.** Questions included in the two online discussion forum threads............... 189

**Figure 24.** Example interview questions. ................................................................. 191

**Figure 25.** Word cloud of the emotion-related categories used by tutors to describe students’ emotions when undertaking assessed, online, group activities (pleasant emotion-related categories: non-underlined; unpleasant emotion-related categories: underlined; unclassified/neutral emotion-related categories: *). ................................................. 196

**Figure 26.** Final thematic map (themes and sub-themes). ........................................ 198

**Figure 27.** Factors that influence students’ emotions* and their emotional expression#. ........................................................................................................................................ 217
Figure 28. Example emotional trajectory throughout an assessed, online, group activity. ........................................................................................................................................................................... 239

Figure 29. Individual and collective level emotions in assessed, online, group activities (↔ = sharing and convergence of emotions). ........................................................................................................... 241

Figure 30. Causes of emotions in assessed, online, group activities ......................................................................................... 243

Figure 31. Conceptual model of the causes of emotions, factors influencing emotions, subjective appraisals, and emotions in assessed, online, group activities...................................................................... 247

Figure 32. Potential consequences of relief and anxiety in assessed, online, group activities ........................................................................................................................................................................... 253

Figure 33. Emotion regulation strategies employed by students in assessed, online, group activities ........................................................................................................................................................................... 255

Figure 34. Emotion regulation goals pursued by students in assessed, online, group activities ........................................................................................................................................................................... 258
1 Introduction

The growing importance of online learning and distance education has been emphasised with the recent COVID-19 pandemic. At a time where many governments around the world ceased face-to-face education, educational institutions made use of online technologies to ensure the continuation of teaching, learning, and assessment. Even before the pandemic, however, there had been a huge growth in the provision of online instruction at all levels of education over the last two decades (Harasim, 2017). This rise has been particularly dramatic in higher education, with many universities now offering their educational provision online to learners globally (Morris et al., 2020).

The ways in which students learn online is also changing. For instance, traditional methods of online instruction, such as one-way transmission of knowledge from teacher to student, are being replaced by active learning which encourages interaction with fellow learners. As such, social and collaborative learning activities have become increasingly more prevalent in higher education online learning programmes (Garrison, 2021). At the OU, for example, online collaborative learning methods are advocated and used in many of their online courses (Evans & Galley, 2016).

There have been a number of reasons for these changes. First, they reflect advances in communications technology which afford educators opportunities to incorporate more progressive teaching methods into their online courses (often based on social-constructivist views of learning; Garrison, 2021). Second, they reflect reforms in educational policy aimed at improving the quality of teaching and learning in higher education (e.g., the Teaching Excellence Framework in the United Kingdom). Such reforms emphasise the importance of students learning through social interaction with others, rather than through individual acquisition of knowledge from their teacher. Third, the use of collaborative learning is thought to help equip learners with a range of employability skills, such as teamwork competencies, creative and critical thinking, and collaboration skills, which are seen as essential for working in the 21st century ‘knowledge age’ (Binkley et al., 2012).

The term ‘collaborative learning’ can be used to describe ‘…a variety of educational practices in which interaction among peers constitute the most important factor in learning, although without excluding other factors such as learning material and interactions with teachers’ (Dillenbourg et al., 2009, p.3). Although often used as an
umbrella term, collaborative learning has primarily been used in literature to refer to group activities where two or more students actively work together to solve problems and co-construct knowledge and understanding (Barkley et al., 2014). At the OU, for instance, a range of online collaborative activities are used for teaching and learning, such as paired working, informal group discussions, and cooperative group learning activities. One form of collaboration that is becoming more frequently adopted, is the use of assessed, online, group activities (Evans & Galley, 2016). These typically involve students working in small groups to create a product or artefact and will often be assessed on a number of criteria (e.g., a combination of individual and group marks for the process of working in a group and/or the overall quality of the final product) which will count towards a student’s overall module grade. These activities have been described by Donelan and Kear (2018, p.39):

Group projects generally require members to work together to create a final output or product. In an online learning setting, where building something physical is impractical, the output of group work typically takes the form of a report or wiki page, or a digital artefact, such as a website.

In an ideal scenario, such group activities would bring together individuals with diverse experiences, skills, and knowledge to solve complex problems. Group members would engage in: shared knowledge construction; coordination of different perspectives; commitment to joint goals; and shared evaluation of collective activities (Brindley et al., 2009; Dillenbourg et al., 2009). Not only would everyone respect and appreciate each other’s contributions, but they would also all feel valued by one another. Everyone would experience positive feelings and emotions from working as a group, and a sense of belonging and community would be fostered (Harasim, 2017; Kear, 2010). As a result, learners would be confident, motivated and satisfied, and the group’s achievements would be far superior to anything that could be accomplished by any one individual alone (Dewiyanti et al., 2007).

Unfortunately, online collaboration with such process and outcomes is not frequently observed and less positive experiences are often found (e.g., Capdeferro and Romero, 2012; Oliveira et al., 2011; Allan and Lawless, 2003). For example, at the OU, research has generally reported that students are less satisfied with student-centred teaching and learning which involve communication and collaboration (such as online group
activities), when compared with more assimilative learning approaches (e.g., learning activities involving reading, watching, and listening) (Rienties & Toetenel, 2016a). Evans and Galley (2016, p.2) also note OU students consistently highlight in interviews and surveys their preference for studying independently and their dislike of studying collaboratively.

Research in higher education has found that, instead of working as an effective team, some learners may experience various challenges that disrupt collaboration and learning in these online learning contexts. For instance, personality clashes (Donelan & Kear, 2018), confusion (Thompson & Coover, 2003), differences in goals and priorities (Capdeferro & Romero, 2012), challenges with commitment and time (Brindley et al., 2009), uncertainties of working with ‘strangers’ (Hilliard et al., 2020), and issues of ‘free-riders’ (Capdeferro & Romero, 2012) have all been highlighted in previous literature. Ultimately, these challenges may have the potential to increase group conflict, reduce satisfaction, increase unpleasant emotions, and have a detrimental impact on student engagement and learning (Capdeferro & Romero, 2012; Hilliard et al., 2020).

As highlighted above, it is evident that students may have varied emotional experiences when undertaking online collaborative activities in higher education settings. However, surprisingly, there is a lack of investigation that has specifically explored students’ emotions in these learning contexts, with much prior research tending to focus on students’ general learning experiences. Over the past two decades, research has highlighted the profound influence emotions can have on students’ learning, achievement, and wellbeing (Pekrun et al., 2018; Tyng et al., 2017). For example, pleasant emotions (such as enjoyment) can increase intrinsic motivation, promote creative and divergent thinking, and facilitate the use of more advanced learning strategies (Fredrickson 2001; Pekrun 2017). Conversely, unpleasant emotions (such as anxiety) can impede learning, cause students to drop out of their university course, and have damaging consequences on their physical and mental health (Pekrun et al., 2018). While the roles and functions of specific emotions have been found to vary, and the view presented above might be overly simplistic (Hascher, 2010), it does highlight the importance of emotions in academic settings as well as how crucial it is to be able to manage and regulate emotions in educational environments (Boekaerts & Pekrun, 2016).
Currently, there is little research exploring students’ emotional experiences in assessed, online, group activities. For example, questions regarding what types of emotions are commonly experienced and what causes them in these academic contexts, how do emotions impact participation and performance, and how do students regulate and manage these emotions have yet to be fully answered. Gaining a greater insight into this underemphasised and underexplored area of research will not only advance our understanding of emotions in online collaborative learning but will help practitioners to design and implement emotionally sound educational learning environments.

1.1 Overall Purpose, Research Questions, and Research Plan

The overall purpose of this research was to investigate students’ emotional experiences when undertaking assessed, online, group activities. To achieve this purpose, four main research questions were addressed:

1. What emotions do students experience when undertaking assessed, online, group activities?
2. What causes students to experience emotions in assessed, online, group activities?
3. How do emotions impact students’ participation and performance in assessed, online, group activities?
4. How and why do students regulate their emotions in assessed, online, group activities?

These four research questions were pursued using three interrelated research studies. All three studies were undertaken at the OU, which was viewed as an ideal research context due to its long history in distance education and online learning. Because of the scarce research investigating students’ emotional experiences in online collaborative settings, each study primarily took an exploratory approach. Exploratory research aims to explore and shed light onto topics that are not well understood (Punch, 2014) and has been recommended when researching students’ emotions in learning contexts that have received little prior investigation (Pekrun et al., 2002a).

Various self-report methods (e.g., surveys, diaries, and interviews) were used to gather both qualitative and quantitative data in the three studies, to address the four research questions. Gaining data through multiple self-report methods helped generate a more
comprehensive understanding and portrait of students’ emotional experiences than could be generated by employing one method alone. Although self-report methods have limitations, such as being limited to consciously accessible information and being subject to memory bias (e.g., Harley, 2015), these methods are routinely used when investigating emotions in educational settings (Pekrun, 2016) and are the only way of exploring students’ subjective experiences (e.g., the conscious component of an emotion, such as feeling happy or anxious) (Feldman Barrett, 2004). Furthermore, self-report methods were particularly necessary in this research due to the investigation of students’ emotional experiences in naturalistic, distance learning settings (i.e., authentic online collaborative learning activities being undertaken at the OU). Using other approaches, such as advanced physiological measures (e.g., electrodermal and cardiovascular responses; Mauss and Robinson, 2009) and behavioural measures (e.g., facial expressions and body posture; Jacob-Dazarola et al., 2016), would have proved extremely challenging, if not impossible, in these contexts. A brief overview of the purpose and rationale of each of the three studies included in this thesis is now provided.

**Study 1: Student survey**

This first study was designed to develop a descriptive understanding of students’ emotional experiences in online, group activities, from which the remaining two investigations could build upon. As this study aimed to capture the emotional experiences of a broad range of students, five modules were purposefully sampled from various faculties at the OU. Each module included an assessed, online, group activity (the details of these differed between modules). This study investigated students’ emotional experiences using a post activity online survey, which included a mix of qualitative and quantitative responses, in a cross-sectional research design (i.e., the type of research where data is collected at one time point).

**Study 2: Student diary**

Although the use of a cross-sectional survey in Study 1 allowed for an initial snapshot of students’ emotional experiences to be gained, this approach does have limitations (Pekrun, 2016). For instance, memory biases may be increased due to the extended
periods of time from when the emotion-eliciting situations occur to when participants are asked to recall information about these events (Bartlett & Milligan, 2015). Furthermore, it is not possible to accurately investigate temporal variations in emotional experiences using a one-off measurement (Hascher, 2008). As such, Study 2 aimed to overcome many of the methodological limitations associated with survey research by employing an online diary in a longitudinal research design. The repeated measurements involved in this approach helped reduce recall times and capture the fluctuating and dynamic nature of students’ emotional experiences, allowing temporal changes to be more accurately observed. As with Study 1, an exploratory approach was employed and both qualitative and quantitative data were gathered using a semi-structured online diary.

**Study 3: Tutor perspectives**

Whilst the first two studies explored students’ own perspectives of their emotional experiences, Study 3 aimed to investigate tutors’ perspectives of students’ emotional experiences. At the OU, tutors are responsible for teaching and supporting students as they study at a distance. By gaining tutors’ perspectives, it was hoped that a more complete picture of students’ experiences could be generated. Furthermore, it allowed for a comparison of findings with the two previous studies and, therefore, permitted the extent to which students and tutors views aligned to be gauged. This study adopted a qualitative research methodology and collected data using a two-phase, multi-method approach. In the first phase, data were gathered using online discussion forum threads; then in the second phase, qualitative interviews were undertaken. Tutors from the five modules used in Study 1 were used as participants in this research investigation.

1.2 **MRes Research Project**

Before outlining the structure of this thesis, it is important to highlight that this research was highly influenced by, and built upon, a Master of Research (MRes) project undertaken by the author of this thesis; this has since been published in Computers & Education (Hilliard et al, 2020). In this project, students’ experiences of anxiety when undertaking an online collaborative project were explored using an online survey and semi-structured interviews. The project aimed to investigate the causes of this emotion,
its impact on students’ participation and performance, and how students coped with this emotional state. This research project provided a detailed understanding of the prevalence and functions of anxiety in this learning setting, yet it was evident that many other emotions were experienced by students when taking part in the online collaborative activity. It was, therefore, viewed vital to explore students’ experiences of emotions more broadly. It was also clear that to progress research on emotions in online collaborative group settings, research approaches other than those which provide a snapshot at one point in time should be utilised (e.g., longitudinal methods). In doing so, it was thought that a more complete understanding of students’ emotions in these learning contexts could be gained.

1.3 Thesis Structure

This first chapter has introduced the main research topic of this thesis and has highlighted the overall purpose and research questions it aims to address. Furthermore, the research approaches adopted have been briefly outlined and details of the three interrelated studies have been provided. The structure of the remaining chapters within this thesis are now described.

Chapter 2: Literature review

Chapter 2 locates this thesis within existing literature, reviewing the theoretical and empirical work on which it is based. More specifically, general literature related to emotion and learning and the importance of emotions in online collaborative learning are discussed. This chapter also provides a critical review of the gaps in current knowledge, providing a rationale for the questions addressed by this research.

Chapter 3: Methodology

In Chapter 3, the philosophical and methodological foundations adopted in this research are outlined. This includes a justification for using a pragmatic and mixed methods approach as well as a discussion of the data collection and analysis methods employed in this project; more detailed descriptions of the specific methods and data analysis
techniques used in each study are included in their corresponding chapters (Chapters 4, 5, and 6). At the end of Chapter 3, a discussion of the main ethical considerations that were considered when undertaking this research project is provided.

**Chapters 4, 5, and 6: Methods, results, and interpretation**

Chapters 4, 5, and 6 describe the methods and findings of Studies 1, 2, and 3, respectively. More specifically, in each chapter, an overview of the specific research objectives each study aims to answer is provided. This is then followed by a description of the study context, participant information, research procedures, data collection methods, and data analysis techniques employed for that study. The findings of each investigation are then presented and their significance in relation to study objectives and wider theoretical and empirical work is discussed. Each chapter ends with a brief description of study limitations.

**Chapter 7: Discussion**

The final chapter brings together the findings from each of the three studies that comprise this thesis. Conclusions are drawn and novel contributions that advance existing understanding and knowledge are discussed. Furthermore, theoretical, methodological, and practical implications are provided, as are overarching limitations and suggestions for future research.

1.4 **Chapter summary**

This first chapter has provided a brief introduction to the topic of this research and outlined its overall purpose and structure. Altogether, this multi-study thesis aimed to gain an in-depth understanding of students’ emotional experiences in assessed, online, group activities. In doing so, the findings can be used by educators to create more affectively sound learning environments. Furthermore, this research sought to contribute, and expand, literature and theoretical understanding in the nascent field of emotions in social and collaborative online learning. In Chapter 2, a detailed literature review of the
main topics covered in this project is provided. This includes a critical evaluation of the gaps in current knowledge which have contributed to the research questions.
2 Literature Review

This literature review is split into two main parts. First, the term ‘emotion’ is conceptualised and the functions of emotions in academic learning settings are discussed. This part of the literature review also defines and explores the process of emotion regulation, discusses collective level emotions, and describes the control-value theory of achievement emotions (Section 2.1). Second, an overview of online collaborative learning is provided and the importance of emotions in these learning contexts is discussed. Key literature related to students’ emotional experiences in online group learning is also examined and gaps in current knowledge are highlighted (Section 2.2).

2.1 Emotion and Learning

2.1.1 Conceptualisation of emotion

Defining the term ‘emotion’ is an extremely difficult task, and currently there is little agreement across or within disciplines about how to best define this phenomenon. Although it is difficult to locate a precise definition, most researchers generally view emotions as episodes that are evoked by a stimulus in meaningful situations (Shuman and Scherer, 2014). For instance, a student may be anxious about an assessment they are completing for their degree, whilst a lecturer might be excited about the topic they are teaching in their lesson.

Consensus has also emerged that emotions are multifaceted, comprising various interrelated processes (Shuman & Scherer, 2014). According to Scherer (2005), three components considered central to an emotion episode are:

1) *subjective experience*, such as affective feelings of *happiness*, *anger*, *pride*, *frustration*, etc

2) *physiological arousal*, such as bodily changes and responses (e.g., increased heart rate, changes in breathing patterns, and increased muscle tension)

3) *motor expression*, such as specific facial expressions, body movements and vocal expressions

Although these three components have been long viewed as fundamental to emotions, additional components have also been advocated by some theorists. For instance, an *action-tendency* component (i.e., how emotions can motivate/trigger behavioural
impulses) and cognitive component (i.e., the evaluation/cognitive processing of objects and events) are both considered crucial by many researchers (see Moors, 2009). Despite consensus on the multi-componential form of emotions, it is evident that theorists have differing views about the importance of each component as well as which components are actually required for a phenomenon to be labelled an emotion.

To further conceptualise emotion, it is also important to distinguish features that differentiate this concept from other related psychological constructs. For instance, the terms ‘mood’ and ‘affect’ are often used interchangeably with the term ‘emotion’ in much research literature. Whilst emotions are thought to be relatively short-lived affective states that occur in response to a specific event or object, moods are often considered to be longer lasting, less intense, and lacking in a particular referent (e.g., generally ‘being in a bad mood’) (Rosenberg, 1998). Affect, on the other hand, is a more general term, and is thought to represent a superordinate category compiled of both emotions and moods (Pekrun et al., 2018).

Emotions can also be categorised by their temporality. State emotions are defined as momentary and transient (e.g., anxiety experienced before an important exam), whilst trait emotions refer to a more stable personality disposition that predisposes individuals to experience certain emotions when specific situations are encountered (e.g., a student’s dispositional tendency to frequently experience anxiety) (Shuman & Scherer, 2014). According to Pekrun et al. (2018), these specific trait tendencies can be used to help describe an individual’s overall personality (e.g., generally having a more calm or excitable personality).

So far, the form of an emotion, and how emotions differ from other similar constructs, have been introduced. This does not, however, explain how specific emotions differ from one another. One way to do this is to use a discrete emotions approach. This approach relies on words and expressions that describe distinct, separable emotional states, such as happiness, anger, surprise, and anxiety. It is thought that the language used to describe these states corresponds to the unique response patterns for each emotion (e.g., physiological responses and specific facial and vocal expressions) and can, therefore, be used to differentiate different emotions (Scherer, 2005). Alternatively, dimensional approaches use various dimensions to differentiate and classify emotional states (Hascher, 2010). For instance, two commonly used dimensions are valence (i.e., the
degree to which an emotion is pleasant or unpleasant) and arousal level (i.e., the degree to which an emotion is physiologically activating or deactivating) (Feldman Barrett, 1998).

Despite their distinctions, discrete and dimensional approaches do not have to be treated separately. For example, in Barrett and Russell's (1998) and Linnenbrink's (2007) circumplex models of affect, the intersection between the dimensions of valence and arousal level is used to describe four broad categories of affective states onto which discrete emotions can be projected (an example affective circumplex model is presented in Figure 1). These four categories are:

- pleasant activating (e.g., excitement, enjoyment)
- pleasant deactivating (e.g., relief, contentment)
- unpleasant activating (e.g., anxiety, anger)
- unpleasant deactivating (e.g., boredom, hopelessness)

Each discrete emotional state in these broad categories can vary in intensity (Linnenbrink-Garcia et al., 2016). The combination of these two approaches is frequently undertaken in research literature. For instance, it is quite common for discrete emotions to be assessed individually and then aggregated according to their superordinate dimension (Shuman & Scherer, 2014).

![Affective Circumplex Diagram](image)

**Figure 1.** Affective circumplex. Adapted from Barrett and Russell (1998).
As highlighted in the preceding discussion, defining emotion is a complex and challenging task. In this thesis, the primary focus is on transient state emotions that occur in response to specific events or objects, rather than emotions that are a dispositional tendency or a longer lasting affective state that have no specific reference object (i.e., moods). The following definition of emotion by Deci (1980, p.85) draws on many aspects of how emotion is conceptualised in this thesis:

An emotion is a reaction to a stimulus event (either actual or imagined). It involves change in the viscera and musculature of the person, is experienced subjectively in characteristic ways, is expressed through such means as facial changes and action tendencies, and may mediate and energize subsequent behaviors.

As described above, emotions will be conceptualised as episodes which consist of several interrelated psychological processes, including subjective feelings, cognitions, motivational tendencies, physiological processes, and expressive behaviour (Pekrun et al., 2018). For instance, a student about to undertake their first video-conferencing meeting as part of an online group project, might report subjective feelings of anxiety (affective component). These feelings may reflect thoughts of worry and concern about their ability to communicate clearly and to successfully contribute to the meeting (cognitive component). Such thoughts may evoke: a desire to avoid the situation (motivational component); increased heart rate (physiological component); and changes in facial expressions (expressive component).

This study also views the affective component of an emotion (i.e., subjective feelings) as an essential feature of an emotional episode. The subjective experience of an emotion reflects the unique mental and physical patterns (i.e., changes of the other components) experienced during an emotional episode (Scherer, 2005). Although other components may not be present when an emotion is instigated, the affective component is a necessary, core constituent (Pekrun et al., 2018). This component is also generally considered the conscious experience of an emotion (Scherer, 2005), which allows individuals to describe their emotional episodes (e.g., using verbal or written communication). This is essential when measuring emotions using self-report methods (Shuman & Scherer, 2014), which was vital for the research in this thesis. Some researchers do, however, believe that we may not be conscious for all of the emotions we experience and, therefore, it is sometimes not possible to describe all of our emotional experiences (Harley, 2015).
2.1.2 Academic emotions

Traditionally, educational research primarily focused on the cognitive factors of learning, whilst non-cognitive aspects, such as emotions, were often neglected (Pekrun et al., 2018). However, over the last two decades, much more attention has been paid to the affective and emotional aspects of learning. For instance, research has highlighted that students experience a multitude of emotions when participating in academic activities and these have been shown to be highly important for learning and achievement (Pekrun & Linnenbrink-Garcia, 2012). Contributing significantly to this research movement, has been the work undertaken by Reinhard Pekrun and colleagues (e.g., Pekrun et al., 2002a; Pekrun, 2006; Pekrun et al., 2007, 2018; Pekrun & Perry, 2014).

When distinguishing academic emotions, in addition to their valence and arousal level, Pekrun et al. (2002a) believe it is important to differentiate emotions by their object focus (i.e., the events and objects that trigger them). Accordingly, four broad categories of academic emotions have been identified:

1) achievement emotions, emotions linked to achievement activities and outcomes; (e.g., Pekrun, 2006)
2) epistemic emotions, emotions linked to knowledge and the generation of knowledge (e.g., Chevrier et al., 2019)
3) topic emotions, emotions linked to the contents of the learning material; (e.g., Broughton et al., 2013)
4) social emotions, emotions linked to other people and the interaction among people (e.g., Hareli and Parkinson, 2008)

In an assessed, online, group activity, for instance, achievement emotions would arise from the activity itself (such as enjoyment in relation to progress being made) or the outcome of the group activity (such as anxiety when thinking about the future grade for the activity, or pride at the quality of the work produced). According to Pekrun et al. (2002), the specific object focus of achievement emotions (activity vs outcome) can be combined with valence and activation dimensions to render a three-dimensional taxonomy of achievement emotions (see Table 1). Moreover, this taxonomy further classifies achievement emotions based on a time dimension. For instance, activity emotions are classified as concurrent emotions (i.e., an emotion experienced in the present moment),
whereas outcome emotions can either be prospective emotions (i.e., evoked by thinking about something in the future) or retrospective emotions (i.e., evoked by thinking about something that has already occurred).

Table 1. Three-dimensional classification of achievement emotions. Adapted from Pekrun et al. (2018).

<table>
<thead>
<tr>
<th>Object focus</th>
<th>Positivea</th>
<th>Negativeb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Activating</td>
<td>Deactivating</td>
</tr>
<tr>
<td>Activity/concurrent</td>
<td>Enjoyment</td>
<td>Relaxation</td>
</tr>
<tr>
<td>Outcome/Prospective</td>
<td>Hope</td>
<td>Reliefc</td>
</tr>
<tr>
<td>Outcome/Retrospective</td>
<td>Joyc</td>
<td>Contentment</td>
</tr>
<tr>
<td></td>
<td>Pride</td>
<td>Relief</td>
</tr>
<tr>
<td></td>
<td>Gratitude</td>
<td></td>
</tr>
</tbody>
</table>

aPositive = pleasant emotion. bNegative = Unpleasant emotion. cAnticipatory joy/relief

Epistemic emotions (such as confusion, surprise, and curiosity) are thought to occur more frequently in more novel and nonroutine contexts due to unexpected information and cognitive incongruity (i.e., the discrepancy between beliefs or pieces of information) (Boekaerts and Pekrun, 2016). In the group task, for example, these emotions may be evoked when ideas presented by another group member are different or contrasting to one’s own current beliefs or ideas.

Topic emotions may be triggered by the content and learning material covered in the group activity. For instance, the topic might arouse interest in one student or boredom in another. When compared with achievement and epistemic emotions, topic emotions do not relate to learning and problem solving (Pekrun & Linnenbrink-Garcia, 2012), however, they are thought to have a strong impact on student engagement by influencing interest and motivation (Ainley, 2007).

Social emotions could be evoked by general interaction and relationships with other students and teachers. These emotions are known as non-achievement related social emotions and can include feelings such as love and hate. Social emotions can also be evoked by the success or failure of other group members. These emotions are known as achievement-related social emotions. Examples include: admiration for a student who performed well in the activity; or sympathy for another student that received a low score.
for the task) (Pekrun et al., 2018). As highlighted in the examples provided, there is a clear overlap between social and achievement emotions. The exploration of social emotions has often been neglected in academic research, largely due to a greater focus on learning and performance in individual learning settings (e.g., when revising for, or undertaking, academic exams) (Pekrun et al., 2002a).

Classifying emotions by their object focus is clearly important for distinguishing the different emotional states that can be evoked when learning. The suitability of these four broad categories may, however, not be appropriate for the emotions experienced in all learning contexts. For instance, emotions experienced in online collaborative learning environments may result from other sources, such as the task environment and conditions (e.g., time constraints, technology) and factors that are entirely unrelated to the activities themselves (e.g., relationships, lack of sleep) (Webster, 2019). Therefore, it would be prudent to further explore the triggers of emotions in different learning contexts.

### 2.1.3 Functions of emotions for learning

Up to now, this literature review has described the form and classification of emotions. This, however, does not explain their function in academic settings, and more specifically, how emotions impact academic learning and achievement. Historically, emotions were viewed as a disruptive phenomenon in learning settings (Sylwester, 1994), and this often led scholars to ignore their potential impact (both positive and negative) on learning processes and human functioning (Artino & Naismith, 2015). As such, many theories of learning were developed which considered emotion and cognition as separable mental processes (Jones & Issroff, 2005; O’Regan, 2003).

The sharp distinction between cognition and emotion has, however, been challenged in recent decades, and it is now becoming increasingly apparent that both cognition and emotion are inextricably linked (Tyng et al., 2017). This drastic change in perspective has meant that emotions have taken a more prominent role in the study of human learning and development in the last two decades (Pekrun et al., 2018), and findings have continually highlighted their critical importance for students’ learning, achievement, and wellbeing (Pekrun et al., 2018).

Although the exact relationship between emotion and learning is still not fully understood, research has shown that emotions can have profound influences on a range
of cognitive, motivational, and regulatory processes that are imperative for academic learning and achievement (Pekrun & Linnenbrink-Garcia, 2012). For instance, Artino et al. (2012) contend that there are four primary pathways through which emotions can effect learning:

1) memory processes (i.e., memory storage and retrieval)
2) learning strategies (i.e., cognitive and metacognitive thinking strategies)
3) cognitive resources (i.e., attention and flow)
4) motivational processes (i.e., intrinsic and extrinsic motivation)

How specific emotions impact these functions is complex, however. For instance, it is too simplistic to presume that all unpleasant emotions will have negative effects on learning and achievement and that all pleasant emotions will have positive effects (Hascher, 2010). Whilst pleasant emotions have been found to increase motivation (Pekrun, 2006), enhance divergent thinking (Fredrickson, 2001), and encourage more advanced learning strategies (Linnenbrink & Pintrich, 2002), they have also been observed to reduce task focus and attention (Clore & Huntsinger, 2009) and suppress cognitive processing (Oaksford et al., 1996). And although unpleasant emotions have been found to reduce attention (Meinhardt & Pekrun, 2003), decrease motivation (D’Mello et al., 2014; Pekrun et al., 2002a), and increase processing of superficial information (Pekrun et al., 2010), they have also been found to promote deeper learning (D’Mello et al., 2013) and encourage the use of external regulation strategies (such as guidance from teachers and family) (Pekrun, 2017).

A common limitation of much existing research that has explored how emotions impact learning is that affective states have often been differentiated by their valence alone (i.e., pleasant emotions or unpleasant emotions) (Pekrun, 2011). As this is only one aspect of an emotion, it is necessary to distinguish other dimensions to gain a greater understanding of how emotions influence academic learning and achievement (such as the activation, intensity, or object focus of an emotion; Pekrun, 2011; Hascher, 2010).

Findings from research that has differentiated both the valence and activation of an emotion, have generally found that:

- pleasant activating emotions (such as enjoyment, hope, and pride) are beneficial for student learning. For instance, these emotions have been shown to foster
flexible learning strategies (Fredrickson, 2001) and enhance interest and motivation (Pekrun, 2006).

- unpleasant deactivating emotions (such as boredom, hopelessness, and disappointment) have detrimental consequences. For example, they have been found to decrease the motivation to learn (Pekrun et al., 2002a) and reduce task-related attention (Pekrun et al., 2011).

- the effects of pleasant deactivating emotions (such as relief, relaxation, and contentment) and unpleasant activating emotions (such as anxiety, frustration, and anger) are complex. For instance, whilst relaxation may enhance cooperative interaction when working in groups (Linnenbrink-Garcia et al., 2011), it may also reduce motivation and effort (Sweeny & Vohs, 2012). And although anxiety may decrease motivation in one student, it may increase it in another (Pekrun et al., 2011). It is, however, thought that any positive consequences of unpleasant emotions will probably be outweighed by their maladaptive effects (Pekrun et al., 2018).

The links between emotions and their impacts on academic learning are thought to be highly complex (Pekrun et al., 2018), and there are numerous factors which could affect this relationship. For example, the intensity of unpleasant emotions is thought to be particularly important in relation to whether these emotions promote or hinder learning (Rowe & Fitness, 2018). If an unpleasant activating emotion (such as anxiety) is experienced at too high or low an intensity, any potential facilitative benefits may be diminished, and it might lead to detrimental effects for everyone (Yerkes & Dodson, 1908).

### 2.1.4 Regulating emotion in academic settings

As highlighted in the preceding section, it is evident that some emotions can be helpful in educational settings whilst others can be harmful. As such, being able to effectively regulate, or manage, one’s emotions can be viewed as a crucial process in learning (Jacobs & Gross, 2014). The concept of emotion regulation can be defined as ‘…the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions’ (Gross, 1998, p.275). In other words, emotion regulation aims to influence the intensity, duration, or type of emotions we
experience (Jacobs & Gross, 2014). Typically, this will involve down-regulating unhelpful emotions (usually unpleasant emotions) and maintaining or up-regulating helpful emotions (primarily pleasant emotions). Emotion regulation is considered to be similar to the concept of coping (Lazarus & Folkman, 1984), with the terms used interchangeably in some research literature. Coping, however, is thought to be limited to the management and down-regulation of stress responses and unpleasant emotional feelings, whereas emotion regulation is a broader concept, encompassing the up-regulation and down-regulation of both pleasant and unpleasant emotional states (McRae & Gross, 2020).

Traditionally, emotion regulation research has focused on the regulation of one’s own emotions (known as *intrinsic* emotion regulation). Yet, in recent years there has been a growing interest in the regulation of others’ emotions (known as *extrinsic* emotion regulation) (Gross 2015). For instance, in social environments it is believed that individuals may want to regulate and influence the emotions experienced by others (Nozaki & Mikolajczak, 2020), such as a teacher offering emotional support to help improve the feelings of a student. There may also be instances where both *intrinsic* and *extrinsic* regulation occur in a single action. For example, student A may support and encourage student B, who is frustrated and not partaking in the collaborative activity, in order to prevent themselves (student A) from reacting negatively to student B’s lack of engagement.

Emotion regulation can be further classified as *intrapersonal* or *interpersonal* (Zaki & Williams, 2013). Intrapersonal regulation is the process of influencing one’s own emotional experiences with the absence of social interaction (e.g., by changing thoughts about a situation or exercising by oneself); whereas interpersonal regulation involves influencing the emotional experience of oneself, or other people, through social processes (e.g., seeking or giving social support) (Zaki & Williams, 2013). Although the boundary between these two categories is blurred, this research adopts the position that emotion regulation can only be classified as interpersonal if it involves the live presence of other people (Zaki & Williams, 2013). For instance, although imagining interacting with someone to reduce unpleasant emotions may seem like a social encounter, due to the absence of live others this would be classified as intrapersonal regulation.
Although emotion regulation is often viewed as a conscious, effortful, and controlled process (*explicit* emotion regulation), it can also be unconscious, effortless, and automatic (*implicit* emotion regulation) (Gross, 1998). For instance, a student experiencing *anxiety* about taking part in a group activity may explicitly use intrinsic interpersonal emotion regulation (e.g., seeking support from their teacher) in an attempt to reduce their unpleasant feelings. On the other hand, a student experiencing *frustration*, due to a lack of progress being made in the online task, may implicitly use intrinsic intrapersonal emotion regulation (e.g., increasing their effort and focus) to decrease their unpleasant emotions.

Despite the clear importance of emotion regulation in academic contexts, there is currently relatively little empirical evidence exploring this concept (Harley et al., 2019). This is especially the case in naturalistic settings where students are engaged with authentic academic tasks (Harley et al., 2019). From the research that does exist, most has investigated *how* students regulate their emotions (e.g., the emotion regulation strategies they employ) (e.g., Webster and Hadwin, 2015; Davis et al., 2008; Schutz et al., 2004). Such research has identified that students use a wide range of strategies to regulate their emotional states. For example, when investigating how students regulated their emotions during independent studying, Webster and Hadwin (2015) found that students used a vast number of cognitive (e.g., thinking positively, focusing on the task, or changing perceptions about the activity), behavioural (e.g., increasing organisation of the work, studying in different locations, or avoiding undertaking the task), and social (e.g., seeking help from peers or instructors or interacting with friends) regulation strategies.

Due to the vast number of ways individuals may regulate their emotions (e.g., Parkinson and Totterdell, 1999, identified over 150 distinct emotion regulation strategies), a number of taxonomies have been proposed to classify, and distinguish between, different groups of regulation strategies. These have often originated from general research on human emotions and have primarily taken an individual, or intrinsic, perspective; categorising strategies aimed at regulating one’s own emotions. Lazarus and Folkman (1984) differentiated between *problem-focused coping* strategies (i.e., those aimed to actively manage or resolve a situation, such as working harder, seeking help, and managing priorities) and *emotion-focused coping* strategies (i.e., those aimed at regulating or dealing with the emotional distress in the mind, such as seeking emotional support,
venting, wishful thinking, distraction, and withdrawal). Gross (1998, 2015) distinguished between five ‘families’ of emotion regulation that are initiated at various points of the emotion generative process (i.e., the experience of an emotional episode). The first four families (*situation selection, situation modification, attentional deployment, and cognitive change*) are considered ‘antecedent-focused’ as they occur before the emotional response. Whilst the fifth family (*response modulation*) is considered ‘response-focused’ as it occurs after the emotional response has developed.

As the field of emotion regulation has only recently started to explore extrinsic emotion regulation (Nozaki & Mikolajczak, 2020), there is currently extremely little research investigating this form of emotion regulation, especially in educational environments. Järvenoja et al. (2019) has, however, more recently explored the emotion regulation strategies employed by groups of higher education students when undertaking collaborative learning activities. This move away from investigating emotion regulation at a purely individual level and aimed to understand how groups of students regulated each other’s emotions. Four categories of group level emotion regulation strategies were identified: 1) increasing awareness of group members’ affective states; 2) encouraging group members; 3) socially reinforcing the positive socio-emotional atmosphere; and 4) task structuring, such as restoring on-task behaviour of unfocused group members.

Due to emotion regulation being a goal directed process, the reasons an individual has for wanting to regulate their, or others’, emotions will greatly influence when and how they do so (Tamir, 2016). It is, therefore, quite surprising that emotion regulation research has primarily focused on *how* people regulate emotions (i.e., the strategies they use) and not *why* they do so (i.e., the goals they pursue). A growing body of literature is, however, starting to emerge which explores the motives, or goals, individuals have for wanting to regulate emotions. As Tamir and Gutentag (2017, p.84) state, ‘…to promote adaptive emotion regulation, emotional experiences and behaviour, it is necessary to identify and understand what people want to feel, and why they want to feel that way’. Emotion regulation goals, therefore, involve both the ways an individual is trying to change their emotions (e.g., to amplify pleasant emotions or dampen unpleasant emotions) and the specific reason why they want to do this.

To distinguish between different types of emotion regulation goals, Tamir (2016) proposed a taxonomy that differentiates between *hedonic goals* and *instrumental goals*. 
Hedonic goals are aimed at changing the immediate ratio of pleasure to pain (Tamir, 2016). In most circumstances, this will involve increasing pleasant emotions and/or decreasing unpleasant emotions (referred to as a prohedonic regulation) (Augustine et al., 2010). For instance, a student who is in a bad mood may have the desire to increase immediate feelings of happiness. In contrast, there may be instances where individuals, want to increase or maintain immediate unpleasant emotions and/or reduce immediate pleasant emotions (known as in contrahedonic regulation). Yet, pursuing such goals is thought to be rare (Tamir, 2016). Whilst the purpose of hedonic goals is purely to change one’s momentary emotional experiences (e.g., a student may regulate their anxiety in order to feel less anxious), instrumental goals target other goals that will occur from a change in emotions. These will often relate to future, or long-term, outcomes (Tamir, 2016). For instance, someone undertaking an assessment requiring creative thinking, may be motivated to try and experience emotions that promote creativity; whereas someone who has to work in team with other individuals, may be motivated to experience emotions desirable in social situations.

2.1.5 Collective emotions and other group-level processes
So far in this literature review, emotions have predominantly been considered an individual level psychological phenomenon. For instance, a student’s emotions stemming from events and concerns that are personally meaningful to themselves (e.g., such as an individual’s own goals and desires). However, research (primarily undertaken in general team- and group-based contexts) has also highlighted that emotions may also be experienced at a collective level (Goldenberg et al, 2020; Barsade and Knight, 2015). For instance, this includes occasions where a group of individuals experience the same, or similar, emotions to one another, deriving from group-relevant events (Smith et al, 2007). These macro-level emotional states are thought to occur when individuals who belong to, and identify with, a group become mutually aware of each other’s emotions (e.g., through the expression or sharing of emotions) and when emotions converge and become synchronised between individuals (Goldenberg et al, 2020; Forsyth, 2021). For example, if a group of students are frustrated that they have not received a grade for their assignment and they discuss and share these emotions with one another, a collective sense of frustration may form if their emotions converge with one another. Although research has been exploring collective emotional states for over two decades, much of this work
has been undertaken in non-educational settings (Kelly and Barsbade, 2001). More recently, however, exploration of these group level emotional phenomena has started to be explored in face-to-face collaborative learning contexts (Törmänen et al., 2021).

In addition to the experience of collective level emotions, it has also been suggested that these macro-level phenomena may contribute to other group level processes (Goldenberg, 2020). For instance, it is thought that the experience of shared positive emotional states may lead to more pro-social interactions, stronger group cohesion, and enhanced group performance (Brasade and Knight, 2015). Conversely, negative collective emotional states may reduce levels of social cohesion, increase conflict between individuals, and lower vigour and effort (Forsyth, 2021). As highlighted here, it is believed that collective emotions can lead to both favourable and unfavourable group behaviours and outcomes.

There is currently less understanding about how collective emotions can be regulated (Goldenberg, 2020). Research is, however, starting to move away from solely focusing on how individuals regulate their own emotions, to how group members can work together to regulate a group’s overall affective state or socio-emotional atmosphere (Törmänen et al., 2021; Jarvenoja et al, 2019). For instance, in face-to-face group learning environments, research has shown that group members support the regulation of their peers’ emotions (co-regulation) and can work together in synchrony to support the groups socio-emotional atmosphere (socially shared regulation) (Jarvenoja et al, 2019). It is evident, however, that further understanding is needed into how these processes can help regulate collective emotional states. This will help answer questions such as how can unhelpful collective emotions be reduced and how can potentially useful collective emotions be enhanced?

2.1.6 Control-value theory

Due to the neglect of the concept of emotion in much education research up until the last two decades, few comprehensive theories exist regarding the structure and function of emotions in educational settings (Artino, 2012). This means that there has been a general disparity between the theoretical approaches used in much research undertaken in the field (Hascher, 2010). Over the last decade, however, Pekrun's (2006) Control Value Theory (CVT) of achievement emotions has become a widely adopted theory for analysing the antecedents and effects of emotions experienced in achievement and
academic settings (see Figure 2). Although originally developed from research exploring
the emotions of students in individual school learning situations (e.g., when studying or
taking tests), the CVT is increasingly being adopted as a theoretical framework for other
learning settings, such as in individual online learning contexts (Artino & Jones, 2012;
Butz et al., 2016) and social and collaborative online environments (e.g., Camacho-
Morles et al., 2019a; Camacho-Morles et al., 2019b).

**Figure 2.** Control-value theory of achievement emotions. From Pekrun (2019).
The CVT is used as the primary theoretical reference point throughout the thesis. However, due to the exploratory nature of this research, the CVT was primarily used when discussing and interpreting findings of each study, rather than being used to formulate research questions or guide methodological approaches and instrument design. Using the CVT in such a theory-driven approach would have narrowed the focus of this research, which, ultimately, would have meant that important aspects of student’s affective lives would have been overlooked.

The CVT is primarily based on appraisal theories of emotion, which postulate that ‘emotions are elicited and differentiated on the basis of a person’s subjective evaluation and appraisal of the personal significance of a situation, object or event on a number of dimensions or criteria’ (Scherer, 1999, p.673). Put more simply, emotions are not provoked by situations themselves but rather by how we interpret situations; these interpretations are known as ‘cognitive appraisals’ (for a detailed overview of appraisal theory, see Moors et al., 2013). The CVT also draws on assumptions from various other theoretical perspectives, such as attributional theories (e.g., Weiner, 1985), theories of perceived control (e.g., Perry, 2003), theories of motivation (Wigfield & Eccles, 2000), and theories related to the effects of emotions on learning and performance (e.g., Fredrickson, 2001). As such, this theory provides an integrated and comprehensive framework that not only addresses the origins of achievement emotions but also their situational specificity, functions, and regulation (Pekrun & Perry, 2014).

Although various non-cognitive factors can evoke emotions (such as neurohormonal processes and physiological feedback from the autonomic nervous system), the CVT identifies cognitive appraisals as playing a major role in the arousal of achievement emotions. Previous research suggests that there are various appraisal dimensions important for human emotions (e.g., goal relevance, goal importance, agency, novelty, expectedness, so on; Moors et al., 2013), however, Pekrun (2006) postulates that the appraisals of perceived control and perceived value are most important for evoking achievement emotions (see Figure 2). Perceived control refers to appraisals of control over achievement-related activities and outcomes (Pekrun & Perry, 2014). These appraisals relate to expectations (e.g., task-specific self-efficacy and self-confidence), causal attributions (e.g., the causes of success on a recent exam), and competence perceptions (e.g., self-concepts of ability). Perceived value, on the other hand, pertains to the perceived importance of achievement activities and outcomes. Value appraisals can
be intrinsic (e.g., an innate interest in a specific subject) and extrinsic (e.g., valuing the external reward that can be gained from undertaking an activity). The CVT, therefore, asserts that students’ achievement emotions are determined by their control and value appraisals of academic activities and outcomes.

In accordance with the CVT, different combinations of control and value appraisals will generate different achievement emotions. For instance, *enjoyment* during an activity is proposed to be aroused when a student is interested in the material they are studying (i.e., high intrinsic value) and feels competent in mastering the topic they are learning (i.e., high competence/control). If, however, the activity the students are taking part in lacks any intrinsic value, then *boredom* is predicted. The prospective outcome emotions of *anxiety* and *hope* are thought to be experienced in situations that are of high subjective value (e.g., when undertaking an important exam) but when there is uncertainty over the outcome (i.e., lack of control). The attentional focus for *anxiety* will be on anticipated failure, whereas for *hope*, it will be on anticipated success. Anticipated *hopelessness* and *joy* are proposed to be aroused when there is either a perceived lack of control (*hopelessness*) or a high degree of perceived control (*joy*). The retrospective outcomes emotions of *relief* and *disappointment* are thought to depend on the match between expectations and the outcome. For instance, *relief* will arise when anticipated failure does not occur and *disappointment* will be evoked when anticipated success does not transpire. A number of retrospective outcome emotions are also thought to be induced by whether success or failure is attributed to oneself (i.e., *pride* and *shame*) or others (e.g., *gratitude* and *anger*). Frenzel and Stephens (2013) and Pekrun (2006) provide a detailed overview of typical appraisal combinations for achievement emotions.

The CVT does not assume that all appraisals are made consciously (Pekrun & Linnenbrink-Garcia, 2012). Instead, academic activities and situations that are repeated over time can lead to instances where appraisals become routinized and autonomic (Pekrun & Linnenbrink-Garcia, 2012). This repetition means that emotions can be generated without conscious cognitive appraisal. For example, when a teacher announces that “everyone will have to present their work in front of the class today”, many students will automatically become anxious with little to no conscious cognitive appraisal.

Whilst cognitive appraisals are thought to be proximal determinants of achievement emotions, several other individual factors are theorised to effect emotions by first
influencing control and value appraisals. For instance, achievement goals, gender, beliefs, trait emotions, and cognitive abilities (Pekrun & Perry, 2014) are all considered distal antecedents of achievement emotions. For instance, gender-linked stereotypes of competencies are expected to influence appraisals which will in turn lead to differences in achievement emotions. This is thought to help explain differences between male and female students in different academic domains. For example, research has identified that female students report experiencing more unpleasant emotions in mathematics than males (Frenzel et al., 2007; Goetz et al., 2013). These differences have been shown to be mediated by female students’ lower self-concepts of ability and lower intrinsic value of mathematics.

Similarly, the CVT also postulates that the control and value appraisals, and ultimately achievement emotions, can be influenced by academic task demands and the learning environment. For instance, the cognitive quality of the tasks (e.g., structure, clarity, and difficulty), autonomy afforded by the learning environment (e.g., meeting students’ needs for autonomy), composition of student groups (e.g., being in a high- or low-achieving class), and feedback during learning (e.g., from the teacher) may all be influential (see Figure 2; Pekrun and Perry, 2014).

As highlighted earlier, the CVT also proposes how achievement emotions impact learning and achievement (see Pekrun and Linnenbrink-Garcia, 2012, for an overview). More specifically, this theory differentiates how pleasant activating, pleasant deactivating, unpleasant activating, and unpleasant deactivating emotions influence:

- **cognitive** mechanisms of learning (i.e., the availability of cognitive resources enabling individuals to focus attention on achievement tasks)
- **motivational** mechanisms of learning (i.e., interest and motivation to perform tasks)
- **behavioural** mechanisms of learning (i.e., use of learning strategies and self-regulation of learning).

Similar to the discussion on the functions of emotions in Section 2.1.3, positive activating emotions (e.g., enjoyment and pride) are expected to have positive effects, whereas unpleasant deactivating emotions (e.g., boredom and hopelessness) are theorised to have negative effects. The effects of pleasant deactivating (e.g., relief and relaxation) and
unpleasant activating emotions (e.g., *anxiety* and *anger*) are thought to be more variable, with potential beneficial and detrimental impacts.

Another important aspect proposed by the CVT is that the learning environment, appraisals, emotions, and achievement are linked through reciprocal causation (see Figure 2). As highlighted previously, learning settings are thought to influence control and value appraisals which in-turn instigate emotions and these emotions can impact learning and achievement. However, emotions can also affect appraisals and the learning environment. For instance, experiencing pleasant emotions may lead to more optimistic appraisals, whereas unpleasant emotions undermine control and value judgements. In relation to the motivational quality of the learning environment, students’ and teachers’ emotions can reciprocally influence each other. For example, a teacher’s *enjoyment* can influence *enjoyment* in their students, and a student’s *enjoyment* can in turn evoke pleasant emotions in their teacher. This suggests that students’ and teachers’ emotions are often inextricably intertwined; this may be explained by the mechanism of emotional transmission/contagion (Frenzel et al., 2018; Frenzel et al., 2009). Achievement outcomes can also reciprocally influence emotions, appraisals and the learning environment (Pekrun & Perry, 2014).

The CVT also acknowledges the regulation of achievement emotions. It is proposed that emotion regulation can be targeted at any element in the CVT (see Figure 2). For instance, this includes the emotions themselves (e.g., using relaxation techniques or drugs to cope with anxiety), control and value appraisals (e.g., by reappraising one’s performance as being successful), the task and learning environment (e.g., by selecting and designing tasks and learning environments that foster adaptive emotions), and one’s own competencies (e.g., training and acquisition of learning-related skills and competencies that are needed for academic success).

Despite the predominant use of the CVT as the theoretical framework of emotions in educational settings, there are a number of reasons that this theory (in its current form) might not be suitable for explaining emotions in all educational settings, such as assessed, online, group activities. Firstly, the CVT has largely been developed using research in individual learning situations (e.g., when studying or taking tests) at school level. How achievement emotions function in, for instance, highly social learning contexts (e.g., when working collaboratively with others) and higher education contexts might be vastly
different. Secondly, the CVT has been specifically proposed for achievement emotions (Pekrun, 2006). As such, its relevance and application to other academic emotions (i.e., social, epistemic, and topic emotions) is not yet fully understood. For example, although control and value appraisals may play an important role for achievement emotions, other appraisals may also be of high importance for other types of academic emotions (Rowe & Fitness, 2018). For instance, it is believed that appraisals of novelty and cognitive incongruity may be primary triggers of epistemic emotions (Chevrier et al., 2019) and social relationships may be an important appraisal for social emotions (Pekrun, 2019b). Furthermore, how these other types of academic emotions impact learning and achievement is relatively unknown. Thirdly, as with many emotion theories, the CVT views emotions as individual psychological processes. This does not acknowledge or explain how people may experience emotions together in social situations, at a shared, collective level (Goldenberg et al., 2020). Finally, the suitability of the CVT in non-traditional academic learning settings (e.g., online learning environments) has also been questioned (Artino, 2012).

2.2 Emotion and Online Collaborative Learning

2.2.1 Online learning

Before outlining what is meant by the term ‘online learning’, it is prudent to start this section by briefly discussing, and defining, the term ‘distance education’. Distance education can be defined as:

…teaching and planned learning in which teaching normally occurs in a different place from learning, requiring communication through technologies as well as special institutional organisation.’

(Moore and Kearsley, 2012, p.2)

This definition highlights a number of important characteristics of the distance education process:

1) the separation of students and teachers for the majority, or the entirety, of teaching and learning

2) the requirement of communication mediated through technologies
3) the importance of special organisations (e.g., educational institutions) in the planning and delivery of teaching and learning

Although distance education is of high relevance in today, and its importance has been significantly emphasised during the COVID-19 pandemic, the origins of this pedagogical approach can be dated back to the 18th century (Bozkurt, 2019). From this time onwards, it is thought that distance education has gone through three ‘ages’ (Bozkurt, 2019; Garrison, 1985); each of which has primarily been shaped by technological advances and changes in pedagogical approaches. The first age of distance education is known as ‘correspondence study’. In this age, paper-based learning materials were sent to students using the postal service and students would send their written assignments back to their instructors for grading and feedback. The second age of distance education, known as ‘visual-auditory’, was defined by the use of audio (e.g., radio) and visual-auditory (e.g., television) technology. These technologies not only allowed for faster delivery of learning materials and increased the immediacy of the learning process but also afforded education institutions the potential to deliver distance education to ever increasing numbers of students (Bozkurt, 2019). The pedagogy adopted in the first two ‘ages’ of distance education were often teacher-centred and characterised by behaviourist models (e.g., using teacher-centred approaches to develop associations between stimulus and response) and cognitivist models (e.g., using self-directed activities to internalise new information in relation to existing knowledge) of learning (Anderson & Dron, 2011). This meant students often learned with little or no interaction with other students.

In the third age of distance education, developments in digital computing technology (such as the Internet) enabled such interaction between students to take a central focus in the learning process, and therefore, independent study is no longer a necessary option (Garrison, 2021). As such, teaching and learning in this computer-based generation has a greater focus on social-constructivist theories of learning, based on the ideas of Vygotsky (1978), Piaget (1959), and Dewey (1897). These view social interaction between learners as central to the construction of knowledge, rather than the necessity of acquiring facts and information directly from the teacher (Anderson & Dron, 2011). These changes have transformed distance education from purely teacher-centred (traditional classroom) to student-centred.
This third age of distance education has become the most popular form in the 21st century (although correspondence study and visual-auditory forms are still being used) and is often referred to as ‘online learning’ (Garrison, 2021; Kovanović et al., 2015). Although various definitions have been proposed, online learning will be defined here as:

…a form of distance education where technology mediates the learning process, teaching is delivered completely using the Internet, and students and instructors are not required to be available at the same time and place. It does not include more traditional distance education instruction methods, such as print-based correspondence education, broadcast television or radio, videoconferencing in its traditional form, videocassettes/DVDs and stand-alone educational software programs.

(Kovanović et al., 2015)

The opportunities afforded by online learning, such as being able to reach vast numbers of students located all around the world (many of whom may not have access to more traditional forms of teaching and learning) and offering students greater flexibility to study where and when they like, have meant that this special form of distance education has been increasingly adopted by many higher education learning institutions in Europe and beyond in recent years (Morris et al., 2020). At the OU, for instance, many degree courses are now offered almost fully online, with students learning through various synchronous and asynchronous modes of teaching and learning (The Open University, 2021a). Synchronous teaching involves both the teacher and the learner(s) being present at the same time, such as using video-conferencing and instant messaging, whereas asynchronous teaching involves learners working through online study material and activities in their own time and communicating with other students and their teacher via online discussion forums, email, and wikis.

The importance of online learning provision has also recently been emphasised due to the COVID-19 pandemic and the closure of university campuses for significant periods of time. This led many traditional higher education institutions to migrate all teaching, learning, and assessment into online domains (Watermeyer et al., 2020).
2.2.2 Online collaborative learning

The advances in digital computing technologies and the adoption of constructivist approaches to learning have led to a specific form of constructivist teaching being developed in distance education, commonly referred to as ‘online collaborative learning’ (Bates, 2019). Harasim (2017, p.117) defines this learning model as:

…educational applications that emphasize collaborative discourse and knowledge work mediated by the Internet; learners work together online to identify and advance issues of understanding, and apply their new understanding and analytical terms and tools to solving problems, constructing plans or developing explanations.

Online collaborative learning is used to describe a variety of educational practices in which students are encouraged and supported to interact online and work together to create and enhance knowledge and understanding (Reeves et al., 2004). This approach stresses that learners are not passive in the acquisition of knowledge (e.g., one-way transmission of information from teacher to student) but rather they play an active role in this process. They are encouraged to explore ideas with other students, participate in group discussions, ask and answer questions, search for information, share thoughts and opinions, and solve problems together. Online collaboration is similar to face-to-face collaborative learning; however, students ‘meet’ and communicate online using synchronous and asynchronous communications methods.

The inclusion of online collaborative learning methods in higher education online courses is becoming increasingly prevalent (Harasim, 2017; Järvelä et al., 2015). At the OU, for instance, this educational approach has been advocated and adopted by many courses (Cross et al., 2012; Rienties & Toetenel, 2016b). Students will often be encouraged to participate in forum discussions, and synchronous tutorials, take part in paired working, and undertake small group activities and projects. One form of online collaborative learning that is becoming more frequently adopted at this distance education institution, is the use of assessed, online, group activities (Evans & Galley, 2016). This form of online learning typically involves students working in small groups to create a product or artefact. Students will then be assessed on a number of criteria (e.g., using a combination of individual and group marks for the process of working in a group and/or the overall quality of the final product) and their mark will count towards their overall grade.
Figure 3 illustrates an example of the structure and organisation of an online group activity. In this example, the tutor has organised their class of 15 students into four groups. The tutor is able to communicate with individual students, each group, and the class as a whole using various communication methods. Students will predominantly interact with members of their own group and these discussions will often be ‘closed’ off from other learners in the class. There may, however, be occasions where groups are encouraged to interact with one another (for instance, when peer reviewing another group’s work), and these discussions can take place in either ‘open’ or ‘closed’ discussion areas. In this model, interaction can be achieved using asynchronous (e.g., via online discussion forums) and/or synchronous (e.g., using videoconferencing or instant messaging) communication methods. A combination of these approaches offers many benefits (Kear, 2011). For instance, asynchronous communication methods help overcome issues of spatial separation (for instance, even if learners are separated by distance, they can still communicate with one another) and separation by time (for instance, learners can still interact even if they are not available at the same time). Whereas synchronous methods allow students to jointly carry out activities, share ideas, and support each other in real time.
Although research has shown that online collaborative learning can have many benefits, it has also highlighted that it can present numerous challenges and is often viewed in a less than positive light by students (Robinson, 2013).

In terms of the benefits, research has shown that this type of learning approach can lead to deep and transformative learning (Bates, 2019; Garrison, 2021). Online collaboration affords opportunities for knowledge to be co-created and shared among peers (Brindley et al., 2009) and if applied appropriately can be effective at producing positive learning outcomes (Means et al., 2009). This online learning approach has also been shown to have a positive impact on student retention in online courses. At the OU, for instance, meaningful communication has been identified as a key element that directly contributes to students remaining on, or completing, their course (Rienties & Toetenel, 2016a). Another benefit of learning collaboratively online is that it can help develop a range of employability skills, such as teamwork competencies, creative and critical thinking, and collaboration skills, which are seen as essential for working in the 21st century.
‘knowledge age’ (Binkley et al., 2012). It can also foster social relationships and trust among students, and with their teachers (McCabe and Gonzalez-Flores, 2017), as well as promote a sense of belonging and community (Barkley et al., 2014; Kear, 2011). This can help reduce feelings of isolation and loneliness that can stem from learning independently in online environments (Jones & Issroff, 2005; Zembylas, 2008).

The challenges of online collaborative learning in distance education settings can, however, counteract these benefits. First, students may be resistant to collaborative learning (Barkley et al., 2014). Many students choose to study online due to having additional commitments (e.g., employment and caring responsibilities) and the need for maximum study flexibility. Due to the shared discussion, planning, and creation often involved in collaborative activities, students may feel that their study flexibility has been reduced. Additionally, some students may be reluctant to take part due to their preference for working independently and not having to interact and rely on others.

Second, there may be issues related to low levels of participation and interaction. For instance, research has highlighted that there can often be unequal participation when collaborating online, with some students taking less of an active role than others (Capdeferro & Romero, 2012; Hilliard et al., 2020). When undertaking online group activities (especially those that are assessed), this can be especially problematic. For instance, if a group member ‘disappears’ and stops participating in a collaborative group task, other group members may become extremely frustrated, which may impact their overall learning and achievement. A lack of communication between group members also defeats the purpose of this learning model, which is dependent on meaningful interactions (Harasim, 2017).

Third, working collaboratively may lead to conflict between group members. For instance, personality clashes (Donelan & Kear, 2018), differences in goals and priorities (Capdeferro & Romero, 2012), challenges with commitment and time (Brindley et al., 2009), and issues of working with ‘free-riders’ (Capdeferro & Romero, 2012) all have the potential to cause confrontations between students. If such disagreements are not properly resolved, they might diminish the effectiveness of working and learning collaboratively online with other students.

Finally, the collaborative process can take more time than working independently. This is especially true in distance learning settings using asynchronous modes of
communication as there are often delays between interactions. Furthermore, if students have never communicated or worked together before, there may be an initial ‘forming’ stage where students get to know one another (Tuckman, 1965).

2.2.3 Importance of emotions in online collaborative learning

So far, Section 2.2 has provided a brief overview of distance education, online learning, and online collaborative learning. Discussion will now focus on what is currently known about emotions in online collaborative learning contexts.

With the increasing prevalence of online learning in higher education, as well as an increased interest in the affective aspects of learning in general, the investigation of emotions in digital and online learning environments has grown significantly over the last two decades (Henritius et al., 2019).

Whilst early research in this nascent field often viewed online education as less emotional, more impersonal, and lacking emotional richness when compared to traditional, face-to-face learning contexts (Rice & Love, 1987; Vrasidas & Zembylas, 2003), research has increasingly highlighted that rich emotions are commonly experienced in these learning settings (e.g., Beirne et al., 2018, 2021; Graesser, 2019; Loderer et al., 2020; Reis et al., 2018). Furthermore, with the advances in computing and communication technologies (such as video communication and the development of emoticons and emojis), the affective richness of these settings has been significantly enhanced. As such, it has been claimed that there are few differences between the emotions experienced by students in online settings compared to those experienced in face-to-face contexts (Daniels & Stupnisky, 2012). It has also been recognised that, like face-to-face settings, emotions play a powerful role in terms of learning, engagement, and achievement in online contexts (Artino, 2012).

A growing stream of research is emerging exploring students’ emotional experiences in social and collaborative online learning environments (e.g., Camacho-Morles et al., 2019b; Capdeferro & Romero, 2012; Hilliard et al., 2020; Pietarinen et al., 2018; Robinson, 2013). Although this field of research is still scarce and underexplored, the presence and importance of emotions has been evidenced (Cleveland-Innes & Campbell, 2012). For instance, research has shown that emotions can not only have a great impact
on how students’ interact and collaborate with one another but also on their overall performance in online collaborative tasks (Hilliard et al., 2020; Robinson, 2013).

Despite these findings, the role and functions of emotions are still notably missing, and are often completely neglected, in theories and models of social online learning. For example, in Harasim's (2012, 2017) Collaborativist theory, there is currently no indication of what emotions students may experience when undertaking online collaborative learning and how emotions can impact learning and achievement. There is also little recognition of the importance of emotions in the widely adopted Community of Inquiry (CoI) (Garrison et al., 2000). Although, more recently, Garrison (2017, p.41) has noted that emotion can be viewed as the ‘gravity’ of the framework, due to its pervasiveness, ability to hold things together, and role in guiding judgement, decision making, and cognition. When discussing Connectivism, Siemens (2006) also contends that emotions, along with cognition, perception and belief, are enablers for the creation of knowledge and knowledge navigation. However, like Garrison (2017), there is a lack of explanation about how emotions specifically influence learning.

It is clearly evident that further research is needed to better understand the pervasive role of emotions in online collaborative learning environments (Cleveland-Innes & Campbell, 2012; Garrison, 2017). It is also clear that greater integration of, and emphasis on, emotions is needed in theories and frameworks of social online learning. These points are highlighted by Garrison (2017, p.40), who asserts that enhancing the awareness of importance of emotions in online environments as well as the development of emotional theory, will lead to greater understanding of emotions and more effective learning in online communities of inquiry.

2.2.4 Current understanding of emotions in online collaborative learning

In the remainder of this chapter, literature relevant to emotions in online collaborative learning contexts is examined. This primarily focusses on assessed, online, group activities undertaken in higher education; however, due to the scarcity of research in this area, other relevant literature is occasionally drawn upon (e.g., in non-assessed online collaborative activities, face-to-face group work, or with other student populations). The following specific areas are discussed:

1) the range of emotions experienced by students in online collaborative settings
2) the causes of students’ emotions in these contexts
3) the impact of emotions on students’ participation and performance
4) the regulation of students’ emotions when working collaboratively online

Range of emotions experienced

There is currently limited research exploring the types and occurrence of emotions experienced by students in online collaborative learning contexts. For instance, from the 58 papers identified in a systematic review exploring affective states (defined as emotions, moods, and personality traits) in online collaborative learning environments, only 17 were found to list emotions (Reis et al., 2018). From these, a total of 45 terms were used to describe the specific emotional states experienced by students in these learning contexts. The most frequently mentioned are shown in Figure 4.

![Emotions investigated in online collaborative learning environments. From Reis et al. (2018).](image)

A number of studies have explored the emotional aspects of undertaking online collaborative activities in traditional, face-to-face learning settings. For instance, Webster (2019) explored the emotional states of undergraduate students who were undertaking an in-class computer-supported collaborative learning assignment. Emotions were measured using a context-sensitive emotion awareness and regulation tool (the Socio-Emotional
Sampling Tool; SEST) which involved participants self-reporting their feelings at three time-points during the collaborative assignment (once at the beginning, once at the mid-point, and once at end). Students were asked to select one emotion that best represented how they were feeling about the activity from a list consisting of six pleasant emotions (excited, optimistic, confident, happy, focused) and six unpleasant emotions (anxious, worried, stressed, doubtful, frustrated/angry). Results revealed that students reported more pleasant than unpleasant emotions at all three time-points. Overall, feelings of confidence and optimism were the most commonly reported pleasant emotions, whilst feelings of anxiety and stress were the most frequently reported unpleasant emotions.

Although the above research provides useful insights into the specific discrete emotions experienced by students when undertaking online collaborative learning in an in-class environment, these emotional states may be very different to those experienced in assessed, online, group activities in distance learning settings. As D’Mello et al. (2013) note, affective states, such as emotions, will depend on the nature and context of the learning environment in which students are studying.

From the scarce research that has explored students’ emotions in these unique learning contexts, there is a general view that more unpleasant emotions are experienced by students than pleasant emotions (Allan & Lawless, 2003). For example, in prior research undertaken by Hilliard et al. (2020), anxiety was found to be commonly experienced by undergraduate OU students before and during an 8-week assessed group project. Capdeferro and Romero (2012) also found that adult learners experienced high levels of frustration when undertaking online collaborative activities in a distance learning master’s degree course. Previous research has, however, also found that students experience pleasant emotions in these learning environments. For example, when exploring OU students’ experiences of undertaking an assessed group project, Donelan and Kear (2018) identified that many students had positive learning experiences, with the emotion of enjoyment often being reported.

After reviewing existing research in this area, as well as research exploring students’ emotional experiences in other forms of social and collaborative online learning, it is evident there has been a tendency to use cross-sectional research designs (e.g., one-off interviews or questionnaires) and to either explore one specific emotion or a pre-defined set of emotions (usually based on a theoretical framework or emotions investigated in
previous research). This may, ultimately, limit the understanding of emotions in these environments. For example, such approaches may miss the fluctuating and dynamic nature of emotions over the course of these activities as well as neglect emotional states that may be highly prevalent and/or important in these contexts.

Furthermore, as with much emotion research, there has been a dominance of inquiry investigating unpleasant emotional states. This could be due to a number of reasons, such as: their pervasiveness in these learning settings; students being more likely to voice unpleasant emotions compared to pleasant emotions (for example, to seek help); and researchers’ natural desire to find solutions to problems affecting wellbeing (e.g., wanting to understand what causes anxiety and frustration to support and help students) (Fredrickson, 2001). Gaining a greater understanding of the broad range of emotions that are experienced (both pleasant and unpleasant), and how these emotions change over time, is, therefore, vitally important to fully understand students’ emotional experiences of working in these unique learning contexts. The first research question adopted by this thesis was therefore: **RQ1: What emotions do students experience when undertaking assessed, online, group activities?**

**Causes of emotions**

In addition to understanding the types of emotions experienced by students in these learning contexts, it is also important to explore the causes of emotions. As Wosnitza and Volet (2005) highlight, developing such insight, especially into the causes of unpleasant emotions, is vital for effective educational interventions and the development of emotional sound learning environments. Although the importance of exploring the causes of students’ emotions in educational settings has been long emphasised (e.g., Pekrun et al., 2002), and calls for such research in social and collaborative learning contexts have been issued (Camacho-Morles et al., 2019b; Volet et al., 2019), there is currently limited empirical inquiry investigating this topic in collaborative settings (in either face-to-face or online contexts). Furthermore, research that has explored this topic is quite dated, and, therefore, does not take into account changes in online learning environments as well as technological advances that have occurred in recent years.

In a face-to-face computer-supported collaborative learning setting, Järvenoja and Järvelä (2005) explored the explanations given by secondary school students about the sources
of their emotions. From interviews conducted before and after lessons, five primary sources of emotions emerged, namely: 1) self (i.e., previous experiences, self-belief); 2) task (i.e., elements of the task itself); 3) performance (i.e., progress or performance in the collaborative activity); 4) context (i.e., the pedagogical model, teacher’s instructions); and 5) social (i.e., interaction and comparison with others). The authors found that emotional experiences were primarily self or context driven, particularly at the beginning of the collaborative activities, whilst task, performance, and socially driven emotions were less frequently reported.

Wosnitza and Volet (2005) identified similar origins of students’ emotions in social online learning situations. Based on results from their earlier research with school and university students, the authors described that emotions may emerge from: oneself (e.g., internal attributions), the task (e.g., task features and demands), and technology (e.g., the online learning medium). Additionally, due to the social context of the learning activities, emotions can also stem from other people (e.g., students and teachers). More specifically, Wosnitza and Volet (2005) note these social emotions can be caused by one other person (I-s/he emotions), the group to which the student belongs, or at another group his/her group is interacting with (I-them emotions). Furthermore, these socially related emotions may also be generated by one learner on behalf of the group of learners they are a member of (Us-them emotions).

The causes of emotions highlighted by both Järvenoja and Järvelä (2005) and Wosnitza and Volet (2005) were also similar to those reported by Vuorela and Nummenmaa (2004), who explored the sources of undergraduate students’ in a five-week collaborative online course. After analysing open-ended questionnaire responses, five categories of the causes of emotions were identified. These were: 1) the web-based collaborative learning environment; 2) the functionality of technology; 3) the course as a whole; 4) interacting and collaborating; and 5) external factors (i.e., factors not related to online collaboration). The authors noted that social interactions between students were a prevalent cause of emotional reactions in these learning contexts and were much more frequently mentioned than technical aspects of the learning setting (i.e., the web-based environment and the technologies used). This contrasts with the findings of Järvenoja and Järvelä (2005), who found that socially related emotions were the least reported source of emotion. These differences may be explained by the different learning contexts (web-based collaborative learning vs. in class computer-supported collaborative learning) and student groups.
(undergraduate vs. secondary school) being investigated. Surprisingly, Vuorela and Nummenmaa (2004) found that the most reported reason for emotions was external factors, highlighting that many emotions experienced by students during online collaborative activities may actually be generated outside of the learning context itself.

Very few studies have aimed to specifically explore the causes of distance learning students’ emotions in online collaborative learning contexts. From the research that does exist, social aspects of the activities have been identified as prevalent cause of unpleasant emotion. For instance, when exploring master’s degree distance learning students’ frustration in a variety of online collaborative activities, Capdeferro and Romero (2012) found that the perception of an imbalance in commitment, responsibility, and effort between group members (e.g., if one group member does not actively participate or is absent from the activity) was the most common source of this emotion. Other socially related causes of frustration reported by Capdeferro and Romero (2012) included: differences in goals and expectations between group members; communication problems; dominance and control by other group members; and instructor inactivity.

The social context of these types of activities has also been found to be a major cause of student anxiety. For example, Hilliard et al. (2020) found that students undertaking an assessed, online, collaborative project at the OU, primarily described their anxiety to stem from: the uncertainty of working with strangers; being reliant on others, and fear of negative evaluation from others. Findings also highlighted that non-social causes of anxiety, such as a student’s lack of self-belief in their ability to complete the activity.

A few studies have reported on the causes of emotions more generally (i.e., instead of focussing on one particular emotion). From these, it has been shown that both pleasant and unpleasant emotions can derive from various aspects of the activities. For instance, when exploring students’ experiences of undertaking an online group project, Donelan & Kear (2018) identified that emotions can stem from: 1) interacting and collaborating with other group members; 2) the task students were undertaking; and 3) the assessed nature of the activity. Whereas O’Regan (2003) showed that emotions could be triggered by: the design and organisational issues (i.e., a lack of clear instructions); cognitive issues (i.e., learning materials, success); social issues (during communicating); time management; and technology.
It is evident that emotions can be caused by a range of factors in online collaborative learning. Currently, however, scarce research exists which has specifically investigated the causes of emotions in the context of assessed, online, group learning. From the research that does exist, it is apparent that more research has focused on unpleasant emotions (e.g., anxiety and frustration) and little attention has been paid to the causes of pleasant emotion. Furthermore, there is also a limited attempt to distinguish the causes of emotions at different time-points throughout the activities (e.g., before, during, and after). Gaining a more in-depth understanding of the causes of student emotions in this unique learning setting will help educators create group activities that aim to promote beneficial emotions and reduce detrimental emotions. This will hopefully enhance student learning, achievement, and wellbeing. The second research question adopted by this thesis was therefore: **RQ2: What causes students to experience emotions in assessed, online, group activities?**

**Impact of emotions**

Investigation into the impact of emotions in either face-to-face or online collaborative environments is extremely sparse. In a face-to-face group work context, Linnenbrink-Garcia et al. (2011) investigated how students’ affect related to their socio-behavioural engagement (social loafing and quality of interactions). Findings revealed that pleasant affect, both deactivating (*calm*) and neutral (*happy*), was associated with positive group interactions, whilst unpleasant deactivating affect (*tired*) was negatively associated with positive group interactions. Unpleasant affect (feeling *tired* or *tense*) was also associated with higher levels of social loafing and often led to cycles of negative group interactions which discouraged participation of group members.

In other face-to-face collaborative settings, research has shown that socio-emotional challenges and conflicts (such as personality clashes, overruling or undermining behaviour, and dysfunctional working and communication styles) between group members can trigger unpleasant emotional reactions that have detrimental consequences on engagement and group functioning (Ayoko et al., 2008). Näykki et al. (2014), for instance, found that unpleasant emotions disrupted group harmony, which caused students to adopt more avoidance and withdrawal focused behaviour as well as reduced ‘on-task’ engagement.
Although not specifically exploring online collaborative learning, Kahu et al. (2015) found that the emotions experienced by students in an online distance learning environment had differing effects on their engagement. More specifically, the pleasant emotions of *enjoyment* and *interest* were observed to positively influence students’ behavioural engagement (e.g., perseverance and effort) and cognitive engagement (e.g., use of deep learning strategies and seeking greater levels of understanding). In contrast, unpleasant emotions, such as *anxiety, boredom,* and *frustration,* were often found to inhibit engagement, both behaviourally (e.g., by impeding effort and work rate) and cognitively (e.g., making it more difficult to process and absorb information). The researchers also highlighted that such pleasant and unpleasant emotions often led to positive and negative outcome emotions (such as *pride* or *disappointment*) which could have powerful reciprocal effects on engagement, often by increasing or decreasing motivation and self-efficacy.

Evidence of the positive effects of pleasant emotions and negative effects of unpleasant emotions has been found in online collaborative learning settings. For instance, Camacho-Morles et al. (2019a) investigated the relationship between adolescent learners’ emotions (*enjoyment, boredom,* and *anger*) and their social and cognitive performance in an in-class computer-based collaborative problem solving tasks. Findings revealed that the pleasant activating emotion of *enjoyment* was associated with increased effort, which in turn, influenced both cognitive and social performance in the collaborative tasks. In contrast, unpleasant emotions, both activating (*anger*) and deactivating (*boredom*), were found to be associated with reduced motivation to invest effort in the activities, and in turn, poorer cognitive performance during collaboration. The relationship between unpleasant emotions and social performance (e.g., information-sharing and willingness to externalize thoughts) was mixed, with *anger* being found to have a negative association and *boredom* being revealed to have little association with this performance factor.

In relation to the emotion of *anxiety,* research has also highlighted potential for positive and negative impacts when working collaboratively online. For instance, Falkner et al. (2013) reported that several learners perceived *anxiety* to have a positive impact when completing collaborative learning activities in a Computer Science course; whereas Oliveira et al. (2011) found that increased levels of *anxiety* were prevalent in less successful collaborative working in an online environment. In both studies, however, the details of how *anxiety* impacted the participation and engagement of learners were not
explored. The beneficial and detrimental effects of this emotion have also been observed by Hilliard et al. (2020) when exploring OU students’ experiences of anxiety in an assessed, online, collaborative project. Findings reported that more learners perceived anxiety to have had a facilitative effect on their individual participation and performance than a debilitative one. Students’ qualitative responses revealed that these facilitative effects were often linked to increased motivation and work rate. Although debilitative effects were less reported, this emotion was found to be linked to reduced effort and work rate in some students, as well as the adoption of disengagement and avoidance behaviours.

Overall, there is a dearth of research exploring the impact of students’ emotions on their participation and performance in online collaborative learning activities; especially in learning situations that are assessed. From the little research that has been undertaken, it is clear that the effects of emotions are complex and their impacts on students’ learning and achievement can be varied. Further enquiry into how different emotions impact participation and performance in these specific academic contexts is, therefore, greatly needed. Examining this gap in the literature will help shed light on mechanisms underpinning participation and performance and will have important implications for educators. The third research question adopted by this thesis was therefore: **RQ3: How do emotions impact students’ participation and performance in assessed, online, group activities?**

**Regulation of emotions**

Over the last two decades, more attention has started to be paid to exploring students’ emotion regulation in higher education learning environments (e.g., Davis et al., 2008; Harley et al., 2019; Järvenoja et al., 2019). Yet, to date, the study of this topic in social and collaborative online learning contexts remains scarce, and after a search of the literature, only a few studies were found that had specifically explored this concept in these learning settings (Ayoko et al., 2012; Hilliard et al., 2020; Järvelä et al., 2016; Lajoie et al., 2015; Malmberg et al., 2015; Vuorela & Nummenmaa, 2004; Webster, 2019; Xu et al., 2013, 2014). It is, therefore, not surprising that little is currently known about the specific strategies used by students, and the goals they pursue, when regulating their own and other students’ emotions when learning collaboratively online (Webster, 2019).
From the existing research, a variety of approaches have been employed to investigate this area. For instance, Webster (2019) used a quantitative research approach to explore university students’ planned emotion regulation strategies when undertaking two 80-minute in-class computer-supported collaborative problem-solving tasks. Students filled out an emotion awareness and regulation self-report tool on three occasions during the activities (at the start, in the middle, and at the end). Students could select from a list of eight strategies to regulate their pleasant or unpleasant emotions or describe any additional strategies in an open-ended textbox. The list of eight emotion regulation strategies was developed from existing theory and literature. These were: creating a good plan; changing the plan or approach; focusing on the task; changing thoughts or beliefs; thinking positively; talking to others in the group; taking deep breaths and/or relaxing; and accepting it and carrying on. In both of the online collaborative tasks, it was revealed that focusing on the task, thinking positively, and creating a good plan were the most frequently selected strategies by students. Results from the SEST also revealed that students’ goals for regulating their emotions were primarily aimed at maintaining or increasing pleasant emotions and decreasing unpleasant emotions.

Vuorela and Nummenmaa (2004) used quantitative questionnaires to explore undergraduate students’ use of two commonly studied emotion regulation strategies - cognitive reappraisal (i.e., re-evaluating the meaning of a situation) and expressive suppression (i.e., inhibiting an emotional response to a situation or event) - in a collaborative online learning environment. The authors reported that using reappraisal led to increased activity and participation in collaborative discussions, whereas suppression was negatively associated with activity participation levels in the collaborative environment.

When investigating university students’ emotion management in an online collaborative course, Xu et al. (2013) developed an 8-item scale to measure the use of different emotion regulation strategies in this learning context. Strategies were both intrinsic and extrinsic as well as intrapersonal and interpersonal. For instance, an intrinsic intrapersonal strategy included: ‘Tell myself not to be bothered with previous mistakes’; whereas an extrinsic interpersonal strategy included: ‘Tell my group members not to be bothered with previous mistakes’. Results revealed that emotion management was positively related to: feedback (from both teachers and peers); arrangement of the learning environment; monitoring motivation; and help seeking. It was also revealed that full-time students were more likely
to initiate emotion management during online collaborative work when compared to part-time students. It was postulated that this difference could have been due to greater levels of commitment (in terms of learning and efforts to manage their emotions) from full-time students compared to part-time learners.

A few studies have used a qualitative research approach to investigate the emotion regulation strategies employed by students in online collaborative learning environments. Ayoko et al. (2012) examined patterns of conflict and emotions in eight small groups of university students who were undertaking an assessed, online, group project. Through analysing each group’s asynchronous text-based online discussions, it was found that students used a variety of emotion regulation behaviours to regulate their own and other students’ emotions. For instance, it was observed that after making a negative statement, students apologised or tried to explain their comments further to reduce unpleasant feelings and group conflict. The expression of unpleasant emotions was also found to be beneficial in identifying and resolving group issues, whilst the expression of pleasant emotions appeared to motivate students to complete the project.

Hilliard et al. (2020) also employed a qualitative approach when exploring how OU students regulated and coped with feelings of anxiety when undertaking an online collaborative project. From interviews with 11 students, the importance of emotional support and encouragement (e.g., from peers, tutors, and family members) in helping alleviate these unpleasant feelings was highlighted. Results also revealed that students used a range of problem-focused coping strategies, such as increasing their effort, planning their time more thoroughly, taking control over the task, and seeking task-specific information, to regulate their anxieties. Although less reported, some students also noted using a number of avoidance coping strategies (e.g., reducing effort and engagement in the activity, avoiding communicating with other students, and retreating from the online environment) to manage their anxiety. This study also identified that some students regulated their emotions to improve performance in the activity and to gain more control over the situation.

It is evident that students’ efforts to regulate and manage their emotions when collaborating and working in groups online is crucial for academic learning (Xu et al., 2013). However, as highlighted above, there is currently a paucity of research exploring this area of investigation; this is especially the case for empirical inquiry examining
emotion regulation in assessed, online, group activities. Furthermore, from the research that does exist, there has often been little attempt to differentiate between the regulation of emotions that differ in valence (e.g., Xu et al., 2013; Vuorela and Nummenmaa, 2004). This is important, as the regulation of unpleasant and pleasant emotions may differ substantially and both will play an important role for students’ emotional experiences (Webster, 2019). Overall, this means that little is currently known about the strategies used by students, and goals they pursue. It is thought that emotion regulation in these environments may be vastly different to that in face-to-face settings due to the unique context offered by online learning (Marchand & Gutierrez, 2012).

Gaining a greater understanding of how and why students manage and regulate their emotions in assessed, online, group activities may help determine what types of support are appropriate for students. This is especially important for learners who may experience high levels of undesirable and detrimental emotions during online collaboration, as well as individuals who find it difficult to regulate and cope with their emotions in these settings. The fourth, and final, research question adopted by this thesis was therefore: **RQ4: How and why do students regulate their emotions in assessed, online, group activities?**

### 2.3 Chapter Summary

In summary, this literature review has emphasised the criticality of emotions for academic learning and achievement, and highlighted the current dearth of research exploring emotions in online collaborative learning contexts, and in particular, assessed, online, group activities. After providing an in-depth review of current research and identifying essential gaps, four main research questions were generated. In the next chapter, Chapter 3, the overarching methodology adopted to address these questions is described.
3 Methodology

This section begins by recapping the four main research questions that this thesis aims to address (Section 3.1) and then outlining the philosophical (Sections 3.2) and methodological (Section 3.3) approach adopted in this research. This is followed by a description of the overall research design, as well as the specific research designs for the three individual empirical studies that form this thesis (Section 3.4). A description of the data collection methods and analysis techniques used is then given (Section 3.5) and relevant ethical issues are discussed (Section 3.7). At the end of this section, an overview of the research context is provided (Section 3.8).

3.1 Research Questions

As outlined in the preceding chapters, this thesis aimed to address the following four research questions:

1. What emotions do students experience when undertaking assessed, online, group activities?
2. What causes students to experience emotions in assessed, online, group activities?
3. How do emotions impact students’ participation and performance in assessed, online, group activities?
4. How and why do students regulate their emotions in assessed, online, group activities?

These questions were used to help inform the specific research methodologies and methods used to this research.

3.2 Philosophical Underpinnings

Having an awareness of one’s assumptions and beliefs about the world is valuable before undertaking a research project. This allows the researcher to employ a research methodology under a suitable ‘research paradigm’ that is in line with their worldviews (Lincoln & Guba, 1985). Research paradigms can be conceptualised as ‘…as systems of beliefs and practices that influence how researchers select both the questions they study and methods that they use to study them’ (Morgan, 2007, p.49). According to Guba
research paradigms are characterised through their ontology (i.e., beliefs about the nature of being or reality), epistemology (i.e., beliefs about the nature and scope of knowledge), and methodology (i.e., the tools and strategies used to know about reality). This relationship is shown in Figure 5.

**Figure 5.** Associations between ontology, epistemology, methodology, and research paradigm.

On the next page, a comparative summary of four commonly adopted research paradigms is presented in Figure 6. This outlines their underlying ontologies, epistemologies, methodologies, and provides examples of the types of questions that would be addressed.
Figure 6. Comparative summary of four commonly used research paradigms. Adapted from Richardson (2018).
The complex nature of the research questions investigated in this thesis could be investigated through the positions of multiple research paradigms. For instance, understanding what emotions students experience during the assessed, online, group activities could be investigated through quantitative research approaches (e.g., measuring emotions using pre-existing self-report inventories) and follow a positivist research paradigm. Alternatively, this question could be explored using qualitative research approaches (e.g., using open-ended responses from surveys or interviews) and adopt an interpretivist perspective.

To be able to best address the research questions of this thesis, and expand the scope of this work, a pragmatic approach using a mixed methods methodology was adopted. Pragmatism offers greater flexibility to the researcher compared to other research paradigms. For instance, from an ontological perspective, pragmatists believe that both single and multiple realities are open to empirical inquiry (Feilzer, 2010). And from an epistemological perspective, they claim that knowledge can be gained through iterations of independent observations and subjective constructions using the best-suited methods (Clark & Ivankova, 2016). Pragmatism, therefore, embraces both positivist perspectives (e.g., quantitative approaches and deductive reasoning) and interpretivist perspectives (e.g., qualitative approaches and inductive reasoning).

In addition to the methodological pluralism and research question guided approach afforded by pragmatism, this philosophical perspective aims to facilitate human problem solving (Powell, 2001). One of the main driving forces for undertaking this thesis was to understand what could be done to create more positive and supportive learning environments when undertaking assessed, online, group activities. For instance, it was hoped that by gaining a greater understanding of the emotional aspects of these activities, practical suggestions could be provided to educators about how to create more affectively sound learning environments.

3.3 Methodological Approach

The research methodology most often associated with pragmatism is mixed methods (Johnson & Onwuegbuzie, 2004). Over the past 30 years, this research methodology has emerged as an alternative to the dichotomy of qualitative and quantitative traditions.
Although definitions vary, Johnson et al. (2007, p.123) define mixed methods research as:

the type of research in which a researcher or team of researchers combined elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purpose of breadth and depth of understanding and corroboration.

A mixed methods study would involve mixing within a single study; a mixed method program would involve mixing within a program of research and mixing might occur across a closely related set of studies.

As highlighted in the definition above, mixed methods research is characterised by the combination of qualitative and quantitative approaches. In the research reported in this thesis, a mixed method programme was undertaken. This involved collecting and integrating qualitative data (from studies 1, 2, and 3) and quantitative data (from studies 1 and 2) from three related studies to help answer the four primary research questions. This methodological approach is different to that of ‘multi-methods’ (Anguera et al., 2018), which is where multiple forms of qualitative data or multiple forms of quantitative data are collected and analysed together (Fetters and Molina-Azorin, 2017).

The use of a mixed methods research methodology has been advocated by many scholars (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2010) who proclaim that it yields a better understanding of the phenomenon under investigation than could be achieved by using either qualitative or quantitative approaches alone (Creswell & Plano Clark, 2007). Triangulating one set of results with another is thought to enhance the validity of the inferences that can be made (Johnson et al., 2007). The combination of approaches also allows researchers to answer the ‘what’ (quantitative data) and ‘how’ and ‘why’ (qualitative) types of research questions, as well as explore both confirmatory/deductive and explanatory/inductive research inquiries. It has been suggested that this helps reduce the limitations each approach has, renders less bias, and provides more accurate conclusions (Punch, 2014). The use of mixed methods research has also been specifically recommended when investigating emotions in educational settings (e.g., Pekrun, 2016; Schutz et al., 2016; Pekrun and Linnenbrink-Garcia, 2014).
The superiority claimed by many mixed methods advocates over the use of a single methodological approach has, however, come in to question. First, some researchers believe that the underpinning ontological and epistemological assumptions of qualitative and quantitative research are incompatible and, therefore, it is not suitable to combine the two methodologies (Venkatesh et al., 2013). Second, it has been found that there is often little integration between qualitative and quantitative elements of research in the analysis and interpretation stages of mixed methods investigation (Bryman, 2007). The integration of these elements is essential for effective mixed methods research as this will provide insights that may otherwise not be found (Bryman, 2007). Third, there are many practical issues with conducting mixed methods research which can make the process very challenging. These include: increased time required to collect and analyse data; difficulties when writing up due to word limits set by journals; needing additional training to enhance qualitative or quantitative research skills.

It is evident that combining qualitative and quantitative research is more complex than it may initially seem. It is, however, the opinion of the author that both approaches can be combined in a single research project, and that mixed methods research would provide a more comprehensive understanding of students’ emotional experiences than could be achieved by either qualitative or quantitative research alone. This view is in line with numerous prominent emotion researchers in the field of education (e.g., Pekrun, 2016; Schutz et al., 2016; Pekrun and Linnenbrink-Garcia, 2014). To overcome the limitations presented above, a number of steps were taken. For instance, thought was given to the underpinning philosophical assumptions of both qualitative and quantitative research before this approach was employed. Considerations of how data were to be integrated and any practical issues related to using this approach were all thoroughly considered at the very start of this project.

3.4 Research Design

Research design can be defined as ‘…a way of organizing a research project or program from inception to maximize the likelihood of generating evidence that provides a warranted answer to the research questions for a given level of resource’ (Gorard et al., 2010, p.239).
There are two main factors for consideration when designing a mixed methods research project: 1) priority of qualitative or quantitative elements; and 2) sequence of data collection (Creswell & Plano Clark, 2017). According to Johnson et al. (2007), the research design may have equal priority of qualitative and quantitative elements or there may be greater emphasis on the qualitative or quantitative aspect. The priority of the design will be dependent on the research question(s) being asked, the researcher’s own philosophical views, and issues related to data collection (Johnson et al., 2007). The sequence in which data is collected can vary greatly and can take basic and advanced forms (Creswell, 2013). In general, designs can collect qualitative and quantitative data at the same time (referred to as convergent designs) or one could precede the other (known as sequential design) (Creswell, 2015). The design the researcher selects will ultimately be influenced by the type of inquiry they are conducting (e.g., triangulating data from different perspectives to explore a topic or using data to develop an instrument design).

In this research, equal priority was given to qualitative and quantitative elements of the project and the sequence followed a convergent mixed methods research design. This allowed for both qualitative and quantitative data to be collected in separate studies and for the generation of conclusions through the integration of inferences from these different methodological approaches. More specifically, this mixed methods programme consisted of three closely related studies that were used to provide contributions towards the four research questions of this thesis. The three studies aimed to provide different insights into the same research questions, thereby, allowing for the problem to be viewed from multiple angles and multiple perspectives. By triangulating and merging the inferences from these three studies, a more comprehensive understanding and portrait of students’ emotional experiences was obtained than could be generated by one method alone. This allowed for exploration of the degree to which findings converged, diverged and related to each other (Bryman, 2016). Figure 7 provides an overview of the mixed methods programme design used in this research project.

The specific research design for each of the three studies was different (see Figure 7). Study 1 used a cross-sectional research design where an online survey was sent to students from five different OU modules. The aim of this study was to gain an initial understanding of emotional experiences in assessed, online, group activities from a broad range of students. The online survey gathered both quantitative and qualitative data.
Study 2 used a longitudinal research design, using an online diary, to explore the emotional experiences of students at various stages during an assessed, online, group activity. This aimed to build on and extend findings from Study 1. For instance, this investigation allowed the temporal changes in students’ emotional experiences to be observed more thoroughly and investigated a small number of specific pleasant and unpleasant emotions (rather than pleasant and unpleasant emotions more generally). Again, qualitative and quantitative data were gathered.

In Study 3, tutor perspectives of students’ emotional experiences (e.g., their emotions, causes, impacts, and regulation) were investigated using a multi-method, qualitative methodology. Data were collected in two phases. In this first phase, data were gathered via online discussion forum threads that were intentionally created for this study, and in the second phase, qualitative interviews were undertaken.
**Research questions:**

1. What emotions do students experience when undertaking assessed, online, group activities?
2. What causes students to experience emotions in assessed, online, group activities?
3. How do emotions impact students’ participation and performance in assessed, online, group activities?
4. How and why do students regulate their emotions in assessed, online, group activities?

**Study:**

**Purpose:**
To explore tutor perspectives of students’ emotional experiences in assessed, online, group activities.

**Data collected:**
Qualitative and quantitative

**Research design:**
Multi-method/Cross-sectional

**Data collection methods:**
Semi-structured interviews and online discussion forums

**Research questions addressed:**
1, 2, 3, and 4

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**Study:**

**Purpose:**
To explore students’ experiences of specific pleasant and unpleasant emotions in an assessed, online, group activity, using longitudinal research approach.

**Data collected:**
Qualitative and quantitative

**Research design:**
Longitudinal

**Data collection methods:**
Online diary

**Research questions addressed:**
1, 2, 3, and 4

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**Study:**

**Purpose:**
To gain an initial understanding of students’ emotional experiences in assessed, online, group activities.

**Data collected:**
Qualitative and quantitative

**Research design:**
Cross-sectional

**Data collection methods:**
Online survey

**Research questions addressed:**
1, 2, 3, and 4

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**Meta-inference**
Triangulation and merged interpretation

**Mixed methods programme consisting of three closely related studies**

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**Figure 7.** Convergent research design of mixed methods programme mapped with research questions.
3.5 Data Collection Methods

Based on the multi-componential view of emotions adopted in this thesis (see Section 2.1.1), various types of measures are thought to be able to assess the different components that comprise emotion (i.e., their affective, cognitive, motivation, behavioural, and physiological components) (Pekrun et al., 2018). These can be categorised into three primary groups: 1) self-report methods (e.g., interviews, questionnaires, and diaries); 2) behavioural observation (e.g., detecting facial and postural expression as well as nonverbal features of speech); and 3) physiological measurement (e.g., heart rate and blood pressure assessment).

As highlighted in Section 3.4, this study used a self-report approach to explore the emotional experiences of students when undertaking assessed, online, group activities. Self-report uses participants’ verbal or written reports to assess their interpretations of their personal emotional states, and is currently the most widely employed measure in emotion research (Pekrun, 2020). Although often thought of as only comprising structured questionnaires, self-report methods can take various forms (Pekrun & Bühner, 2014). They can be: structured or unstructured; retrospective or concurrent; oral or written; qualitative or quantitative; one-dimensional or multi-dimensional; paper-and-pencil or online; and can comprise single or multiple items (Pekrun & Bühner, 2014). As such, in addition to structured questionnaires, self-report also includes measures such as interviews, open-ended responses in surveys, single-item momentary reports, and diaries.

It is evident, therefore, that although all self-report methods rely on participants to self-assess and report on the variables under investigation, their structure, timing, and the type of data collected can vary significantly.

Self-report has several important benefits over behavioural and physiological approaches that made it advantageous for this research project. First, it is the only approach that can explore the subjective experiences of individuals (Feldman Barrett, 2004). As emotions are characterised by subjective experiences (which can only be directly accessed by the individual themselves) (Scherer, 2005), simply asking individuals about the nature of their emotional experiences is viewed as the only way of gaining such information (Frenzel & Stephens, 2013; Scherer, 2005). Pekrun (2016) further highlights that as all components of an emotion can be mentally represented in a conscious mind, the use of self-report is advantageous when assessing these core components of human emotion at a more fine-grained level (dependent on the quality and type of questions asked). Second,
Self-report is much more precise at differentiating and distinguishing between different types of emotional states when compared with behavioural or physiological methods (Reisenzein et al., 2014). The use of physiological and behavioural approaches may, therefore, be unsuitable if emotional specificity is an important research goal. Third, self-report can often be the only method applicable to assess emotions in some types of situations. For instance, in a real-life assessed, online, group activity, where students are geographically dispersed and primarily communicate through asynchronous communications methods, it may be extremely impractical (or even impossible) to assess the emotions of students using most physiological (e.g., heart rate, respiratory rate, etc) or behavioural (e.g., facial expressions and bodily displays) measurements. Self-report methods, such as online surveys or diaries, on the other hand, can be easily and conveniently used to trace these emotions.

Despite the benefits of using self-report, these methods do have a number of limitations which can undermine the accuracy of one’s self-reported emotional experiences. For instance, self-report methods are limited to information that is consciously accessible; therefore, any aspects of an emotional experience not represented in the conscious mind cannot be assessed (Harley, 2015). Another limitation relates to the differences in semantic understanding of the language used to describe emotions between cultures and even between individuals that share the same culture (Pekrun & Bühner, 2014). This may mean that participants have a different understanding of an emotional term compared to the researcher. A further limitation of self-report is that it can be affected by memory biases, such as issues of memory decay and recall bias (Pekrun, 2020). This is particularly the case for retrospective measures that are administered at extended periods of time after the phenomena being investigated was experienced. According to Pekrun (2020), even when self-report is undertaken directly after an emotional event or as a momentary measure asking participants about the emotions they are experiencing right now, it still lacks the ‘temporal granularity’ needed to capture the real-time dynamics of affective processes (unlike some concurrent physiological or behavioural observational methodologies). Memory biases may also cause amplified levels of unpleasant emotion to be reported in retrospective evaluations (Miron-Shatz et al., 2009). Other noteworthy limitations include: the reliance on individuals to willingly disclose details of their emotional experiences (Pekrun, 2019b); the susceptibility of self-report to various forms of response bias such as social desirability bias (Pekrun, 2020); and the level of self-
awareness individuals have of their emotions and their ability to differentiate between different affective states (Feldman Barrett et al., 2001).

Despite the above limitations, self-report was viewed as the most suitable approach to explore emotions in this research project. The ability of self-report to explore students’ subjective experiences through written or verbal communication make them well suited to explore this phenomenon (Duffy et al., 2018). Furthermore, the exploratory nature of this research meant it was imperative to employ methods that could render distinguished and differentiated assessment of emotional states (e.g., the ability to identify specific pleasant and unpleasant emotions states, rather than separating emotions by their valence alone). The use of self-report was also viewed as most applicable approach due to the naturalistic online learning environment in which the study was being conducted. For example, it would not have been feasible or economical to adopt many physiological and behavioural measurements in this research. Overall, therefore, the ability to explore students’ subjective experiences with high levels of emotion specifically, combined with the low cost, ease of use, and high flexibility (e.g., the data collection tools can be administered before, during, or after a learning session), made self-report the most appropriate method of exploring students’ emotional experiences in this research. To try and reduce some of the drawbacks of using self-report, as well as boost its validity, examples of various emotional states were provided to participants in each study. This aimed to make the operationalisations more transparent between the researcher and participants. The triangulation of different self-report methods used in this study, and merged interpretation of findings, also aimed to increase the validity of using this approach (Pekrun, 2020).

A general overview of the four self-report methods used in this research project are described next; more detailed descriptions of the specific instruments used in each of the three studies are provided in their corresponding chapters (Chapters 4, 5, and 6).

### 3.5.1 Online surveys

Surveys, administered in various forms (e.g., self-administered, postal, telephone, or online), are a well-established method for investigating participants’ views, attitudes, perceptions, and experiences (Bryman, 2016). Over the last two decades, and with advances in computer technology, online surveys are becoming frequently used in social
science research (Bryman, 2016; Hooley et al., 2012). In this research project, an online survey was used in Study 1 to gain initial perspectives of emotions from a broad range of students undertaking assessed, online, group activities.

An online survey has many advantages when compared with other forms of survey, such as: being cheaper; requiring less time and resources; and allowing data to be exported to statistical packages (McPeake et al., 2014). Another major advantage is that it allows access to populations separated by large geographical distances (Wright, 2005). This highly valuable in this research project due to its focus on individuals in a distance learning environment. The use of online surveys is a common approach to exploring students’ experiences in distance learning contexts and has previously been used to explore students’ emotions in these learning settings (e.g., Angelaki and Mavroidis, 2013; Capdeferro and Romero, 2012). It is also a method that has previously been successfully used by the author of this thesis when exploring anxiety in an assessed, online, collaborative project (Hilliard et al, 2020). The types of questions used in a survey can take various forms. For instance, both quantitative responses (e.g., Likert, dichotomous, and multiple-choice styled questions) and qualitative responses (e.g., open-ended written response questions) can be incorporated.

There are a number of limitations that have been highlighted regarding online surveys (Bryman, 2016; McPeake et al., 2014), and these have often been concerned with access (e.g., gaining access to the community) and sampling (e.g., difficulties establishing a sample frame, low response rates, and self-selection bias) (Wright, 2005). These limitations are, however, often unavoidable. For Study 1, there were no issues surrounding generating and gaining access to a sample as participants were recruited from the OU (although ethical regulations needed to be followed). Although it has been suggested that online surveys produce lower response rates compared to administering surveys in other ways (Nulty, 2008; Sinclair et al., 2012), this view has been disputed. For instance, research has also found that online surveys can produce response rates that are equal to, or better, than other modes of survey (Rübsamen et al., 2017). The overuse of online survey research in distance education settings can also lead to lower survey response rates (McPeake et al., 2014). However, the OU’s ethical committee ensures that any student taking part in research will have not undertaken more than two surveys within the last 12 months.
To enhance survey completion rates in this research, a number of strategies were also used. These included: keeping the survey brief, without threatening the integrity of the data collected; stating an estimated completion time in the introductory email; sending at least two reminders to non-respondents; and extending the duration of the survey’s availability (these strategies have been recommended in previous research; McPeake et al., 2014; Nulty, 2008).

3.5.2 Online diaries

According to Alaszewski (2006, p.45), a diary can be defined as ‘…personal documents created by an individual to record events, experiences or feelings.’ This definition highlights several key features of this method:

1) it is personal to an identifiable person
2) the diary is organised around a sequence of regular entries which might be at fixed time intervals or linked to a specific event or day
3) diary entries are contemporaneous, occurring at the time of the event or close to when the events occurred (so reduce issues caused by recall)
4) the diary entries form a record of what an individual considers important (this can take many forms, such as a written document, audio recordings, or online records)

There are two main forms of diary; ‘solicited diaries’ and ‘unsolicited diaries’. Solicited diaries are personal documents which people have been asked to keep over a period of time, usually for research purposes (Bartlett & Milligan, 2015). Unsolicited diaries, on the other hand, are personal documents which people choose to keep without any request (e.g., a personal diary) (Jones, 2000). In Study 2 of this research project, solicited diaries were used. These took the form of ‘online’ solicited diaries, with entries being completed on a web-based platform.

The design of a solicited diary can vary greatly. Unstructured, or qualitative, forms allow diarists to record detailed commentaries and narratives about their actions, experiences, thoughts and emotions around a loose theme or topic set by the researcher (Bartlett & Milligan, 2015). Structured, or quantitative, diaries adopt checklist or fixed response formats with the purpose of gathering numerical data that can be analysed using quantitative methods (Bartlett & Milligan, 2015). A combination of these two approaches, referred to as a semi-structured format, can also be used (i.e., a mix of fixed response and
free text questions). The frequency of when the diary entries are made is also an important design consideration. Entries may be made at fixed times (interval-based sampling), when specific events occur (event-based sampling), or when signalled by an email or text message, for example (signal-based sampling) (Rönkä et al., 2010).

There are many advantages of using solicited diaries as a data collection method. For instance, this method allows for information to be gained unobtrusively at an individual level as well as capturing ‘within-person’ changes over time (Bolger et al., 2003). Diaries also allow participants to record their thoughts and feelings immediately, or soon after an experience or event has occurred. This reduced recall period helps overcome issues of memory decay and retrospective bias often associated with other data collection methods (e.g., cross-sectional research designs with long duration between when an emotional event occurs and when this is reported) (Alaszewski, 2006; Bartlett & Milligan, 2015). Diaries have also been speculated to include more emotional data when compared to other commonly used methods, such as interviews, as they are completed closer to the time of the event and are usually written in privacy without the researcher being physical present (Spowart & Nairn, 2013). This makes them particularly suitable for research examining emotions. The online nature of the diaries used in this research project also has the practical advantage of reducing the risk of errors when undertaking data entry. It is also seen as suitable for OU students who are undertaking an online distance learning course and are therefore accustomed to completing activities online.

There are, however, a number of limitations to using this data collection method. Firstly, high demands are placed on participants and long-term levels of commitment are required (Alaszewski, 2006; Bolger et al., 2003). This may reduce the numbers of participants taking part in such research as well as increase dropout rate when using this method. It may also distract students from undertaking work for the course they are studying. Secondly, there is a reliance on participants to complete diary entries within required time periods which may increase the chances of missing diary entries and having incomplete data sets (Day & Thatcher, 2009). To help mitigate these issues, it has been suggested that the researcher should build a relationship with the participant and be upfront about the frequency, timing, and length needed to complete entries (Jones & Woolley, 2015). Third, the use of written diaries presupposes that participants possess a range of skills necessary for using this method. For instance, diaries require literacy skills, with participants required to describe and elaborate on their emotional experiences in written
language (Hascher, 2008). Without such skills, important aspects of a students’ emotional lives may be missed. Furthermore, individuals comfortable with writing diary entries (such as those who have written diary entries previously) will render very different accounts to those who have little experience and to whom diary writing is a novel way to express oneself (Spowart & Nairn, 2013). Finally, diaries that focus on participants emotions may act as an intervention by making students more aware of their emotional states. This, in turn, may have positive or negative consequences (e.g., a greater attention on pleasant emotions may enhance these feelings, whilst a greater focus on unpleasant emotions may exacerbate such feelings).

Solicited online diaries were chosen to be included in this research project as they were viewed as flexible learning tool that could capture rich data about students’ emotional experiences during an assessed, online, group activity. This method would, therefore, allow a more in-depth description of the temporal changes in emotions throughout the activity than that which could be achieved using cross-sectional approaches. Diary methods have also previously been advocated when exploring students’ emotional experiences in educational settings (Hascher, 2008), and similar approaches have been used when investigating the affective states of adult learners in traditional face-to-face (e.g., Peterson et al., 2015) and distance education (e.g., Kahu et al., 2015; Zembylas, 2008) contexts.

3.5.3 Online discussion forums

In this research project, data gathered from online discussion forums were used in the first phase of Study 3 to gain an initial insight into tutor perspectives of students’ emotional experiences in assessed, online, group activities. More specifically, online discussion forum threads, created by the researcher for the purposes of the research, were placed into pre-existing online discussion forums at the OU. When using intentionally created discussion forums threads, the researcher usually posts a discussion topic/prompt to initiate discussion from participants followed by further prompts and interactions to guide and promote further discussion (Im and Chee, 2012). This is different to using pre-existing data from pre-existing forums (Im and Chee, 2012). Despite being a relatively recent approach to data collection in research inquiry, these platforms are being increasingly used in qualitative online research (e.g., Davies et al., 2020; Ferndale et al.,
Online discussion forums are often compared with traditional, or online, focus groups, as they allow communication between research participants (Im & Chee, 2012). As a data collection method, discussion forums have a number of advantages. For instance, one of the main benefits of using this method is that they allow for asynchronous interaction between individuals. This is ideal for settings where individuals are geographically dispersed, such as distance learning environments, or in a different time-zone (Ferrante et al., 2016). Furthermore, this approach also allows individuals to share their opinions and experiences in their own time, therefore, affording greater flexibility to when an individual contributes to the discussion. This contrasts with synchronous focus groups which occur in real-time, requiring all participants to contribute at a pre-arranged time (Williams et al., 2012). Another advantage of this method is that it allows individuals to question each other and explain themselves to each other which can provide valuable data about the extent of consensus and diversity among participants. The ability to observe agreement and disagreement is, therefore, as a clear strength to this method, and something which could only be speculated upon when using other data collection approaches (e.g., one-to-one interviews).

Disadvantages of using online discussion forums include self-selection bias, response bias, and self-presentation bias (Ferrante et al., 2016; Williams et al., 2012). For instance, some participants may be very keen to express their views, whilst others may not participate at all. There may also be concerns from participants about writing openly in a space that can be viewed by other individuals. This may have an impact the depth and type of posts from participants. There may also be a risk of participants being influenced by previous comments (Ferrante et al., 2016). Other issues that have been raised about the use of online discussion forums for research purposes include: the authenticity of participants (e.g., who is contributing to the forum); and the role of the researcher (e.g., active vs passive role) (Im & Chee, 2012).

The use of asynchronous forums was viewed as an ideal method for gathering data about tutors’ perspectives of students’ emotional experiences in this research project for several reasons. For instance, OU tutors are often geographically separated, and many have additional commitments (e.g., further employment); therefore, the use of discussion
forums was thought to offer a greater degree of flexibility (e.g., to where and when participants contributed) than that of other data collection methods. Furthermore, the use of online discussion forums is one of the principal methods used among tutors to interact with one another and with students at the OU. This increased familiarity with the communication modality was also viewed as a key advantage of utilising this research method. The opportunity for participants to interact with one another was also viewed as a key advantage of this data collection method.

3.5.4 Qualitative interviews

In this research project, interviews were used in the second phase of Study 3 to gain an in-depth understanding of students’ emotions from a sample of tutors. Interviewing has a long tradition in understanding individuals’ thoughts and feelings and can provide ‘insightful accounts’ of emotion at ‘a fine-grained level’ (Rienties and Rivers, 2014, p.14). This research method has been frequently used when exploring the emotional experiences of students in online education (e.g., Symeonides and Childs, 2015; Zembylas, 2008; O’Regan, 2003) and has also been used to explore how teachers understand students’ emotions in traditional learning settings (Rowe et al., 2015; Rowe & Fitness, 2018).

Advocates of interviews believe they can act as a ‘window’ into the minds of informants or on to the social worlds in which they (Hammersley and Gomm, 2008, p.89). It is claimed that interviewing will allow for ‘direct’ explanations for human action and the opportunity to access and explore participants’ experiences, perspectives, beliefs and orientations (Kvale, 1996). The use of interviews has, however, attracted criticism and this has led to what has been coined the ‘the radical critique of interviews’ (Murphy et al., 1998, p.120). Proponents of this critique argue that interviews are ‘contextually situated’ (Murphy et al., 1998, p.120) and are therefore unable to tell us anything outside of the context of the interview regarding people’s stable attitudes and perspectives that govern their behaviour.

However, Hammersley (2003) states that this does not justify abandoning the use of interviews as a data collection technique altogether. Instead, more caution is necessary when interview data is used in research; and recommendations should be followed to ensure that interview data is not undermined (Hammersley & Gomm, 2008). For instance,
Hammersley and Gomm (2008) suggest that the nature of the interview questions should always be thoroughly deliberated before they are carried out. This will ensure that questions are not too difficult for the informant to answer. They also advise that interview data should be compared or triangulated to other sources (e.g., surveys or observation) (Hammersley & Gomm, 2008).

In Study 3 of this research project, telephone interviews were used. This was deemed a suitable type of interview due to the distance learning environment in which the study was situated. This mode of interview can significantly reduce costs when participants are geographically dispersed (Bryman, 2016). Additionally, due to the sensitive nature of the topics being discussed it is thought that individuals might prefer to be contacted over the telephone rather than by interviewing face-to-face. As noted by Bryman (2016), the telephone interview may help informants feel more relaxed, and disclose more sensitive information. This mode of interview has also been found to produce data of a similar amount and quality when compared to face-to-face interviews (Block & Erskine, 2012; Sturges & Hanrahan, 2004).

3.5.5 Other self-report measures considered

Beyond the methods discussed above, a number of other self-report measures were considered when designing this research project. These included the use of pre-existing self-report inventories and experience sampling method (Larson and Csikszentmihalyi, 2014).

The use of pre-existing inventories is widely used in emotion research. There are, however, a lack of feasible, reliable, and valid instruments that can measure a broad range of emotions in educational settings (Pekrun, 2016). This is particularly true for online and online collaborative learning contexts, where the types of emotions experienced, and how these emotions operate, are still not well understood. One example of a self-report inventory that has been widely used in academic settings over the last decade is the Achievement Emotions Questionnaire (AEQ; Pekrun et al., 2011). This multi-item questionnaire was developed for traditional classroom environments (i.e., studying, learning in the classroom, and taking exams) and only assesses achievement emotions. The use of such an instrument in the current study would, therefore, be unsuitable.
The experience sampling method refers to ‘...a method of data collection in which sampling procedures gather self-report data repeatedly during real-world experiences so as to provide real-time data, as opposed to retrospective reports, on individuals’ perspectives’ (Goetz et al., 2016, p.246). This method has, therefore, primarily been used to explore momentary state emotions in emotion research (i.e., emotions experienced at the time of the measure is undertaken), rather than reflecting back on emotions that have previously been experienced (e.g., in the short or long term). This approach primarily requires data to be collected during the actual situation or event being examined (e.g., when a student is undertaking a learning activity). Although advances in technology have made it easier to employ this method (e.g., by using digital and electronical devices rather than pencil and paper), there is still relatively little research has adopted this approach in educational settings (Goetz et al., 2016). Despite the benefits of using experience sampling method, this method is more suited to synchronous activities, where data can be collected the moment an activity or event being undertaken. The diary method was, therefore, preferred to this method, due to its suitability in asynchronous activities. For instance, the diary method afforded participants more flexibility over when they completed each entry (e.g., at a suitable time over a 48hr period). Due to the real-time data collection of experience sampling method, this method is also more suited to gathering small amounts data during each measure. The volume of data gathered in this study (e.g., types, causes, effects and regulation of emotions) would, therefore, have been unsuitable.

3.6 Data Analysis Approaches

Due to the mixed methods approach utilised in this research project, analysis of both quantitative and qualitative data was undertaken. As highlighted in Figure 8, Study 1 and Study 2 used both quantitative and qualitative methods whereas Study 3 solely used qualitative data analysis methods. A brief overview of the analysis approaches used in this investigation are provided in Sections 3.6.1 and 3.6.2 below; more specific details of the analysis techniques employed are provided in their corresponding chapters (Chapters 4, 5, and 6)

68
3.6.1 Analysis of quantitative data

In Study 1 and 2, various closed-ended questions (e.g., Likert-type scales and multiple-choice response questions) were included in both the online survey and diary. Analyses of these questions were made using various types of descriptive statistics, such as the calculation of frequencies \( (n) \) and percentages \( (%) \) and the transformation of data into tables and graphs. Due to the exploratory nature of this research, the use of more advanced forms of statistical analysis was not deemed necessary.

3.6.2 Analysis of qualitative data

Three types of qualitative data analysis techniques were used: 1) word-count analysis; 2) content analysis; and 3) thematic analysis.
**Word count analysis**

In this thesis, word count analysis was undertaken to explore:

- the emotions experienced by students in the group activities (Study 1 and Study 3)
- the emotions that impacted students’ participation and performance in the group activities (Study 1)

Word count involves counting the words people use, to understand their perspectives (Leech & Onwuegbuzie, 2008). This qualitative data analysis technique can be undertaken by hand or by using computer-assisted data analysis software (e.g., word count analysis can be undertaken using NVivo; Leech and Onwuegbuzie, 2011). Word count analysis, in various forms (e.g., analysing existing data or data gathered for the purposes of the research), has been used previously to explore peoples’ affect and emotions in various contexts (e.g., Achmadi et al., 2020; Kross et al., 2014; D’Mello and Graesser, 2012).

The underlying assumption of this analysis approach is that the more important and significant a word is, the more it will be used by individuals (Leech & Onwuegbuzie, 2008). Word count analysis is, therefore, associated with a more positivist research paradigm. Proponents of counting words in qualitative data analysis believe that the products of any inquiry are unavoidably quantitative (Sechrest & Sidani, 1995). For instance, terms such as ‘many’, ‘most’, ‘few’, and ‘never’ are often used by qualitative researchers, yet all of these are fundamentally quantitative (Sechrest & Sidani, 1995). It is, therefore, believed that by counting words when analysing qualitative data, more precision, meaning, and rigour can be achieved.

There are a number of limitations of this analysis technique, however. These limitations primarily relate to the misleading interpretations that can be made by only counting the words a person uses. For instance, words may be counted in the analysis process that are not relevant to the context of the study (Leech & Onwuegbuzie, 2008). In this research, for example, a tutor could describe the *anxiety* a student experiences before an exam. Although this word describes an emotion the student has experienced when learning, it does not relate to the context of an assessed, online, group activity. Therefore, if counted, this could overemphasise the significance of this emotion. Another limitation is that the frequency of a word may not necessarily indicate that it is more important for an
individual (Leech & Onwuegbuzie, 2008). Ensuring steps are taken to ensure the trustworthiness and legitimacy of the analysis is, therefore, important. Steps undertaken in this study are outlined in Section 4.2.5 and 4.2.6 for Study 1 and in Section 6.2.5 and 6.2.6 for Study 3.

Content analysis

In this research, content analysis was used to explore:

- the causes of students’ pleasant and unpleasant emotions, their impacts, and the strategies they used to regulate emotions in the group activities (Study 1)
- the causes, regulation strategies, and regulation goals of specific pleasant and unpleasant emotions in the group activities (Study 3)

Many forms of content analysis exist, ranging from more quantitative and deductive approaches to more qualitative and inductive approaches (Neuendorf, 2018; White & Marsh, 2006). In this thesis, content analysis from a qualitative perspective was adopted. Hsieh and Shannon (2005, p.1278) define this as ‘…a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns.’ Although this approach to analysing qualitative data involves counting the frequencies of codes and categories in the analysis process, it also aims to examine language intensely (unlike more quantitative variations). As such, qualitative content analysis aims to identify the importance of concepts (e.g., by counting frequencies) as well as provide detailed knowledge and understanding of the phenomenon being investigated (Hsieh & Shannon, 2005). This was, therefore, viewed as an ideal method of data analysis for this investigation. For instance, the detailed analysis of the qualitative data meant that an in-depth understanding of various emotion related processes and strategies could be gained, and quantification of emergent concepts meant that their importance could be established (e.g., which emotion regulation strategies are used most and least often by students). Similar forms of content analysis have been frequently used in emotion research; including studies exploring emotion related concepts in educational settings (e.g., Volet et al., 2019; Duffy et al., 2018; Järvenoja and Järvelä, 2005; Wosnitza and Volet, 2005; Vuorela and Nummenmaa, 2004).
In this thesis, two forms of qualitative content analysis were used. In Study 1, a conventional approach to content analysis was utilised (Hsieh & Shannon, 2005). This aims to gain a rich understanding of the phenomenon being investigated and is usually undertaken when there is limited research literature on the topic being explored. Categories, which are defined as patterns or themes in the text, are inductively derived during the analysis process (Elo & Kyngäs, 2008). It must be acknowledged, however, that the creation of codes and categories is inevitably going to be influenced by academic literature and existing beliefs. This is often unavoidable when using inductive approaches to qualitative data analysis (Gibbs, 2007).

In Study 3, both conventional content analysis (which was used to analyse emotion regulation goals) and directed content analysis (which was used to analyse the causes of emotion and the ways students regulated their emotions) were adopted. As emotion regulation goals had not been explored in Study 1, inductive category development was thought to be more suitable. For data related to the causes of emotions and emotion regulation strategies, however, codes and categories from Study 1 were used to inform the analysis process. Directed qualitative content analysis is used when there is already prior knowledge about a phenomenon, yet this is either incomplete or would benefit from further analysis (Hsieh and Shannon, 2005). Although this process begins with deductive category application, it can also involve inductive coding as analysis proceeds for any new codes or ideas identified in the data. These can then be used to refine or extend the existing framework or theory (Hsieh and Shannon, 2005).

Both conventional and directed forms of content analysis follow similar analytical procedures. A summary of the commonly used steps when undertaking both forms of analysis are presented in Table 2 (these have been adapted from Hsieh and Shannon, 2005). A detailed description of the specific steps used in Study 1 and Study 2 are presented in Section 4.2.5 and Section 5.2.5, respectively.

As with all forms of content analysis, ensuring rigour and trustworthiness of the analysis process is crucial. For instance, Hsieh and Shannon (2005) note that a challenge when undertaking conventional qualitative content analysis is the failure to identify key categories due to not gaining a complete understanding of the content. Ultimately, this can mean that findings do not accurately represent the data. To overcome such an issue, numerous steps can be taken. Such as member checks, prolonged engagement in the field,
and triangulation (Lincoln & Guba, 1985). Another approach to increase the rigour of the content analysis process which is frequently recommended as good practice is inter-rater reliability (i.e., the agreement of different coders in relation to how the same data is coded) (O’Connor & Joffe, 2020). The steps taken to ensure the quality and rigour of content analysis process in this study are provided in Section 4.2.5 and 4.2.6 for Study 1 and Section 5.2.5 and 5.2.6 for Study 2.

**Table 2.** Steps used to conduct conventional and directed content analysis.

<table>
<thead>
<tr>
<th>Step</th>
<th>Conventional content analysis</th>
<th>Directed content analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Read and become familiar and immersed in the data</td>
<td>Read and become familiar and immersed in the data</td>
</tr>
<tr>
<td>2</td>
<td>Make notes on thoughts, ideas, and initial analysis</td>
<td>Highlight text that represents data relevant to the predetermined codes and categories</td>
</tr>
<tr>
<td>3</td>
<td>Code data and create a coding scheme</td>
<td>Code highlighted text with predetermined codes</td>
</tr>
<tr>
<td>4</td>
<td>Sort codes into categories (based on how codes are related and linked)</td>
<td>Create new codes for any text relevant to the investigation but has not been coded</td>
</tr>
<tr>
<td>5</td>
<td>Generate definitions for categories</td>
<td>Sort new codes into existing categories (if possible), or refine, extend, or develop new categories</td>
</tr>
<tr>
<td>6</td>
<td>Write up findings</td>
<td>Write up findings</td>
</tr>
</tbody>
</table>

**Thematic analysis**

In this research project, thematic analysis was used in Study 3 to explore tutors’ understanding of students’ emotional experiences in the group activities.

Thematic analysis involves identifying, analysing, and reporting patterns (‘themes’) in a dataset and interpreting their meaning and importance. Although various versions of thematic analysis exist, this research adopted the approach developed by Braun and
Clarke (2006). This version embraces a qualitative orientation and views the subjectivity of the researcher as an essential component to the process of analysis (Terry et al., 2017). It is also associated with a more constructivist paradigm (Clarke & Braun, 2017). As such, an inductive and flexible approach (also sometimes referred to as ‘bottom up’ or ‘data driven’) to coding and theme development is primarily adopted (Terry et al., 2017). When using this form of thematic analysis, Terry et al. (2017) note that analysis should be guided and driven by the data itself and not by pre-existing coding schemes and theoretical concepts. It is, however, important to acknowledge that qualitative thematic analysis does recognise that every researcher will have existing ideas based on their knowledge and beliefs when they start analysis (Terry et al., 2017). Rather than assuming the researcher is a ‘blank slate’, it contends that data is the starting point of analysis, not existing ideas and theories.

In Study 3, thematic analysis was used to gain a detailed understanding of tutors’ perspectives of students’ emotional experiences in assessed, online, group activities. Although content analysis could have been adopted in this study, this approach may have meant that important ideas and thoughts from tutors could have been missed. Understanding the emerging concepts and themes generated from tutors’ descriptions was an important reason for using this analysis approach. A summary of Braun and Clarke’s (2006) six-phase model used in this study is presented in Table 3. A detailed description of the specific steps used in Study 3 is outlined in Section 6.2.5.

As also highlighted when discussing word count analysis and content analysis, it is important that steps are taken to ensure quality when undertaking thematic analysis (Terry et al., 2017). In contrast to suggestions for content analysis, Braun and Clarke (2006) suggest that the use of interrater reliability is inappropriate when using their form of thematic analysis. Instead, quality assurance strategies that are focused on ‘…reflection, rigour, a systematic and thorough approach, and even greater depth of engagement’ are encouraged (Terry et al., 2017, p.20). The steps used to ensure quality in this research are described in Section 6.2.5 and 6.2.6.
### Table 3. Steps used to conduct thematic analysis.

<table>
<thead>
<tr>
<th>Step</th>
<th>Process</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Familiarisation with the data</td>
<td>Actively engaging with the data (e.g., transcribing, reading, and re-reading); becoming immersed in, and intimately knowing, the data set; making initial notes</td>
</tr>
<tr>
<td>2</td>
<td>Generating codes</td>
<td>Systematically working through interesting features of the entire data set that are relevant to answering the research question(s); labels (codes) are provided to data that share similar meanings</td>
</tr>
<tr>
<td>3</td>
<td>Constructing themes</td>
<td>Codes are examined and collated into clusters (potential themes) which represent broader patterns of meaning; data for each potential theme is gathered together</td>
</tr>
<tr>
<td>4</td>
<td>Reviewing potential themes</td>
<td>Potential themes are checked to ensure they work well in relation to coded data, the dataset, and the research question(s); themes can be adjusted and refined</td>
</tr>
<tr>
<td>5</td>
<td>Defining and naming themes</td>
<td>A detailed analysis of each theme is created, ensuring they are clear, cohesive, and tell a story that is based, and about, the data; clear names for each theme are generated</td>
</tr>
<tr>
<td>6</td>
<td>Producing the report</td>
<td>Final tweaks and revisions to themes (e.g., content and names); creation of a written analytic narrative (e.g., ) which weaves together data, connections, and previous literature and answers the research question(s)</td>
</tr>
</tbody>
</table>

#### 3.7 Ethical Considerations

Throughout this research project, ethical considerations were regarded with paramount importance. As with any form of emotion research, it was fully understood that this project was exploring a particularly sensitive topic which could have the potential to promote powerful feelings and possibly cause harm (Prosser, 2015).

Various guidelines were consulted to help address ethical issues and concerns for this research, including guidelines from the OU (Wardale, 2012), British Educational Research Association (2018), British Psychological Association (2018), and numerous steps were taken to ensure that this project was ethical. Before contacting students or staff,
ethical approval for each of the three studies was gained individually. This followed a two-stage process, ensuring compliance with the OU’s ethical guidelines. First, authorization was needed from the OU’s Student Research Project Panel (SRPP) or Student Staff Project Panel (SSPP). The SRPP ensure that the research is of an appropriate nature that will not cause harm or offence to students, as well as safeguarding students from being overburdened with requests to participate in research. The SRPP also provides advice for how proposed aspects of the research project could be improved and/or provide suggestions about aspects that might further enhance the research. The SSPP is very similar to SRPP and ensures that staff are not put at risk of harm or offence and are not asked to take part in research that does not meet university guidelines.

The second stage of the ethical process involved gaining approval from the OU’s Human Research Ethics Committee (HREC). The HREC approval is a separate process to SRPP and SSPP and must also be completed for all research involving people. This process looks at ethical issues more broadly and ensures the integrity of all research undertaken by OU academic staff and research students.

After approval, the following SRPP, SSPP, and HREC references were provided:

- Study 1: SRPP 2018/006, HREC/2018/2773/Hilliard (Appendix A)
- Study 2 pilot study: SRPP 2018/022, HREC/2018/2806/Hilliard (Appendix B); Main study: SRPP 2019/009, HREC/3144/Hilliard (Appendix C)
- Study 3: SSPP2017/104, HREC/2018/2786 (Appendix D)

When recruiting participants to take part in each study, invitations sent to students and staff included: a clear description of the aims and purpose of the study; what the study entailed for the participants; what the obtained information would be used for; and details of who could be contacted to answer any questions or queries. Furthermore, students and staff were made fully aware that: participation was completely voluntary; they would be guaranteed anonymity and confidentiality; their decision on whether to participate or not had no effect on any aspect of their module or university study or employment (for tutors); they had the right to withdraw from the study at any time; and that if they withdrew the data they had provided up to this point would be destroyed. Any individual interested in taking part was then asked to provide their informed consent.

It was very important not to overburden participants in this research project. Students at the OU are often completing their study alongside employment and other responsibilities,
and OU tutors may have similar pressures. Therefore, the demands of taking part in any of the three studies were kept to a minimum. As Study 2 involved students completing diary entries at multiple time points, it was particularly important that this aspect of the project was well thought through and the time commitment clearly stated to participants. To ensure that this did not have a negative impact on students’ academic study, the timing of entries was agreed upon with the module team chair (the academic responsible for providing academic leadership of the module) to ensure they did not clash with important study deadlines. Furthermore, students were given a 48-hour time period to complete each diary entry and any participant who completed all aspects of the research received a financial incentive (as recommended by the SRPP). All information from participants was treated as strictly confidential. Data were password protected and was stored on secure OU servers. Data sets were only accessible by the primary researcher and supervisory team. Information that could identify participants was anonymised (such as names and ID numbers).

To help support students who may have experienced unpleasant feelings during the activities or when completing the research, links were provided to advice and support on how to best manage unpleasant emotions. In addition, details of support services whom students could contact at the OU were provided on invitation emails and at the end of each study.

3.8 Research Project Context

3.8.1 The Open University (United Kingdom)

Given that the main aim of this thesis was to explore the emotional experiences of students undertaking assessed, online, group activities, the OU was viewed as an ideal research context of this thesis. The OU has been a pioneer of distance education since being established in 1969. It was one of the world’s first distance education providers and is currently the largest HE institution in the UK and one of the largest in Europe, with a student population of around 120,000 (Higher Education Student Statistics, 2019).

The student population at the OU is vastly different to that of many other traditional universities in the UK. OU students come from diverse backgrounds; for instance, their age (OU students are typically older than those who attend typical HE institutions); location (located all over the UK and around the world); previous levels of education (the
OU requires no formal entry qualifications); and employment status (many OU students are in full-time or part-time employment) will vary greatly (Herodotou et al., 2019; The Open University, 2020). Additionally, there are a higher portion of students with disabilities and with additional needs/requirements studying at the OU in comparison to other UK universities (The Open University, 2018, 2020).

The OU currently offers more than 200 qualifications and 400 modules via its unique distance education method called ‘Supported Open Learning’. This method offers a flexible approach to education, with students having much greater freedom to study where and when they like, compared to traditional campus-based universities. This teaching model also aims to be ‘all-inclusive’ (students are provided with high quality learning material), ‘supportive’ (personal tutors provide academic expertise, guidance and feedback and specialist advisors are available to help with other aspects of OU study), and ‘social’ (opportunities are provided to interact with other learners and tutors) (The Open University, 2021b).

To deliver Supported Open Learning, the OU makes considerable use of a virtual learning environment (VLE) in conjunction with online and/or face-to-face tutorials with designated tutors and peers. The VLE provides access to course content (e.g., weekly study material, interactive quizzes, podcasts) and supports student interaction with peers and tutors using asynchronous (e.g., online forums, wikis) and synchronous (i.e., online tutorials in Adobe Connect) communication methods. The incorporation of such technologies into learning tasks and activities, has enabled online learning to become more social and collaborative at the OU (Gosling & Nix, 2011).

Although many of the social and collaborative learning activities used in OU modules are not compulsory (Evans & Galley, 2016), linking these activities to assessment is becoming increasingly more common (Evans & Galley, 2016; Rienties & Toetenel, 2016a). Evans and Galley (2016) state that there are four main areas that online collaborative activities can typically be assessed: 1) the product(s) of the activity (i.e., the overall output); 2) the process (i.e., the experience and learning from the collaborative activity); 3) group collaboration and effectiveness (i.e., the quality of how well the group worked with each other); and 4) the individual’s input into the collaborative activity (i.e., the individual’s contribution to the task).
With the OU being a pioneer of distance and online education, the large cohorts of students that study at the institution, and the increasing incorporation of assessed, online, group learning activities in module design, the OU was seen an ideal setting to undertake this research project.

3.8.2 Open University modules

A total of six OU modules were used in this research project. These modules were selected as they met the following inclusion criteria: 1) included an assessed, online, group activity; 2) were an undergraduate module (to enhance consistency); 3) had a large enough number of students that could participate (cohort sizes can vary and response rates to research studies can often be low); and 4) module team chair gave permission to allow students to participate in this research. For Study 1 and Study 3, selected modules aimed to represent the four different faculties at the university: Faculty of Arts and Social Sciences (FASS); Faculty of Business and Law (FBL); Faculty of Wellbeing, Education and Language (WELS); and the Faculty of Science, Technology, Engineering and Mathematics (STEM). The purpose of this was to explore students’ emotional experiences of collaboration in a broad range of subject areas. As Study 2 aimed to gain a more in-depth exploration of specific pleasant and unpleasant emotions using a longitudinal approach, it was decided that students from one module would be used. This ensured that the overall size of the data collected was not too overwhelming. In addition to the six modules used in this project, another five modules were initially contacted; however, module team chair permission was not granted (primarily due to students being involved in other research activities).

For each assessed, online, group activity, the recommended communication method between group members was via asynchronous forums specifically set up for each group. In addition, the use of synchronous communication methods on the OU VLE (i.e., Adobe Connect) was also suggested in several modules. Communication outside of the OU’s VLE (e.g., via WhatsApp, Facebook, etc) was allowed, but this was not the preferred communication method as tutors are not able to monitor such communication between group members. The assessed, online, group activities in the six modules used in this research project are outlined in Appendix E, and further details of modules and online collaborative activities used in each study are discussed in Chapters 4-7.
3.9 Chapter Summary

In this chapter, the pragmatic and mixed methods approach that this research project adopted was discussed. This was then followed by an overview of the research design, description of data collection and analysis methods, and discussion of key ethical considerations. Finally, this chapter provided an outline of the research context within which this project was set. In the next three chapters (Chapter 4-6), an in-depth overview of each of the three studies that comprise this thesis will be given. These chapters will provide a description of the methods used and highlight the results and findings of each study.
4 Study 1 (Student Survey): Methods, Results, and Interpretation

As outlined in Section 3.4, this thesis is comprised of three empirical studies. Study 1 aimed to gain an initial understanding of students’ emotional experiences in assessed, online, group activities and sought the perspectives of students on five OU modules using an online survey. This chapter describes the methods and findings of this investigation and is divided into four sections. First, ‘Study Purpose and Objectives’ (Section 4.1) provides a clear reasoning for undertaking the study and states the specific research objectives for this investigation. Second, ‘Methods and Materials’ (Section 4.2) describes the methods and procedures used to collect and analyse data. Third, ‘Results’ (Section 4.3) presents and reviews the findings in relation to Study 1’s research objectives. Fourth, ‘Discussion’ (Section 4.4) interprets and describes the significance of the findings and highlights limitations of this research study.

4.1 Study Purpose and Objectives

As highlighted in Section 2.2.4, research exploring the emotional experiences of students undertaking social and online collaborative learning is scarce. Previous research has highlighted that there is currently little known about the emotions experienced by students in these learning contexts (Reis et al., 2018), what causes these emotions (Järvenoja & Järvelä, 2005), how emotions impact student participation and performance (Hilliard et al., 2020), and how students regulate their emotions (Webster, 2019). To gain an initial insight into these areas, this study employed a cross-sectional research design using an online survey. This approach was used to capture the emotional experiences of a broad range of students undertaking different assessed, online, group activities in various faculties of the OU. An exploratory research design, using a predominantly qualitative methodology, was adopted in this study. This approach was chosen over a more theory-driven approach (e.g., based on an existing theoretical framework) to ensure that important aspects of students’ affective lives would not be overlooked. The study sought to address the following:

1. To explore the types of emotions experienced by students when undertaking assessed, online, group activities (linked to RQ1)
2. To explore the causes of emotions in assessed, online, group activities (linked to RQ2)

3. To explore the impact of emotions on participation and performance when undertaking assessed, online, group activity (linked to RQ3)

4. To explore the strategies used by students to regulate their emotions in assessed, online group activities (linked to RQ4)

4.2 Materials and Methods

4.2.1 Study context

This study was undertaken in the 2017/2018 academic year using students from five undergraduate OU modules (modules: ‘Cell biology’, ‘Business’, ‘Computing’, ‘History and literature’, and ‘International development’). Four of the modules ran once during the academic year whereas one module (‘History and literature’) ran twice. Both cohorts from this module were included in this study. Each module was purposefully sampled due to its inclusion of an assessed, online, group activity where students worked together in small groups to create a shared piece of assessed work (e.g., a group essay or website) (see Appendix E for an overview of each activity). Additionally, these modules also represent a range of different subject disciplines taught at the university. As the purpose of the study was to explore the emotional experiences of students in a broad sense, it was considered important to ensure a diverse sample in this study; rather than using students from one specific module. Although all five group activities were different (e.g., in terms of the topic being covered, type of activity being completed, duration of task, and how it was being assessed), each was undertaken entirely online (although some had optional face-to-face tutorials before and during the activities). The recommended communication method between group members was via specifically created asynchronous discussion forums located in each module’s VLE. Students were also encouraged to use synchronous communication methods and were provided with access to Adobe Connect. The use of commercial online communication tools (e.g., via WhatsApp, Facebook, etc) was also highlighted to students; however, these were less encouraged as tutors do not have access to each group’s interaction and collaboration in these platforms (information which is needed for assessment purposes). A student’s grade for each activity was made up of both individual and group marks and this counted towards their overall module grade.
4.2.2 Participants

From the 3962 students registered on the five modules at the start of the 2017/2018 academic year, 1462 students were available to be contacted about taking part in the study. A large proportion of students could not be surveyed because they had either taken part in other educational research within the previous 12 months or had asked not to be contacted about such research. A total of 294 respondents returned the online survey (overall response rate of 20.1%). Such a response rate is common at the OU, where students study part-time at a distance, and many are in full-time employment or have other responsibilities (Ashby et al., 2011; Hilliard et al., 2020; Holmes & Anastopoulou, 2019). The 294 respondents ranged in age from 18 years to 85 years (M = 42.01 years, SD = 14.96 years). This was slightly higher than that in each module’s overall cohort, with the 30–39 year age band being the largest in each. The majority of respondents were female (69%), which is slightly higher than that found in the overall number of students registered on all five modules (61%). An overview of respondent details is provided in Table 4. There were no financial incentives offered to participants in this study.
Table 4. Survey respondent details.

<table>
<thead>
<tr>
<th>Student details</th>
<th>Open University modules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>History and literature</td>
</tr>
<tr>
<td>Students registered at the start of the module</td>
<td>Cohort 1</td>
</tr>
<tr>
<td>Students invited to complete survey</td>
<td>1680</td>
</tr>
<tr>
<td>Students completed survey (response rate)</td>
<td>603</td>
</tr>
<tr>
<td>Age range (years)</td>
<td>149</td>
</tr>
<tr>
<td>Mean age ± SD</td>
<td>44.91 ± 16.04</td>
</tr>
<tr>
<td>% Male</td>
<td>26.2</td>
</tr>
<tr>
<td>% Female</td>
<td>73.8</td>
</tr>
</tbody>
</table>
4.2.3 Procedures

Before contacting students, ethical approval was gained from the OU’s HREC and the SRPP (Section 3.7). Invitation emails containing a link to the online survey were sent to students shortly after the completion of the group activities in each of the five OU modules. The email stated the purpose of the research and informed students that taking part would have no effect on any aspect of their module or university study. Before filling out the survey, those interested in taking part completed an online informed consent form. Both the informed consent form and survey were administered using a commercial Internet survey platform (Qualtrics) and this was distributed by the OU’s Institute of Educational Technology Student Statistics Survey Team. The survey was active for 5 weeks and during this time three reminder emails were sent (2, 3 and 4 weeks after the initial invitation email was sent). The survey was only completed once by respondents.

4.2.4 Data collection instrument

An online survey was thought to be a suitable data collection method for exploring students’ emotions in this learning context. Similar approaches have been used and advocated previously (e.g., Hilliard et al., 2020; Angelaki and Mavroidis, 2013; Capdeferro and Romero, 2012). The online survey used in this study was developed by the author of this thesis. To ensure the face and content validity of the instrument, recommendations outlined by Gehlbach and Brinkworth (2011) and Taherdoost (2016) were followed. These included: 1) completing an extensive literature search on the topic before developing the instrument; 2) following guidelines for effective survey design (Lumsden, 2007); 3) undertaking an expert validation with specialists in distance education and psychology once the instrument had been developed; and 4) pilot testing the online survey using a Think Aloud Protocol (TAP) (Ericsson & Simon, 1980).

The TAP was undertaken with six research students (3 females and 3 males) from the OU. This cognitive interviewing method aimed to ensure synergy between the researcher’s intentions and participants’ interpretations. The TAP method involved participants reading through the survey, in the presence of the researcher, and describing out loud their interpretations of each question and how they would formulate a response. If there were any questions that participants felt were confusing or unclear, they were encouraged to comment and explain these to the researcher. After reading through the
survey, participants were asked to reflect upon the questions encountered and the responses they provided. They were then asked if there were any other aspects of the survey that they thought were ambiguous or confusing and whether the instrument had allowed them to adequately and accurately express their full experiences. After undertaking the TAP, two revisions were made to the survey. The survey introduction and instructions were amended to increase clarity of the purpose of the survey and how it should be completed. The format of Question 2 was also altered to allow respondents more freedom to describe the dominant emotions experienced when undertaking the assessed, online, group activities.

The final online survey comprised 7 items. Of these, two were closed-ended (using a 5-point Likert-type response scale) and five had short open-ended response options. In addition, the two closed-ended items had an optional ‘Additional comments’ box, providing respondents with the opportunity to explain and qualify their responses. The survey was split into four main sections. Section 1 explored the emotions experienced by students before, during, and after the online collaborative activities. Section 2 asked about the causes of pleasant and unpleasant emotions at the different stages of the activity. Section 3 inquired about the impact of emotions on participation (engagement in the task and working with others) and performance (overall achievement in the activity). Section 4 explored how students regulated, or managed, their emotions during the activities. Survey questions are given in Figure 9 and the full online survey is provided in Appendix F.
Section 1: Emotions experienced

- ‘What were the dominant emotions you experienced before, during and after the [...] online collaborative activity? (please list up to three emotions for each stage)’ (open text entry field)

Section 2: Causes of emotions

- ‘Can you state the causes for the main pleasant emotions that you experienced before, during and after the [...] online collaborative activity? (if any)?’ (open text entry field)
- ‘Can you state the causes for the main unpleasant emotions that you experienced before, during and after the [...] online collaborative activity? (if any)?’ (open text entry field)

Section 3: Impact of emotions on participation and performance

- ‘Do you think that the emotions you experienced in the [...] online collaborative activity had an impact on how you [participated or performed]?’ (5-point scale, ranging from ‘Yes, definitely’ to ‘No, definitely not’)
- ‘Can you state the emotions (if any) that had the biggest [positive/beneficial or negative/detrimental] impact on how you participated and/or performed in the [...] online collaborative activity?’ (open text entry field)

Section 4: Regulation, or management, of emotions

- ‘Do you feel that you were able to effectively regulate, or manage, the emotions you experienced in the [...] online collaborative activity?’ (5-point scale, ranging from ‘Yes, definitely’ to ‘No, definitely not’)
- ‘Can you explain what you did to try and regulate, or manage, the emotions you experienced in the [...] online collaborative activity?’ (open text entry field)

Figure 9. Survey items.

At the start of the survey, key terminology was defined (see Appendix F). To help students label and communicate the emotions they experienced, three items in the survey included an example list of 44 emotion-related words that could be viewed by participants to help with their responses (Figure 10). These emotion-related words aimed to provide an overview of emotional states that have previously been observed in similar educational settings, without being too exhaustive. Although this list of emotion-related words aimed to help students with their responses, it was made very clear that any other emotion-related words could be used when responding to the survey items. It must be stated that some of the words included in the list could be considered to represent kinds of
psychological conditions other than emotions (see Bernardo et al., 2009; Clore et al., 1987; and Ortony et al., 1987 for detailed discussion on this topic). For example, words such as isolation and belonging may refer to external conditions and boredom and curiosity may represent more cognitive psychological states (Ortony et al., 1987). However, as these terms have been previously referred as ‘emotions’ in educational literature (e.g., Hascher, 2010; Järvenoja & Järvelä, 2005; MacFadden, 2007; O’Regan, 2003; Pekrun et al., 2002; Rienties & Rivers, 2014; Wosnitza & Volet, 2005; Zembylas, 2008) it was decided that they would be included in this study. Each word was also of particular relevance to learning collaboratively online.

| Enjoyment, Frustration, Pride, Anger, Excitement, Anxiety, Surprise, Disappointment, Relief, Insecurity, Challenged, Isolation, Gratitude, Alienation, Hope, Inadequacy, Happiness, Guilt, Helplessness, Curiosity, Irritation, Annoyance, Admiration, Overwhelmed, Sympathy, Comfort, Engaged, Devalued, Sadness, Valued, Confusion, Supported, Fear, Dissatisfaction, Calmness, Shame, Disgust, Satisfaction, Boredom, Empathy, Belonging, Embarrassment, Unsupported, Regret |

**Figure 10.** List of example emotion-related words used in survey.

### 4.2.5 Data analysis

To analyse data from the quantitative survey items in this study, descriptive statistics were used. Frequencies (n, %) were calculated and transformed into graphs using Microsoft Excel 2016.

Qualitative data were analysed using two techniques: 1) word count analysis; and 2) conventional content analysis (described in Section 3.6.2).

Word count analysis was used to analyse data related to the types of emotions experienced by students and the emotional states students perceived to have positive and negative impacts on participation and performance. This process followed a number of steps. First, data were extracted from the Qualtrics survey platform and then data related to the types of emotions experienced and emotions perceived to impact participation and performance were sorted into separate documents. Second, data were read and re-read to become familiar with the content and any spelling mistakes of emotion-related words in the data were corrected. This was to ensure the precision and accuracy of the analysis. Third, data
were imported into the qualitative analysis software NVivo 12 and a Word frequency analysis was undertaken (see Leech and Onwuegbuzie, 2011, for guidelines). Fourth, emotion-related words were explored and the noun and adjective for the same words were combined together. For example, the words ‘anxiety’ and ‘anxious’ were counted under the same emotion-related category: ‘Anxiety’. Fifth, a word-cloud for all emotion-related categories was created and each category was then grouped as either pleasant, unpleasant, or unclassified/neutral. Words that might be considered to represent other kinds of psychological conditions (e.g., isolation, belonging) reported by students were also included in the analysis process.

Conventional content analysis was used to analyse data related to the causes of students’ emotions, how emotions impacted participation and participation, and the ways students regulated their emotions. This followed guidelines outlined by Hsieh and Shannon (2005). This allowed new insights to flow and emerge from the data, rather than preconceived concepts or variables being imposed in a more structured and directed approach (Hsieh & Shannon, 2005). The first stage of the analysis process involved reading and re-reading the qualitative data to become familiar with, and immersed in, the open response comments (including responses provided in the ‘Additional comments’ boxes) from the online survey. Data were then systematically worked through and interesting features that captured key thoughts or concepts were highlighted. Labels for codes were then identified and an initial coding scheme was created. Codes were then organised and grouped into meaningful clusters, termed ‘categories’, based on how different codes were related and linked to one another. The next steps involved providing definitions for each of the categories, identifying exemplars in the data in preparation for reporting the findings, and producing a hierarchical structure as a visual representation of the data analysis. Finally, frequency counts of each of the codes and categories were undertaken. All data were analysed using NVivo 12.

4.2.6 Trustworthiness

A number of steps were taken to ensure the quality and rigour of the data analysis process (these followed a number of suggestions outlined by Elo et al., 2014). For instance, throughout undertaking both word count analysis and content analysis, frequent debriefing sessions occurred with the researcher’s supervisory team. These sessions
allowed for analysis to be scrutinised and divergent opinions to be explored. Figures and tables also ensured findings were presented in a clear and understandable way. To increase the reliability of the content analysis findings, interrater reliability checks were completed (this followed steps similar to those outlined by O’Connor and Joffe, 2020). Inter-rater reliability procedures have been undertaken in previous research exploring emotions in group learning (Järvenoja & Järvelä, 2005; Volet et al., 2019). Due to the large quantity of qualitative data collected for both the causes of emotions and the ways students regulated their emotions, 30% was randomly selected and coded by another researcher (a different researcher for each set of data). As there was less qualitative data for the ways emotions impacted students’ participation and performance, 100% of the data were second coded (again, this was a different researcher to those who coded data related to causes and regulation strategies). All three researchers had considerable experience coding qualitative data and were not involved in the development of the coding framework. Tests of inter-rater reliability yielded the following Cohen’s kappa’s:

- .87 for causes of pleasant emotions and .80 for the causes of unpleasant emotions
- .87 for emotion regulation strategies
- .79 for impacts of pleasant emotions and .82 for the impacts of unpleasant emotions

These results indicate inter-rater reliability with substantial agreement (Landis & Koch, 1977). Minor disagreements were resolved through discussion.

4.3 Results

4.3.1 Emotions experienced

A total of 2317 emotion-related words were reported by the 291 students who responded to the first survey item. From these, 46 (2%) emotion-related words were not counted as it was thought they did not describe a specific emotional or psychological condition. For instance, responses included: ‘A feeling of get it over with’, ‘Good’, ‘Fine’ and ‘The realisation of the intense work involved’. Of the remaining 2271 emotion-related words, 98 specific emotion-related categories were found. These are illustrated in Figure 11. From these, 36 represented pleasant emotion-related categories (a total of 1011 words; 44.52%) and 60 represented unpleasant emotion-related categories (a total of 1147 words; 50.51%). Two emotion-related categories could be classified as either pleasant or
unpleasant (*challenge* and *surprise*; a total of 113 words; 4.98%), therefore, these were identified as unclassified/neutral emotion-related categories. The 20 most reported emotion categories are presented in Table 5.

2271 emotion-related words reported (1011 pleasant emotion-related words, 1147 unpleasant emotion-related words, and 113 unclassified/neutral emotion-related words)

98 specific emotion-related categories described (36 pleasant emotion-related categories, 60 unpleasant emotion-related categories and 2 unclassified/neutral emotion-related categories)

Emotions-related categories (frequencies in brackets):

- Anxiety (219), Relief (183), Frustration (179), Satisfaction (100), Curiosity (93), Irritation (91),
- *Challenge* (83), Hope (76), Engagement (68), Pride (63), Excitement (62), Enjoyment (60),
- Happiness (58), Calmness (56), Annoyance (55), Disappointment (51), Fear (50), Confusion (47),
- Supported (41), Dissatisfaction (41), Insecurity (40), Overwhelmed (36), Unsupported (31),
- *Surprise* (30), Belonging (28), Anger (25), Apprehension (24), Inadequacy (24),
- Boredom (22), Worry (21), Gratitude (17), Isolation (16), Regret (15), Admiration (14), Empathy (12),
- Anticipation (11), Interest (11), Nervousness (11), Helplessness (11), Stress (11), Determination (10),
- Embarrassment (10), Shame (10), Alienation (10), Comfort (9), Guilt (8), Impatience (8), Sadness (7),
- Devalued (7), Concern (7), Confidence (6), Accomplishment (5), Exhaustion (5), Dread (5),
- Enthusiasm (4), Intrigue (4), Unhappiness (4), Hopelessness (4), Motivation (3), Uncertainty (3),
- Disengagement (3), Camaraderie (2), Contentment (2), Gratefulness (2), Resolve (2), Valued (2),
- Apathy (2), Awkwardness (2), Despair (2), Disgust (2), Hesitancy (2), Insecurity (2), Reluctance (2),
- Resignation (2), Reticence (2), Tiredness (2), Trepidation (2), Joy (1), Optimism (1), Fulfilment (1),
- Encouragement (1), Drive (1), Eagerness (1), Commitment (1), Un ease (1), Withdrawn (1), Scary (1),
- Scepticism (1), Resentfulness (1), Reservation (1), Jadedness (1), Loneliness (1), Foreboding (1),
- Fury (1), Aversion (1), Complacency (1), Deflation (1), Demotivation (1)

**Figure 11.** Word cloud of the emotion-related categories used by students to describe emotions experienced when undertaking assessed, online, group activities (pleasant emotion-related categories: non-underlined; unpleasant emotion-related categories: underlined; unclassified/neutral emotion-related categories: *).
The most frequently reported emotion-related categories by students were anxiety, relief, and frustration (as shown in Figure 11 and Table 5). These were found to be the most reported by students in each of the following modules: ‘History and literature’ (cohort 1), ‘Computing’, ‘Cell biology’, and ‘Business’. In ‘History and literature’ (cohort 2), frustration, anxiety, and curiosity were most frequently mentioned, whilst in ‘International development’, relief, frustration, and curiosity were most reported.

Table 5. The 20 most reported emotion-related categories by students (pleasant emotion-related categories: non-underlined; unpleasant emotion-related categories: underlined; unclassified/neutral emotion-related categories: *).

<table>
<thead>
<tr>
<th>Emotion-related categories</th>
<th>Example emotion-related words used</th>
<th>Frequency reported</th>
<th>% of the 2271 emotion-related words reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>Anxiety, Anxious</td>
<td>219</td>
<td>9.64%</td>
</tr>
<tr>
<td>Relief</td>
<td>Relief, Relieved</td>
<td>183</td>
<td>8.06%</td>
</tr>
<tr>
<td>Frustration</td>
<td>Frustration, Frustrated</td>
<td>179</td>
<td>7.88%</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Satisfaction, Satisfied</td>
<td>100</td>
<td>4.40%</td>
</tr>
<tr>
<td>Curiosity</td>
<td>Curiosity, Curious</td>
<td>93</td>
<td>4.10%</td>
</tr>
<tr>
<td>Irritation</td>
<td>Irritation, Irritated</td>
<td>91</td>
<td>4.01%</td>
</tr>
<tr>
<td>*Challenge</td>
<td>Challenge, Challenged</td>
<td>83</td>
<td>3.65%</td>
</tr>
<tr>
<td>Hope</td>
<td>Hope, Hopeful</td>
<td>76</td>
<td>3.35%</td>
</tr>
<tr>
<td>Engagement</td>
<td>Engagement, Engaged</td>
<td>68</td>
<td>2.99%</td>
</tr>
<tr>
<td>Pride</td>
<td>Pride, Proud</td>
<td>63</td>
<td>2.77%</td>
</tr>
<tr>
<td>Excitement</td>
<td>Excitement, Excited</td>
<td>62</td>
<td>2.73%</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>Enjoyment, Enjoy, Enjoyed</td>
<td>60</td>
<td>2.64%</td>
</tr>
<tr>
<td>Happiness</td>
<td>Happiness, Happy</td>
<td>58</td>
<td>2.55%</td>
</tr>
<tr>
<td>Calmness</td>
<td>Calmness, Calm</td>
<td>56</td>
<td>2.47%</td>
</tr>
<tr>
<td>Annoyance</td>
<td>Annoyance, Annoyed</td>
<td>55</td>
<td>2.42%</td>
</tr>
<tr>
<td>Disappointment</td>
<td>Disappointment, Disappointed</td>
<td>51</td>
<td>2.25%</td>
</tr>
<tr>
<td>Fear</td>
<td>Fear, Fearful</td>
<td>50</td>
<td>2.20%</td>
</tr>
<tr>
<td>Confusion</td>
<td>Confusion, Confused</td>
<td>47</td>
<td>2.07%</td>
</tr>
<tr>
<td>Supported</td>
<td>Supported, Support</td>
<td>41</td>
<td>1.81%</td>
</tr>
<tr>
<td>Dissatisfaction</td>
<td>Dissatisfaction, Dissatisfied</td>
<td>41</td>
<td>1.81%</td>
</tr>
</tbody>
</table>

Figure 12 illustrates the most reported emotion-related categories at each stage of the collaborative activities (before, during, and after). Before collaboration, participants reported a total of 768 emotion-related words from 73 specific emotion-related categories. Of these, 27 represented pleasant emotion-related categories (a total of 266 words), 44 represented unpleasant emotion-related categories (a total of 468 words), and two represented unclassified/neutral emotion-related categories (a total of 34 words). The most frequently reported emotions at this stage of the group activities were anxiety,
curiosity, and excitement. Anxiety was the most reported emotion before the collaborative group activities for ‘History and literature’ (cohort 1), ‘Computing’, ‘Cell biology’, and ‘Business’, whilst curiosity was the most reported for ‘History and literature’ (cohort 2) and ‘International development’.

During the assessed, online, group activities, participants reported a total of 762 emotion-related words from 67 specific emotion categories. Of these, 24 represented pleasant emotion-related categories (a total of 244 words), 41 represented unpleasant emotion-related categories (a total of 460 words), and two represented unclassified/neutral emotion-related categories (a total of 58 words). The most frequently reported emotions at this stage of the collaborative activities were frustration, anxiety, and irritation. Frustration was the most reported emotion during the group activities for all modules.

After the assessed, online, group activities, students from all five modules reported a total of 741 emotion-related words from 64 specific emotions categories. Of these, 26 represented pleasant emotion-related categories (a total of 501 words), 36 represented unpleasant emotion-related categories (a total of 219 words), and two were unclassified/neutral (a total of 21 words). The most frequently reported emotions at this stage of the collaborative activities were relief, satisfaction, and pride. Relief was the most reported emotion after the group activities for all modules.
Figure 12. Emotions reported by students before, during, and after assessed, online, group activities.
4.3.2 Cause of emotions

In total, 262 students described the causes of their pleasant emotions and 255 students described the causes of their unpleasant emotions. Altogether, a total of 1273 descriptions of the causes of emotions were found (641 descriptions for pleasant emotions and 632 descriptions for unpleasant emotions). The number of descriptions was substantially higher than the number of respondents, as each item asked participants to describe what caused their emotions before, during, and after undertaking the group activity. Furthermore, participants often reported more than one cause at each of these stages. After a process of coding and organising codes into meaningful clusters (Hsieh & Shannon, 2005), eight categories of the causes of emotions were formulated. A brief overview of these are provided in Table 6. More detailed hierarchical structures of the specific causes of pleasant and unpleasant emotions are also illustrated in Figure 13 and Figure 14, respectively.

<table>
<thead>
<tr>
<th>Category</th>
<th>Example causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>Working and interacting with other students; Engagement and participation from group members; Support from others</td>
</tr>
<tr>
<td>Self</td>
<td>Self-belief in own ability; Own contribution and participation; Previous experiences in similar activities</td>
</tr>
<tr>
<td>Outcome</td>
<td>Completing the activity; Grades for the activity; Quality of the final product</td>
</tr>
<tr>
<td>Group</td>
<td>Group engagement and functioning; Group support; General group dynamics</td>
</tr>
<tr>
<td>Task</td>
<td>Topic of the task; Instructions and guidance; Task difficulty and workload</td>
</tr>
<tr>
<td>Learning model</td>
<td>New and unknown way of learning; Opinions about the type of learning activity; Relevance of this type of learning activity</td>
</tr>
<tr>
<td>Technology</td>
<td>Functionality and usability of technology; New and unknown technology</td>
</tr>
<tr>
<td>External</td>
<td>Situations or events that were entirely unrelated to the activity</td>
</tr>
</tbody>
</table>
Figure 13. Hierarchical tree of the causes of pleasant emotions when undertaking assessed, online, group activities.
Participation and engagement from other students \((n=117)\)
Behaviour and actions of other students \((n=22)\)
Reliance on other students \((n=17)\)
Delayed communication from other students \((n=16)\)
Working and interacting with other students \((n=16)\)
Judgement from other students \((n=15)\)
Familiarity of other students \((n=14)\)
Personality and characteristics of other students \((n=11)\)
Comparison with other students \((n=8)\)
Working to other students’ speed or schedules \((n=8)\)
Compensating for others \((n=7)\)
Other students’ understanding of the task \((n=6)\)
Fear of letting others down \((n=5)\)
Performance of other students in the activity \((n=5)\)
Fear of being let down by others \((n=3)\)
Feelings for other students \((n=1)\)
Other students taking offence \((n=1)\)
Tutor support and encouragement \((n=1)\)

Own participation and performance \((n=61)\)
Self-belief in own ability \((n=38)\)
Previous experiences of undertaking similar activities \((n=18)\)
Amount of time available to contribute to the activity \((n=12)\)
Motivation and determination \((n=6)\)
Reduced feelings of control \((n=5)\)
Mental health condition \((n=4)\)
Own behaviour and treatment of other students \((n=4)\)
Own personality and views \((n=3)\)
Preparedness for undertaking the activity \((n=1)\)

Unknown task details \((n=11)\)
Instructions and guidance \((n=9)\)
Workload of the activity \((n=8)\)
Compulsory or assessed nature of the activity \((n=6)\)
Specific aspect of the task \((n=6)\)
Topic of the task \((n=5)\)
Time required to complete the activity \((n=4)\)
Timing of the task \((n=4)\)
Difficulty of the activity \((n=2)\)
Structured nature of the activity \((n=1)\)
Opportunities to interact and collaborate \((n=1)\)

Group engagement and functioning \((n=27)\)
Group progress \((n=10)\)
Group dynamics \((n=4)\)
Group composition \((n=4)\)
Group disagreements \((n=2)\)
Group organisation and structure \((n=2)\)
End of group working together \((n=2)\)

Grade or result for the activity \((n=26)\)
Quality of the final piece of work \((n=13)\)
Overall experience of undertaking the activity \((n=5)\)
Completion of the activity \((n=1)\)

Opinions of type of learning activity \((n=16)\)
Value and relevance of this type of learning activity \((n=9)\)
A new and unknown way of learning \((n=8)\)
Suitability of undertaking group work online \((n=3)\)
Functionality and usability of technology \((n=13)\)
Use of new technology \((n=2)\)
Understanding of how to use technology \((n=1)\)

A personal situation or event unrelated to the activity \((n=2)\)

Others \((n=273; 43.2\%)\)

Self \((n=152; 24.1\%)\)

Task \((n=57; 9.0\%)\)

Group \((n=51; 8.1\%)\)

Outcome \((n=45; 7.1\%)\)

Learning model \((n=36; 5.7\%)\)

Technology \((n=16; 2.5\%)\)

External \((n=2; 0.3\%)\)

**Figure 14.** Hierarchical tree of the causes of unpleasant emotions when undertaking assessed, online, group activities.
It must be acknowledged that some overlap between a few of the categories was found. For instance, aspects of self can influence perceptions of others, and triggers in the outcome-category are connected to the self, others, and the group categories. These similarities are discussed in the descriptions of each category provided below. It was also found that specific causes of emotions in each category could also be differentiated by a time dimension. For instance, emotions could be evoked by events or situations that may occur: a) in the future (i.e., an emotion evoked by thinking about something that may happen); b) concurrently (i.e., an emotion caused by something in the present moment); or c) in the past (i.e., emotion evoked by thinking about something that has already occurred). Descriptions of each of the eight categories are now presented and verbatim exemplars from students’ responses are provided when discussing findings.

**Others**

This category describes emotions that are triggered by other people involved in the group activities (in both real and imaginary situations). Primarily, causes in this category related to other students in the group, however, students also described emotions that stemmed from their tutors. Emotions in this category mainly stemmed from one other person (I-s/he emotions) or some, or all, of the group a student is a member of (I-them emotions). Of the eight categories, the others-category was found to be the most frequently reported by participants. More specifically, this category was found to be more commonly reported for emotions experienced during the group activities (rather than before or after) and was associated more with unpleasant emotions.

The most frequently cited cause of unpleasant emotions in this category related to other students’ lack of engagement, participation, and contribution to the activities (e.g., ‘I felt frustrated as one member of the group was not contributing’). Other more commonly reported sources of unpleasant emotions in this category included: working with strangers or unknown others (e.g., ‘I was anxious at the thought of working with new people’); having to rely on other students to complete the activity (e.g., ‘relying on other people was worrying’); general working and interacting with others (e.g., ‘Nervous about interacting with others’); the fear of being judged negatively by other students (e.g., ‘there is always a fear of being judged by other students’); worry of letting others down (e.g., I felt anxiety that I would let the other members of the team down); and the behaviour and
actions of other students whilst undertaking the activity (e.g., ‘putting effort into suggesting some ideas and being shut down by one member of the group’).

For pleasant emotions, the most reported cause in this category related to the support and encouragement received from other students (e.g., ‘I did enjoy the support from some members of the group’) and, to a lesser extent, tutors (e.g., ‘I felt supported by my tutor’). Other causes of pleasant emotions in this category included: working and interacting with other students (e.g., ‘pleasure in discussing ideas with others’); the participation and performance of group members (e.g., ‘Relief - when people finally started engaging’); other students’ characteristics and traits (e.g., ‘they were really motivated and worked hard’); and observing and learning from other students (e.g., ‘Hearing other people’s ideas and perspectives was inspiring and interesting’).

**Self**

In the *self*-category, students described the source of their emotions as related to themselves. This was the second most described category by students. This category was more commonly reported for unpleasant emotions, particularly those experienced before undertaking the group activities.

Many of the causes of these unpleasant emotions prior to the activity stemmed from students’ lack of confidence, often relating to *anxiety*, *apprehension*, and *insecurity*. For instance, this included students’ self-doubts in their own ability (e.g., ‘I felt insecure in terms of my knowledge and understanding of the subject’) and worries about their potential contribution to the activity (e.g., ‘anxious that my contribution wouldn’t be good enough’). During and after the group activities, students’ own contribution and participation was more frequently cited as a cause of their unpleasant feelings (e.g., ‘I was worried my contribution wasn’t good enough’). Other sources of unpleasant emotions in this category included: students’ previous experiences of similar activities (e.g., ‘Anxiety based upon earlier experience of producing a Wiki’); a lack of motivation and determination (e.g., ‘extremely tired and unmotivated about doing a group activity’); limited time to take part (e.g., ‘I was worried about being able to complete the task in the time given’); and students’ mental health conditions (e.g., ‘I have severe mental health problems and this caused stress when checking the work’).
Pleasant emotions primarily derived from feeling motivated and looking forward to undertaking the group activities (e.g., ‘Looking forward to the exercise’). During and after the activities, students’ own participation and performance in the activities was the main source of pleasant feelings (e.g., ‘Proud of my personal contributions’). Other less frequently reported sources of pleasant emotions in this category included: feeling prepared (e.g., ‘Feeling somewhat prepared after a day school session’); positive previous experiences in similar activities (e.g., ‘I felt confident because of the earlier experience of an online group work’); and overcoming fears and challenges (e.g., ‘it was beneficial for me as it helped to dispel my initial fears’).

**Outcome**

This category specifically describes emotions that are aroused from the outcomes (both anticipated and actual) of the group activities, such as the grade for the activity, quality of the final piece of work, and a student’s overall satisfaction. This category did not include emotions deriving from more process-related aspects of the activity, such as engagement, participation, and contribution of the students themselves (included in the *self*-category), other students (included in the *others*-category), or the group (included in the *group*-category), as these were not classed as activity outcomes. Causes in the *outcome*-category were found to stem from outcomes of individual students (such as a student receiving a good grade) or the whole group in which students were working (such as the group receiving a good grade). There was no mention of the emotions stemming from the outcomes of other students (such as the grade achieved by another student); however, emotions generated in such a way are possible. It is clear that this category is closely related to the *self, others,* and *group* categories. Due to the high frequency of the causes related to activity outcomes, as well as the difficulty separating these into the aforementioned categories, it was deemed preferable to include this as a separate category.

Causes in this category were more frequently reported for emotions experienced after the activities had been completed and were found to be more prevalent for pleasant emotions. The completion of the activity was the most described cause of pleasant emotions in this category, often relating to the feelings of *relief* and *satisfaction*. For instance, ‘Relief because it was over and submitted’ or ‘Satisfaction that we completed the task on time’.
The grade or end result of the activity was also a commonly experienced source of pleasant emotions (e.g., ‘I hoped for the best possible outcome and result from the activity’). Other triggers of pleasant emotions (particularly pride) in this category included: the overall quality of the work produced (e.g., ‘I was pleasantly surprised with the end document’); the overall experience of completing the activity (e.g., ‘hoped that this would be a good, mutually rewarding experience for the whole group’); and the overall learning from the activity (e.g., ‘happy with the new knowledge gained’).

For unpleasant emotions, the grade or result of the activities was the most described source in this category. For instance, ‘Insecurity about the end result’ or ‘I felt resigned to getting a low mark which made me feel sad’. The quality of the work (e.g., ‘Frustrated because the work we produced was rubbish’) and overall experience (e.g., ‘Disappointment as it wasn't a nice experience’) were also highlighted by participants as triggers of unpleasant feelings.

**Group**

The fourth most reported category was group. This category describes emotions that derive from working as a group and relate to whole group processes. This differs from the others-category, which describes emotions directed at one other person (I-s/he emotions) or some, or all, of the group that a student belongs to (I-them emotions). When describing the causes of emotions in the group-category, students would typically use ‘we’, ‘us’ or ‘our’ in their descriptions. This category was found to be more commonly reported during the group activities and was more associated with pleasant emotions.

Group engagement and functioning was the most described source of pleasant emotions in this category (e.g., ‘I am proud of my team - we were working well together and we were making all decisions as a group’). The encouragement and support provided by the group was also a more frequently mentioned source of pleasant emotions (e.g., ‘There was great support and empathy throughout the team’). Other group related causes of pleasant emotions included: general working in a team (e.g., ‘I just enjoyed working as a team’); group progress (e.g., ‘pleased with the progress we were making’); and positive group dynamics (e.g., ‘I feel that we bonded well as a group and there was banter between us’).
Unpleasant emotions were most frequently found to originate from poor group functioning and engagement (e.g., ‘worried the group wasn’t working effectively’). Other less described triggers of unpleasant emotions included the breakup of the group at the end of the activity (e.g., ‘Disappointed that we had disbanded’) and the structure and organisation of the group (e.g., ‘we lacked team structure’).

Task

This category describes emotions that are triggered by the task itself. For instance, the topic of the task, task instructions and guidance, and task the difficulty and workload. Emotions in this category were found to be aroused more frequently before and during the group activities.

For pleasant emotions, the topic of the task was found to be the most cited cause (e.g., ‘I was excited to get into the actual pathology of a neurological disease’). One participant also noted how they felt empathy when researching a neurodegenerative disease, ‘During the activity I felt empathy while researching Alzheimer’s’. Other causes of pleasant emotions included: the challenge or difficulty of the activity (e.g., ‘I felt happy as it was at a level that was challenging but attainable’); and specific elements of the task (e.g., ‘I really enjoyed the scientific part, reading the literature and collecting information’).

Unpleasant emotions were most frequently aroused by aspects related to task design and implementation. For example, the compulsory nature of the task (e.g., ‘Irritation –we’re forced to work in a group’), workload (e.g., ‘The activity as a whole looked like a huge amount of work so I felt quite challenged and overwhelmed’), the timing of the activity (e.g., ‘This was compounded by the fact that it fell during Easter school holidays which made life more complicated for some’), and the amount of time required to complete the activity (e.g., ‘Didn't enjoy the experience, very time consuming’) were all highlighted as causes of unpleasant feelings. Participants also noted how the instructions and guidance of the task evoked unpleasant emotions (e.g., ‘I found the description of what we had to do a bit confusing’). Although tutor instruction could have been classified in the others-category, in this example it was deemed to be more related to the task itself; however, this does highlight the clear links between these categories. The topic of the task was also described as a source of unpleasant emotions by a couple of participants (e.g., ‘I felt sadness in particular, and frustrated at the disease and how debilitating it is’).
Emotions were also found to stem from the learning model itself. This category differed from the task category as it related to emotions deriving from working in a social and collaborative learning context, rather than emotions stemming from features and aspects of the specific task being undertaken.

For numerous students, undertaking online collaborative learning was a new and unknown way of learning. This caused both pleasant and unpleasant emotions. For instance, one student stated: ‘Excited as it is the first time to participate in online group work’, whilst another wrote: ‘Fear of the unknown as I had little knowledge of this type of learning and didn’t know what to expect’. Students’ preconceived opinions about this pedagogical learning model were also a source of emotion. For example, a student described how they experienced anxiety before completing the task due to their dislike of group work, ‘I was anxious - group work is not my favourite thing as I work better independently’. Whereas another student stated that they were excited by the prospect of learning with others rather than on their own, ‘Much of the work done up to now had been solitary and I enjoy working as a team’.

Other sources of unpleasant emotions in this category included: the suitability of collaborative learning in online settings (e.g., ‘annoyance because I find this type of assignment not suitable for a distant learning setting’); and the value of undertaking this type of learning (e.g., ‘I also felt irritation as I feel this really benefits people who are either in, or studying to enter, the workplace. I felt this activity should be an option’).

A few students described how undertaking the group activity had changed their opinions of working collaboratively online which led to pleasant emotions (e.g., ‘I became fully immersed in the task and working online with the group work; I enjoyed this type of learning more than I thought I would). Pleasant emotions, often related to relief, were also evoked by finishing the group activities and not having to continue with this type of learning (e.g., ‘Glad it was all over and hopefully not something I'll have to do again’).

Technology

The technology-category describes emotions that are caused by the technology used in the online group activities. Overall, causes of pleasant and unpleasant emotions in this
category were described infrequently. It must be noted that the task and technology categories are linked to one another, as the design of the task influences the technology used.

Many of the responses indicated that the limited functionality and poor usability of technology caused unpleasant emotions (e.g., ‘Irritated due to restricted access to some web development technologies meant learning on a crude platform’). Another source of unpleasant emotions included using new or unknown technologies. For instance, one student wrote: ‘I felt great anxiety about creating a Wiki as I still wasn’t entirely sure what it was’. Although this category was primarily a source of unpleasant feelings, a couple of responses did highlight instances where pleasant emotions had stemmed from technology. These responses were, however, found to reflect students’ relief that the technology was working properly and not creating problems rather than more positive aspects of using the technology itself.

External

The external-category describes emotions that were aroused by situations or events that were entirely unrelated to the group activities. This was the least frequently described category and only contained two descriptions; both of which related to unpleasant emotions. One student highlighted how a bereavement was causing them to experience stress and anxiety, whilst another student described how unpleasant emotions caused by their line-manager translated into the collaborative activity.

Table 7 illustrates how frequently each category was described by participants for the different stages of the assessed, online, group activities.
Table 7. Causes of pleasant and unpleasant emotion in assessed, online, group activities.

<table>
<thead>
<tr>
<th>Category</th>
<th>Before</th>
<th>During</th>
<th>After</th>
<th>Total</th>
<th>Before</th>
<th>During</th>
<th>After</th>
<th>Total</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td></td>
<td></td>
<td>%</td>
<td>n</td>
<td></td>
<td></td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Others</td>
<td>33</td>
<td>88</td>
<td>28</td>
<td>149</td>
<td>23.2</td>
<td>168</td>
<td>118</td>
<td>174</td>
<td>422</td>
</tr>
<tr>
<td>Self</td>
<td>35</td>
<td>36</td>
<td>47</td>
<td>118</td>
<td>18.4</td>
<td>54</td>
<td>33</td>
<td>45</td>
<td>270</td>
</tr>
<tr>
<td>Outcome</td>
<td>12</td>
<td>174</td>
<td>186</td>
<td>56.5</td>
<td>8.8</td>
<td>4</td>
<td>34</td>
<td>45</td>
<td>231</td>
</tr>
<tr>
<td>Group</td>
<td>19</td>
<td>44</td>
<td>35</td>
<td>98</td>
<td>13.9</td>
<td>9.8</td>
<td>7</td>
<td>51</td>
<td>149</td>
</tr>
<tr>
<td>Task</td>
<td>19</td>
<td>20</td>
<td>5</td>
<td>44</td>
<td>13.9</td>
<td>10.2</td>
<td>1.6</td>
<td>6.9</td>
<td>101</td>
</tr>
<tr>
<td>Learning model</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>44</td>
<td>13.9</td>
<td>6</td>
<td>6.2</td>
<td>6.9</td>
<td>80</td>
</tr>
<tr>
<td>Technology</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0.0</td>
<td>1.0</td>
<td>0.0</td>
<td>0.3</td>
<td>18</td>
</tr>
<tr>
<td>External</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>137</td>
<td>196</td>
<td>308</td>
<td>641</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>1273</td>
</tr>
</tbody>
</table>

Note. Categories are listed in descending order based on overall frequencies. *Percentage of column total.
4.3.3 Impact of emotions

From the 267 students who responded to two closed-ended statements about the impact of emotions when undertaking the assessed, online, group activities, most believed that emotions did have an impact on their participation (73.41% selected either ‘Yes, somewhat’ or ‘Yes, definitely’ response options) and/or their performance (67.04% selected either ‘Yes, somewhat’ or ‘Yes, definitely’ response options) in the tasks. Figure 15 illustrates participants’ responses to these statements.

![Figure 15](image)

Figure 15. Students’ perceptions of the impact of emotions on participation and performance in the assessed, online, group activities.

After asking students about their perceptions of whether emotions impacted their participation and/or performance in the assessed, online, group activities, they were asked to list the emotions they perceived to have had a positive or a negative impact (see Figure 16). 235 students responded to this survey item. Many of those who did not respond previously selected that emotions did not have an impact on their participation and/or participation in the previous item. When asked to list the emotions that had a positive impact, students reported 224 emotion-related words from 33 specific emotion categories. Of these, 22 represented pleasant emotion-related categories (a total of 177 words), 9 represented unpleasant emotion-related categories (a total of 32 words), and 2 represented
unclassified/neutral emotion-related categories (a total of 15 words). The most frequently described emotion-related categories that had a positive impact were supported, engagement, anxiety, and determination. When asked to list the emotions that had a negative impact, students reported 264 emotion-related words from 37 specific emotion-related categories. Of these, 36 represented unpleasant emotion-related categories (a total of 262 words) and one represented an unclassified/neutral emotion-related category (a total of 2 words). The most frequently described emotion-related categories that had a negative impact were frustration, anxiety, irritation, and fear.
Although not specifically asked for in the survey, a number of participants discussed how emotion-related categories impacted their participation and/or performance. These were primarily found when students were asked to list the emotions, they perceived to have positive and negative impacts during the activities. However, other descriptions were also found in ‘Additional comments’ boxes throughout the survey. After analysing the 158
descriptions found in the survey (62 related to pleasant emotion-related categories and 96 related to unpleasant emotion-related categories), five categories were identified (see Table 8). Descriptions of each of category, including verbatim exemplars, are provided below.

**Table 8.** Ways in which emotions impacted participation and/or performance when undertaking assessed, online, group activities.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Description</th>
<th>Pleasant</th>
<th>Unpleasant</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavioural involvement</strong></td>
<td>Change in behavioural engagement in the task. Such as: effort; frequency of participation and interaction; and time committed to the activity.</td>
<td>16</td>
<td>47</td>
<td>63</td>
</tr>
<tr>
<td><strong>Motivational involvement</strong></td>
<td>Change in motivation and interest in relation to the activity. This category also includes changes in confidence and belief in ability to complete the activity.</td>
<td>27</td>
<td>14</td>
<td>41</td>
</tr>
<tr>
<td><strong>Social/ relational involvement</strong></td>
<td>Change in the support and encouragement provided to other students in the activity. This category also includes changes in how students communicate with each other during the activity (e.g., content or tone of interactions).</td>
<td>14</td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td><strong>Cognitive involvement</strong></td>
<td>Change in attention, focus, and decision making in the activity.</td>
<td>5</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td><strong>Health and wellbeing</strong></td>
<td>Change in health and wellbeing (mental and physical) when completing the activity.</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>N.A</td>
<td>62</td>
<td>96</td>
<td>158</td>
</tr>
</tbody>
</table>

*Note.* Categories are listed in descending order based on overall frequencies. *Percentage of column total.*
Pleasant emotion-related categories (curiosity; pride; satisfaction; supported; belonging; and excitement) were found to have positive impacts.

- Descriptions most frequently highlighted how pleasant emotion-related categories impacted motivational involvement. This primarily related to how these emotion-related categories enhanced motivation, interest, and confidence when undertaking the group activities. For instance, one participant described how feelings of curiosity increased their levels of interest and enhanced their motivation to learn more about the topic. Another participant described how feelings of pride impacted their confidence, ‘as we proceeded with the work, I was proud of my contribution and that gave me a better sense of confidence within my work’.

- The second most described way pleasant emotion-related categories impacted students’ participation was by increasing behavioural involvement. This frequently related to how pleasant emotions increased students’ effort, participation, and contribution to the activities. For instance, one student described how their excitement made them more ‘productive’ and caused them to ‘try harder’ at the start of the activity. Another wrote that their admiration for others led to increased effort in the task, ‘I saw others participating, even though they expressed similar fears to me, which prompted me to have a go and try my best’.

- Participants also described how pleasant emotion-related categories impacted their social/relational involvement. This primarily related to how these emotions positively influenced the support and encouragement they provided to others. One participant, for instance, described how their feelings of sympathy impacted the support they provided to fellow group members, ‘I was concerned that other members of the team were not getting any input, so tried to encourage and support them as much as I could’. Another participant noted that their feelings of belonging increased the support they offered to other students as well as influenced the manner in which they communicated with their group (i.e., by being more friendly and helpful).

- A small number of descriptions also described how pleasant emotion-related categories impacted cognitive involvement. These were primarily related to increased attention and focus as well as being more decisive.
Although unpleasant emotion-related categories were predominantly associated with detrimental impacts, students’ descriptions also highlighted a number of ways in which they could facilitate engagement in the activities. Facilitative and debilitating impacts were mostly associated with the emotions of anxiety and frustration.

- Overall, unpleasant emotion-related categories were most often found to impact students’ behavioural involvement. There were slightly more descriptions of detrimental impacts in this category (27 out of the 47 descriptions). Many of these descriptions related to how unpleasant emotion-related categories caused participants to delay their involvement at the start activities or take more of a ‘step back’ during the activities. For instance, one participant wrote: ‘Feeling overwhelmed made it difficult to start the project and get involved straight away’. Another noted: ‘Frustration made me sit back in the activity a bit more than I would have otherwise’. More extreme behavioural disengagement was also noted by a few participants. For example, one participant noted that they did not submit part of their assignment due to their anxiety about receiving a low score. Another student wrote: ‘My disappointment, frustration and sadness experienced during the activity was the final straw and caused me to discontinue from the course’. A number of descriptions in this category were also found to relate to facilitative impacts (20 out of the 47 descriptions). For instance, one participant wrote: ‘Frustration resulted in continued efforts to move the task forward getting a result’. Another commented: ‘Anxiety made me work many hours to complete the task. This was a negative emotion with a positive impact, I needed the impetus of fear, and potential shame, to finish.’

- The second most frequently described way that unpleasant emotion-related categories influenced engagement was through social/relational involvement. Significantly more descriptions of detrimental impacts were found (18 out of the 20 descriptions). For instance, in relation to anxiety, one participant wrote: ‘Anxiety meant that I may be withheld some of my thoughts or altered how I gave feedback – I was reluctant to offend’. Another participant commented that their irritation influenced how they communicated with another student, ‘I found I snapped at the ‘controlling’ member of the team when she incorrectly changed someone’s work regarding citations’. Both facilitative comments related to how
anxiety positively influenced the support provided to other students (e.g., ‘My anxiety drove me to encourage others and bring the team together’).

- In terms of motivational involvement, unpleasant emotion-related categories were predominantly found to have detrimental impacts (12 out of the 14 descriptions). For instance, one participant described how their frustration at others’ lack of involvement decreased their motivation in the activity, ‘I thought if other members of the team can’t be bothered why should I?!’. Another student described how their feelings of inadequacy reduced their confidence in participating, ‘my worries and doubts about my own ability and what others would think of me meant I was not confident in contributing’. Two descriptions of facilitative impacts were found. For instance, one participant wrote: ‘The fear that I may fail the course completely motivated me to push through and complete the activity’.

- A small number of descriptions highlighted how anxiety impacted cognitive involvement. Again, this related to both facilitative impacts (e.g., ‘Anxiety meant that I focused more closely, so that my contribution would be positive and well thought out’) and debilitative impacts (e.g., ‘anxiety made it hard to concentrate’).

- A few participants also described how unpleasant emotion-related categories negatively impacted their health and wellbeing. For instance, one participant wrote: ‘anxiety caused physical symptoms such as fatigue and weakness which made completing the task very difficult’. Another wrote: ‘the stress and anxiety about the group work reduced my sleep and ultimately led to ill health, this had a negative impact on my participation’.
4.3.4 *Emotion regulation*
When participants were asked if they felt they could regulate, or manage, their emotions effectively in the assessed, online, group activities, the majority of the 258 respondents to this item believed that they could (82.56% selected either ‘Yes, definitely’ or ‘Yes, somewhat’ response options). Figure 17 illustrates participants responses to this survey item.

![Figure 17](image.png)

**Figure 17.** Students’ perceptions of whether they felt they were able to regulate, or manage, their emotions when undertaking assessed, online, group activities.

In total, 238 students responded to the open-ended survey item about the ways in which students regulated their emotions. Throughout the survey, 318 descriptions of emotion regulation strategies were found. This was higher than the number of respondents as more than one emotion regulation strategy was often stated in each response and relevant data were also provided in ‘Additional comments’ boxes. A number of participants’ responses also related to ‘doing nothing’. As this was not thought to represent an emotion regulation strategy, these were not included. After analysis, 45 specific codes describing emotion regulation strategies emerged. These were subsequently organised into the five general categories: 1) *social support*; 2) *changing or directing thoughts*; 3) *active task-related behaviour*; 4) *modifying emotional response*; 5) *evasion or avoidance*. Descriptions of each of the five categories are presented and verbatim exemplars are provided. Figure 18 illustrates a hierarchical structure of the emotion regulation strategies used by students in the assessed, online, group activities.
Figure 18. Hierarchical tree of the emotion regulation strategies used by students when undertaking assessed, online, group activities.
**Social support**

Of the five categories, strategies in the *social support* were found to be the most frequently reported (*n*=85; 26.7%). This category describes how students regulate their emotions through social exchanges with other individuals, and involves seeking, giving, and receiving different kinds of support and encouragement. For instance, this includes emotion-related support (e.g., sharing feelings with others or listening to, and comforting, other group members) and task-related support (e.g., receiving or providing task-related advice and guidance).

Of the seven strategies included in this category, four were related to students sharing their emotions and feelings with others. Most frequently, students reported expressing their concerns to their tutor (e.g., ‘I contacted my tutor during the assignment to express my concerns and ailing health due to the anxiety and stress being experienced’) and their family and friends (e.g., ‘Discussed my emotions with my support network of family and friends’) to help regulate their emotions. It was also found that participants shared their emotions with their fellow group members (e.g., ‘I shared my fears with my group’) and other individuals, such carers and medical professionals (e.g., ‘I spoke to my care team’). Seeking support and reassurance from others was also identified as a strategy for emotion regulation. One participant wrote that they regulated their emotions by: ‘Seeking help from everyone, knowing that they would provide guidance’. In addition to sharing feelings and seeking various types of support, students also reported supporting other group members as a way of regulating their own emotions. For example, one student stated that they: ‘I tried to motivate and be positive and supportive of others in the group so that we got it done together’. The use of humour to improve others’ feelings was also highlighted (e.g., ‘I therefore try to cheer up others, crack jokes and display positivity’).

**Changing or directing thoughts**

The second most frequently reported category was *changing or directing thoughts* (*n*=82; 25.8%). This category includes emotion regulation strategies predominantly aimed at changing the way students think in order to change the way they feel. For instance, this includes strategies aimed at altering the situation’s meaning, directing thoughts in a specific direction, and increasing the focus of cognitive resources on the task at hand.
The most reported strategy in this category was accepting the situation and carrying on. For instance, one participant wrote: ‘Gritted my teeth and accepted the fact I probably will not get a good mark from this’. The second most reported strategy was reappraising the situation. This often involved reappraising the situation to keep things in perspective or to reduce the importance or value of the activity (e.g., ‘Tried to keep it in perspective - Only a level one year so didn't really matter for overall degree mark’). Other strategies included: focusing on the task (e.g., ‘I just kept my mind on what I needed to do, it would eventually stop!’); modifying thoughts about the activity by drawing on previous experiences (e.g., ‘have learned from past experiences that emotions shouldn't put a barrier on the task in hand’); thinking positively (e.g., ‘Try to keep in mind that I had done my best and that was good enough’) and ruminating about the situation (e.g., ‘Think about why I was feeling that way’). Comparison with others’ ability (e.g., ‘Checked all the stuff everyone was doing to gauge my abilities’) and feelings (e.g., ‘I soon realised that I was not alone in my feelings of anxiety’) were also strategies used by students to modify their thoughts.

Active task-related behaviour

The active task-related behaviour category was the third most frequently reported (n=67; 21.1%). In this category, practical actions are used to regulate students’ emotions. This typically involves increasing behavioural and social-behavioural engagement in the task. The most prevalent emotion regulation strategy in this category was increased task-specific interaction with other group members. For example, one participant stated: ‘I engaged quickly with team members - posting relevant information to help decide which way we would work on the group activity together’. This strategy was included in this category rather than social support as it was thought to be more connected with task engagement than supporting and encouraging others. However, it is evident that there is some overlap between these categories. The second most reported emotion regulation strategy in this category was increased effort and work rate (e.g., ‘Pushed myself as much as I could’). Many strategies included in this category are aimed at increasing students’ control over the collaborative task. For instance, all of the following were identified by participants: increasing organisation of the task (e.g., ‘Tried to stay organised and bring everyone back on topic, made deadlines clear’); prioritising the activity (e.g., ‘I put aside
time to do this, including in the evening at my workplace, if necessary’); monitoring group progress (e.g., ‘looking at the progression and checking on how everyone was doing’); creating a plan (e.g., ‘Making a schedule/plan of workload and time to spend on task(s)’); and compensating for others (e.g., ‘I tried to make sure that the wiki contributions were covered in case someone didn’t post up some work that we were expecting’). Participants also described how they regulated and considered their communication to other group members as a strategy for regulation their emotions. One student noted: ‘While I certainly shared my thinking and ideas I was more passive in this regard to allow and encourage other team members to make suggestions which I hoped would stimulate my own thinking’. Another stated: ‘I just responded calmly and politely, as we were communicating electronically I made sure I re-read anything I typed to give time to reflect’. Again, this strategy was not included in the social support-category as regulation was more related to a student’s own behaviour, rather than the social exchanges with others.

**Modifying emotional response**

The fourth most frequently reported category was modifying emotional response (n=51; 16.0%). Emotion regulation strategies included in this category attempt to directly change emotions by using various non-task related actions and behaviours as well as emotional suppression.

The most frequently reported strategy in this category was taking breaks to relax and calm down. Participants described taking time away from the activity to reduce their negative emotions before returning to the task. One student stated they ‘Took a few minutes away from the screen to regroup and breathe’. The second most reported regulation strategy in this category was the use of substances (e.g., ‘drank gin’, ‘Smoking’ or ‘ate chocolate’). A small number of participants also described suppressing or inhibiting the expression of their unpleasant feelings from other group members (e.g., ‘Refrained from telling some of the group what I actually thought, which if I had expressed would probably got me thrown of the course’). One student described that they suppressed their feelings as they did not want to disrupt group dynamics: ‘I tried not to let the other members of the group know that I was frustrated, annoyed or disappointed as I didn't think this would help to create a positive team working environment’. Specific relaxation techniques were also
used by some participants. For example, one student stated: ‘I did some mindfulness and relaxation techniques to reduce anxiety levels’ and another student wrote ‘I engaged in a large degree of CBT [cognitive behavioural therapy] to not throw my phone at the wall every day when I received endless notifications from people in the group’. Other regulation strategies in this category included exercising (e.g., ‘I do yoga’ or ‘went for walks’), resting (e.g., ‘if I'm too sore or depressed, I just go to my bed’), and venting feelings to oneself (e.g., ‘I vented my frustration to myself at the end of the project. I think holding back would have been detrimental to myself’).

**Evasion or avoidance**

The least frequently reported category was *evasion or avoidance* (*n*=33; 10.4%). This category describes strategies aimed at removing oneself from the emotional situation; it can be achieved using either cognitive (e.g., blocking out of mind) or behavioural (e.g., withdrawing from the activity) strategies.

Distracting oneself from the situation was the most reported avoidance strategy. This involved both mental (e.g., ‘I blocked it out of my mind’) and physical (e.g., ‘the only thing that helped me cope was not looking at my laptop’) distraction. It also included distraction from the whole collaborative activity (e.g., ‘I tried to not think about the assignment all the time’) or specific aspects relating to the task (e.g., ‘I ignored the Facebook group because it was full of angry and angsty comments’). This category of emotion regulation strategies also included withdrawn or reduced effort and engagement in the activity. For example, one student wrote: ‘I limited engagement as much as possible’ whilst another stated: ‘I coped by only putting in the bare minimum of effort’. This form of disengagement is the opposite of that reported in the *active task-related behaviour*-category. More extreme avoidance strategies included withdrawing from the activity altogether (e.g., ‘I withdrew from it’) and even deciding not to take part in the activity before it had started (e.g., ‘I decided not to do the activity’). A small number of students reported that they tried to regulate their emotions by completing the activity as quickly as possible. For instance, one student wrote: ‘Evasion; get in, be quick, get out’ whilst another stated: ‘I tried to do as much work as possible as quickly as possible so I could walk away from the project as soon as possible’. Strategies in this category also
included avoidance when interacting with group members (e.g., ‘Withdrew from interactions with said member’).

4.4 Discussion

4.4.1 Interpretation of findings
The aim of this study was to gain an initial understanding of students’ emotional experiences in assessed, online, group activities. Findings are now discussed in relation to the study’s four main research objectives as well as relevant research literature.

The first objective of this study was, ‘To explore the types of emotions experienced by students when undertaking assessed, online, group activities’ (linked to RQ1).

Findings revealed that students reported experiencing a wide variety of pleasant and unpleasant emotions. Overall, unpleasant feelings were reported slightly more frequently by students (primarily due to the prevalence of anxiety and frustration). This is consistent with previous research which has found that students often experience increased unpleasant feelings in these learning contexts (Capdeferro & Romero, 2012; Hilliard et al., 2020; Lawless & Allan, 2004). There were, however, many pleasant emotions reported by students. For example, of the 20 most reported emotions found in this study, 13 were pleasant emotional states (see Table 5). This finding demonstrates that although students may experience increased unpleasant emotions when undertaking assessed, online, group learning, they can also experience many pleasant emotions. This supports previous research undertaken at the OU (Donelan & Kear, 2018).

Another finding from this study was that students perceived emotions to change and fluctuate throughout the different stages of the activities, with a higher frequency of unpleasant emotions being reported before and during the activities and higher frequency of pleasant emotions being reported after the activities had finished. These findings highlight the dynamic and shifting nature of emotions, which have been reported previously in educational settings (Linnenbrink, 2006; Webster, 2019).

The three emotions most highly reported by students were: anxiety; frustration; and relief. The most common was anxiety. The pervasiveness of this unpleasant emotion in educational settings has been well documented (Pekrun et al., 2002a; Pekrun et al., 2018) and previous research has highlighted its prevalence in assessed, online, group learning.
(Allan & Lawless, 2003; Hilliard et al., 2020). Similar to Hilliard et al. (2020), this study found that anxiety was most reported before the group activities began and to a lesser extent during the activities and after they had finished. Frustration was by far the most reported emotion by students during the group activities. This finding supports previous research which has found this emotion to be commonly experienced when undertaking computer-supported collaborative learning (Reis et al., 2018) and online group collaboration in distance education contexts (Capdeferro & Romero, 2012; Robinson, 2013). After the group activities, the most reported emotion by students was relief. Despite the pervasiveness of this pleasant emotion in this investigation (the second most reported emotion overall), few studies have highlighted that this emotion is commonly experienced in online collaborative learning settings (Du et al., 2016).

The wide range of emotions reported in this study, highlights the benefits and importance of using an exploratory research design to investigate students’ emotional experiences in this learning context (or any learning context that has received little emotion-related research). Such emotional diversity could have easily been missed if a theory-driven approach were adopted that limited the range of emotions considered. For instance, if this study had been guided by Pekrun's (2006) CVT, many emotions described by students would not have been identified. This includes more socially related emotions (e.g., admiration, empathy, resentment, gratitude) and emotions related to epistemic aspects of the activities (e.g., curiosity, confusion, surprise). Ultimately, this would have meant that important aspects of student’s affective lives would have been overlooked.

The second objective of this study was, ‘To explore the causes of emotions in assessed, online, group activities’ (linked to RQ2).

This study identified that there were many causes of students’ emotions when undertaking assessed, online, group activities. These were grouped into eight categories: self; others; group; outcome; learning model; task; technology; and external. These findings are generally consistent with previous research that has explored the sources of students’ emotions in both online and face-to-face collaborative learning environments (e.g., Volet et al., 2019; Järvenoja and Järvelä, 2005; Wosnitza and Volet, 2005; Vuorela and Nummenmaa, 2004). This research extends such work, however, by exploring the causes of both pleasant and unpleasant emotions (instead of emotions in general) and
distinguishing between the causes of emotions at different phases of the group activities (before, during, and after).

Social aspects of the online group activities were found to be a prevalent source of emotion in this study. In particular, students described emotions stemming from others involved in the group activities (in both real or imaginary situations) as the most common cause of unpleasant emotions and the second most common cause of pleasant emotions. For unpleasant emotions, the lack of engagement and participation by other students was undoubtedly the most cited cause of these emotions. This emotional trigger has previously been identified as a stimulus of both *frustration* (Capdeferro & Romero, 2012; K. Robinson, 2013) and *anxiety* (Hilliard et al., 2020) in similar learning settings. For pleasant emotions, the support and encouragement received from others as well as working and interacting with other students were found to be the most cited reasons for these emotions. Such triggers have also been previously reported by students when working in online collaborative learning environments (Donelan & Kear, 2018; Volet et al., 2019; Marold Wosnitza & Volet, 2005). These findings demonstrate how social aspects of the activities can both be a benefit and detriment to students’ emotional experiences when learning in online groups.

In addition to emotions being caused by other individuals in the group activities, pleasant and unpleasant emotions were also found to stem from whole group processes (such as group engagement and support). According to Wosnitza and Volet (2005), emotions caused by the group a student belongs to, may suggest that students share similar feelings with one another (e.g., a feeling shared *enjoyment* at how well the group is working together). However, this may alternatively only reflect the individual’s perspective of the situation. Due to the social nature of the pedagogical model and group learning environment investigated here, it is no surprise that social situations have been identified as a prevalent source of emotional responses by students in this research.

Along with socially related causes, triggers of emotions were also found to frequently stem from the students themselves. For instance, a lack of confidence in one’s own ability and doubts about one’s contribution were found to cause unpleasant emotions; whilst positive participation and contribution in the activity and feeling motivated and determined to take part were causes of pleasant emotions. Similar to the findings of Järvenoja and Järvelä (2005) and Hilliard et al. (2020), this study highlighted the
prevalence, and importance, of these self-driven emotions (particularly those related to self-efficacy and confidence) in the early stages of online group learning activities. For instance, increased confidence before or at the start was often associated with pleasant emotions, whereas reduced confidence was associated with unpleasant emotions (such as anxiety, apprehension, and insecurity). This is also similar to the findings of Kahu et al. (2015), who investigated the emotional experiences of adult distance learners. These researchers found that high self-efficacy is needed for enjoyment and enthusiasm, whereas low self-efficacy can lead to various unpleasant emotions, such as anxiety, frustration, and boredom.

Although emotions triggered by the outcome of the activities were frequently described in this study, such sources of emotion have been less reported in previous research. There are several reasons that might help explain this. First, existing research has not always investigated collaborative activities that have been linked to assessment. The increased importance associated with these types of activities may, therefore, have increased the prevalence of emotions triggered by activity outcomes. Second, few studies have specifically explored emotions experienced after collaborative activities have been completed. In this study, causes in the outcome-category (for both pleasant and unpleasant emotions) were predominately linked to emotions experienced in this stage. As such, these causes could have been easily missed if this ‘after’ stage had not been investigated. These findings, therefore, highlight the importance of exploring students’ emotions before, during, and after online group activities. Third, studies have often focused on students’ experiences of a small number of emotions (primarily unpleasant) during online collaborative learning (Allan & Lawless, 2003; Capdeferro & Romero, 2012; Hilliard et al., 2020). In this study, sources in this category were mostly linked to pleasant emotions of relief and satisfaction; both of which have received very little prior investigation in these learning settings.

The learning model, the task itself, and the technology used during the activities have all previously been described by students as evoking emotions when undertaking online collaborative learning (Järvenoja & Järvelä, 2005; Vuorela & Nummenmaa, 2004; Marold Wosnitza & Volet, 2005). In this study, it was clear to the prospect of undertaking social learning was a trigger for pleasant emotions for some students (a change from the independent style of learning they were more accustomed to at the OU). For others, however, their preconceived ideas about the pedagogical model evoked unpleasant
emotional responses. Although slightly more causes of pleasant emotions were found in the *learning model*-category, a number of these pertained to *relief* about not having to continue with this type of learning, rather than pleasant emotions directed at the learning model itself. Various aspects of the task were found to evoke emotions which have important implications on the design of the activities. For instance, ensuring that the topic of the task is interesting and relevant, the workload is not too demanding, the assessment of the activity takes into consideration individual contribution (and is not wholly based on a group mark), and that instructions and guidance are clear will help promote positive emotions and reduce unpleasant emotions during the group activities.

The limited prevalence of emotions stemming from technology reported in this study, supports previous research which has identified that emotions in online collaborative learning environments are more connected to the students themselves, other group members, and performance in the activities (Vuorela & Nummenmaa, 2004). And are less connected to the technology used to interact, collaborate, and complete tasks (Capdeferro & Romero, 2012; Hilliard et al., 2020; Järvenoja & Järvelä, 2005; Robinson, 2013; Vuorela & Nummenmaa, 2004). It could be speculated that with the increased use of technology in education over the last two decades, students are now more normalised to using technological tools when learning. This increased familiarity and confidence may, therefore, reduce *anxieties* that can be experienced when using various technologies in academic contexts.

Although most emotions were a direct reaction to what was happening in the group learning settings, there were instances where emotions originated from situations and events outside of the learning context. These external triggers were found to be solely related to unpleasant emotions; it is, however, likely that pleasant emotions generated outside of the learning context could also intrude on group learning situations. As highlighted by Vuorela and Nummenmaa (2004), the fact that emotions can be brought into group learning activities from outside the educational context means that it is nearly impossible for practitioners to control all of the events that influence emotions in collaborative learning environments. Furthermore, Pekrun et al. (2018) highlight that such emotions can also have a significant influence on students’ learning and achievement. For instance, the intense unpleasant emotions that can be experienced after an event such as a bereavement, may have detrimental impacts on a student’s performance.
The third objective of this study was, ‘To explore the impact of emotions on participation and performance when undertaking assessed, online, group activity’ (linked to RQ3).

Findings revealed that the majority of students believed that emotions impacted their participation and performance in the online group activities. Overall, pleasant emotions were perceived by students as having beneficial impacts. For instance, emotions such as curiosity, enjoyment, and pride were found to enhance motivation, increase behavioural engagement, and augment social functioning. Although unpleasant emotions were predominantly associated with detrimental impacts (e.g., reduced participation, motivation, confidence, and wellbeing), some students also perceived these emotions (primarily anxiety and frustration) to have beneficial effects during the activities (e.g., increased effort and motivation). Interestingly, a range of social emotions, and other socially related feelings, were also identified as having important functions. For instance, pleasant social emotions (e.g., admiration, sympathy) and related feelings (e.g., supported, belonging) were found to positively influence student engagement (e.g., motivation, social functioning), whereas unpleasant social emotions (e.g., resentment) and related feelings (e.g., devalued, inadequacy) were perceived as having harmful effects.

These findings provide support for existing theoretical propositions (e.g., Hareli and Parkinson, 2008; Pekrun, 2006; Fredrickson, 2004) and are generally consistent with previous empirical research undertaken in traditional academic settings exploring the effects of emotions (e.g., Rowe and Fitness, 2018; Rowe et al., 2015; Pekrun et al, 2002). Comparing results to existing research in the similar learning contexts is slightly more difficult, due to the scarce inquiry that has been undertaken in these academic settings (see Section 2.2.4). A few studies have, however, reported the benefits of pleasant emotions and detriments of unpleasant emotions when working collaboratively. For instance, during an in-class computer-based collaborative learning problem solving task, Camacho-Morles et al. (2019a) found pleasant emotions (enjoyment) to have beneficial impacts on adolescents students’ motivation, whereas unpleasant emotions (boredom and anger) were found to have detrimental impacts. Research undertaken during face-to-face group work by Linnenbrink-Garcia et al. (2011) has also shown that pleasant emotions (feeling happy or calm) enhance positive group interactions (e.g., engaged in active listing and respect and working cohesively with others), whereas unpleasant emotions (feeling tired and tense) cause reduced effort and undermine communication.
The role and functions of social emotions (e.g., admiration, empathy, contempt, or envy) have received especially little empirical research in education settings (Rowe & Fitness, 2018). Although pleasant social emotions are thought to positively influence interactions and interpersonal relationships in group learning environments and unpleasant social emotions are thought to have opposite effects (Pekrun, 2014; Pekrun & Linnenbrink-Garcia, 2012), little empirical evidence has been provided to support these claims. This is surprising, due to the potential for these emotions to be evoked in social learning setting as well as research in social psychology highlighting their importance for guiding and shaping social behaviours, interactions, and relationships (Hareli & Parkinson, 2008).

The positive consequences of experiencing unpleasant emotional states in educational settings has been discussed widely (e.g., Artino et al., 2012; Kahu et al., 2015; Pekrun et al., 2018; Pekrun & Linnenbrink-Garcia, 2012; Rowe & Fitness, 2018). Yet, to date, only a few studies have evidenced of this phenomenon in online collaborative learning environments. For instance, when investigating students’ experiences of anxiety in an assessed, online, collaborative project at the OU, Hilliard et al. (2020) found more learners perceived anxiety to have had a facilitative effect on their individual participation and performance than a debilitative one. Findings revealed that positive effects were often linked to increased work rate and motivation. It must also, however, be noted that for some students the experience of anxiety had detrimental consequences, which were linked to reduced effort and work rate, and the adoption of disengagement and avoidant behaviours. The present study has provided further evidence of the complex relationship between anxiety and student engagement in assessed, online, group learning. Additionally, it has extended findings from previous studies by identifying other unpleasant emotional states that may act as both enablers and inhibiters to engagement in these learning settings (e.g., frustration).

A number of reasons have been proposed to explain how unpleasant emotions can have both debilitative and facilitative effects. For example, it may depend on: how resilient someone is to the detrimental aspects of an emotion (Pekrun et al., 2018); students’ efforts and ability to regulate their emotions (Harley et al., 2019); how well-prepared a student is when undertaking the task (Webster, 2019); or how intense/powerful the experience of the unpleasant emotion is (Rowe & Fitness, 2018; Valiente et al., 2012; Yerkes & Dodson, 1908). In relation to anxiety, Strack and Esteves (2015) also propose that if people interpret this emotion as facilitative, they will appraise the emotional encounter,
or potential stressor, as a challenge (i.e., as an opportunity for self-growth or something positive) rather than a threat (i.e., as something negative). They believe that this interpretation will lead to increased motivation, effort, and enhanced levels of performance, as well as reduced levels of emotional exhaustion that are often associated with anxiety. This interpretation may explain why some individuals appear to experience facilitative effects whilst others experience debilitating effects, when faced in the situation. It is important that future research test such theories in online group learning settings, as findings may have important theoretical and practical implications.

The final objective of this study was, ‘To explore the strategies used by students to regulate their emotions in assessed, online group activities’ (linked to RQ4).

Findings revealed that participants used a wide range of emotion regulation strategies in these learning settings. These were classified into five distinct categories: social support; changing or directing thoughts; active task-related behaviour; modifying emotional response; and evasion or avoidance. Of these, social support was found to be the most reported category. These findings support previous studies which have highlighted the importance of interpersonal emotion regulation (i.e., the regulation of emotions through social processes) when managing emotions in similar learning contexts (Hilliard et al., 2020; Symeonides & Childs, 2015; Xu et al., 2013; Zembylas, 2008). Such forms of emotion regulation are thought to have many benefits. For instance, emotional sharing may be advantageous to mental health as it can help construct or reinforce social bonds as well as transfer affection and warmth between individuals (Rimé, 2007). Furthermore, this form of emotion regulation may: help reduce negative psychological responses to online learning (e.g., feelings of isolation and loneliness); encourage students to support one another; promote sharing of successful coping and regulation strategies; and help students become more mindful to what causes unpleasant feelings in other learners (Awang et al., 2014; Boekaerts & Pekrun, 2016; Xu et al., 2014).

These results demonstrate that a student’s social network, both inside of the educational setting (e.g., tutors and peers) and outside of it (e.g., family and friends), can influence how they regulate their emotions in online group activities. It is, therefore, vital that educators aim to foster supportive and trusting learning environments where students can communicate openly about their emotions and task-related issues. Previous research has shown that some students may be reluctant to discuss their feelings with their peers and
tutors when working collaboratively online, and this may be more prevalent when group members do not know each other and have lower feelings of social connectedness (Hilliard et al., 2020; Symeonides & Childs, 2015; Xu et al., 2014). In this study, for instance, students reported seeking support from their peers much less often than from either tutors or support from outside of the educational context (e.g., from family and friends). Thus, it is important that educators ensure that suitable opportunities are provided for students to discuss their social and emotional issues in the learning community (e.g., with fellow students, tutors, support staff).

Findings of this study also revealed that students used a range of intrapersonal emotion regulation strategies (i.e., strategies used to regulate emotions without social interaction). Many of these were grouped in the changing or directing thoughts and active task-related behaviour categories. Similar emotion regulation strategies to those reported in these categories have previously been found when investigating university students' emotion regulation in both traditional face-to-face settings (Jensen et al., 2016; Monteiro et al., 2014; Webster & Hadwin, 2015) and online collaborative learning contexts (Hilliard et al., 2020; Webster, 2019). For example, when exploring how students coped with anxiety in an assessed, online, collaborative project, Hilliard et al. (2020) found that they used a range of task-related behavioural regulation strategies, such as increasing effort in the task, planning time more thoroughly, and taking more control of the situation. Furthermore, during an in-class computer supported collaborative learning session, Webster (2019) found that students planned to use various cognitive strategies (e.g., focusing on the task, thinking positively) and behavioural strategies (e.g., creating a good plan) to regulate their pleasant and unpleasant emotional states. As many of the strategies included in the changing or directing thoughts and active task-related behaviour categories are considered adaptive emotion regulation strategies (e.g., those associated with beneficial outcomes, such as thinking positively, reappraising the situation, and increasing effort and work rate), it would be prudent for educators to provide students with knowledge of these strategies and encourage their use during the group activities.

Students in this study also reported using numerous non-task specific behavioural emotion regulation strategies (e.g., taking breaks to relax, sleeping, exercising, using relaxation techniques, and substance use). These were grouped into the modifying emotional response category. It is thought that such emotion regulation strategies can target both the physiological (e.g., heart rate, blood pressure, muscle tension) and
psychological (e.g., feelings of worry and uncertainty) aspects of an emotion (Boekaerts & Pekrun, 2016). Although such strategies have been highlighted previously in emotion regulation literature (Peña-Sarrionandia et al., 2015), little research has reported their use by students in educational settings. This may reflect the fact that previous studies in educational contexts have rarely explored how students regulate their academic emotions beyond the activities themselves. It may also reflect the affordances of regulating emotions in asynchronous online learning environments. For instance, these contexts allow students to regulate their emotions in ways that are less possible in face-to-face learning settings (e.g., by stepping away from the task to relax or go for a run).

One strategy included in the modifying emotional response category that has been frequently explored in coping and emotion regulation literature (including in educational contexts), is emotional suppression. This has often reported that the tendency to suppress or inhibit unwanted feelings is often associated with negative consequences (Aldao et al., 2010). For instance, research has shown that emotional suppression can increase unpleasant emotions and reduce mental health and well-being (Aldao et al., 2010; John & Gross, 2004). Furthermore, in social situations, hiding or inhibiting emotional responses can result in lower levels of rapport with other individuals and increase negative perceptions from interaction partners (Butler & Gross, 2009; Butler et al., 2003; Srivastava et al., 2009). Although emotional suppression can be viewed as a maladaptive response, it may also have potential instrumental benefits in collaborative learning contexts (Harley et al., 2019). For instance, and as found in this study, students may inhibit their emotions to reduce the prospect of group conflict and to try and maintain group harmony and functioning. Despite this, the use of emotional suppression should not be encouraged, whereas fostering and creating an environment where students feel safe and free to express their feelings should be.

Strategies grouped in the evasion or avoidance were the least reported by students in this study. Although these types of strategy (both in behavioural and cognitive forms) may have potential short-term benefits (e.g., a quick reduction in unpleasant feelings), they are generally considered maladaptive due to their potential long term psychological costs (Aldao et al., 2010). Furthermore, certain avoidant and evasive behaviours during the assessed, online, group activities may negatively impact students own performance (e.g., most assessed group activities award marks for participation) and have detrimental consequences on other students (e.g., a lack of engagement from other students was the
most prevalent cause of unpleasant emotions in this study). There were a few comments which described more adaptive forms of avoidance emotion regulation, however. For instance, one student described how they decided to ignore negative comments being made by other students on a Facebook group to reduce their unpleasant emotions. In general, it is important that educators try and identify and support those students who may use avoidance emotions regulation approaches during the group activities, due to the detrimental impacts these may have on themselves and other students.

4.4.2 Study limitations

Beyond limitations related to relying solely on self-report data and using online surveys (as discussed in Sections 3.5 and 3.5.1, respectively), there were a number of other limitations to this study that should be noted.

First, this study used a cross-sectional research design. This involved retrospective ratings of their emotional experiences after an extended period of time. As emotions are something felt in the moment, such a retrospective approach would increase issues of memory decay and recall bias. For example, delayed recollection of emotions may distort the nature or intensity of the emotion (Feldman Barrett, 1997; Mill et al., 2016). Furthermore, the increased unpleasant emotions reported by students in this study may have, in part, been influenced by the memory-experience gap; a memory bias observed where individuals often amplify the experience of unpleasant emotions in retrospective evaluations (Miron-Shatz et al., 2009).

Second, the findings are based on a self-selected sample. This would have obvious biases which could have impacted the study’s findings. For instance, there was a much higher percentage of female students in comparison to males in the present study (gender differences have been found in emotional experiences; Frenzel et al., 2007; McRae et al., 2008) and there were substantial differences in the numbers of students participating from each course (e.g., over half of the participants were from the ‘History and literature’ module).

Third, some of the survey items may have influenced students’ responses; for example, the list of emotion-related words included in the survey may have led participants to include these in their written responses. Furthermore, this study did not try to differentiate between emotion regulation of pleasant and unpleasant emotions. It may have been the
case that participants predominantly described how they regulated their unpleasant feelings when responding to this item.

Last, a number of the emotion-related words and categories reported by students (see Section 4.3.1 and 4.3.3) may represent other kinds of psychological conditions (Ortony et al., 1987). Although most, if not all, of the psychological states identified in this study have been classified as emotions in previous studies investigating affective and emotional states in educational contexts (see Rienties and Rivers, 2014, for an overview), it is evident that further classification is needed to separate emotional from non-emotional feelings.

4.5 Chapter Summary

In summary, this first study of the thesis has provided an initial exploration of students’ emotional experiences when undertaking assessed, online, group activities. Results from the online survey revealed that students reported experiencing a diverse array of pleasant and unpleasant emotional states, which stemmed from various aspects of the group activities (often related to other students, themselves, and the outcomes of the tasks) as well as factors outside of the learning environment. Findings also highlighted that emotions were perceived to have both beneficial and detrimental impacts on participation and performance and that students regulated their emotions using a variety of intrapersonal and interpersonal strategies. In the next chapter, Chapter 5, the second study of this thesis is described. This study used an online diary to explore students’ experiences of a number of specific pleasant and unpleasant emotions throughout an assessed, online, group activity.
5 Study 2 (Student Diary): Methods, Results, and Interpretation

This chapter describes the second study of this thesis. Study 2 aimed to gain a more in-depth understanding of students’ emotional experiences in an assessed, online, group activity and used a longitudinal research approach. This chapter is divided into four sections. First, ‘Study Purpose and Objectives’ (Section 5.1) provides a short background to the investigation and makes explicit the study’s research objectives. In ‘Materials and Methods’ (Section 5.2), details of the specific methods used in this study are provided, including information about the study context, participants, data collection procedures and methods, and data analysis techniques. Third, ‘Results’ (Section 5.3) reports the findings of the investigation in relation to the study’s research objectives. The final section, ‘Discussion’ (Section 5.4), interprets the significance of the study’s findings and describes the limitations to the research.

5.1 Study Purpose and Objectives

In the first study of this research, an online survey was used to explore students’ emotional experiences when undertaking assessed, online, group activities. Although this study provided a detailed snapshot of students’ experiences in these learning settings, capturing the fluctuating and dynamic nature of emotions as well as their consequences and regulation is often difficult when using such cross-sectional research designs (Henritius et al., 2019). As Lazarus (1991) notes, the study of emotion is primarily a study of change and flow over time and across occasions, and therefore, research approaches that can capture ever changing emotional experiences are highly desirable. In educational settings, the use of longitudinal research approaches (e.g., using diaries or experience sampling) have been advocated when investigating students’ emotional experiences (Goetz et al., 2016; Hascher, 2008; Henritius et al., 2019; Kahu et al., 2015). Such approaches are encouraged as they help reduce the recall period from when the emotion eliciting situation occurs to when participants are asked to recall information about these events; therefore, overcoming numerous limitations often associated with cross-sectional research (e.g., memory decay and retrospective bias; as discussed in Section 4.4.2).

Although longitudinal approaches have been widely adopted in traditional, face-to-face educational settings (e.g., Nett et al., 2011; Peterson et al., 2015), to date, there has been limited research using such research designs to explore students’ emotions in social online
learning contexts (Beirne, 2020; Kahu et al., 2015; Webster, 2019; Zembylas, 2008 are exceptions). This study, therefore, builds on methodologies previously employed by other researchers by using an online diary aimed at capturing students’ emotional experiences throughout the duration of an assessed, online, group activity. The aim of this investigation was to extend findings from Study 1 and provide a more fine-grained understanding of the causes, consequences, and regulation of pleasant and unpleasant emotions in these learning contexts. More specifically, this study focused on a small number of pleasant and unpleasant emotions that were found to be more pervasive in Study 1. Furthermore, this study aimed to understand why students regulated their emotions, not just how they did this. Understanding the goals individuals have for regulating their emotions is thought to be vital for fully understanding the process of emotion regulation (Tamir, 2016); yet currently, this area of investigation has been scarcely researched. This study sought to address the following research objectives:

1. To explore the prevalence of, and change in, pleasant and unpleasant emotions experienced when undertaking an assessed, online, group activity (linked to RQ1)
2. To explore the causes of pleasant and unpleasant emotions experienced when undertaking an assessed, online, group activity (linked to RQ2)
3. To explore how pleasant and unpleasant emotions impact participation when undertaking an assessed, online, group activity (linked to RQ3)
4. To explore the strategies used by students to regulate pleasant and unpleasant emotions in an assessed, online, group activity (linked to RQ4)
5. To explore the goals pursued by students when regulating pleasant and unpleasant emotions in an assessed, online, group activity (linked to RQ4)

5.2 Materials and Methods

5.2.1 Study context

This research was undertaken with students studying a level 2 undergraduate science module in ‘Cell biology’ (see Appendix E for more details). As this module had been included in the first study of this thesis, it was thought a suitable choice for this
investigation. Furthermore, module team chair permission was granted for undertaking this longitudinal study.

As part of this 9-month module, students were required to work in small groups (typically between 3 and 6 students) to undertake an assessed group activity which predominantly involved students working together to explore a specific neurodegenerative disease (Parkinson’s disease, Huntingdon’s disease or Alzheimer’s disease). Each group was required to research their chosen disease and contribute information to a wiki and then collectively generate a summary of information about the disease (no more than 1000 words). To carry out the project, groups were provided with an online discussion forum to interact and collaborate with each other. Students were also permitted to use other online communication and collaboration tools (e.g., Facebook, WhatsApp) throughout the project. Although groups could largely work how and when they wanted, a project planner with a suggested activity timeline was provided to each student (a brief overview of this is provided in Figure 19). A student’s overall grade for the activity was made up of both individual and group marks. The collaborative activity formed part of an assessment which contributed to a substantial proportion (25%) of the overall module grade.
From the 729 students registered on the module at the start of the 2018/2019 academic year, 245 students were available to be contacted about taking part in the study. A large proportion of students could not be contacted because they had either taken part in other educational research within the previous 12 months or had asked not to be contacted about such research. A total of 48 students volunteered to take part in this study (19.59% response rate). This is a reasonable response rate for the OU, where most students study...
part-time, and many are in full-time employment or have other responsibilities (Ashby et al., 2011; Hilliard et al., 2020; Holmes & Anastopoulou, 2019). The increased burden and level of commitment required by participants in a diary-based study may have also resulted in a lower response rate. Two students withdrew from the study one week into the group activity and their data has not been included in this research. The remaining 46 students were aged between 21 years and 56 years (M = 32.7 years; SD = 8.8 years). This is representative of the module cohort, with the 30–39 year age band being the largest. The majority were female (82.6%; 38 females and 8 males) which is slightly higher than the overall module cohort (72.0% female). For participating in the study, participants who completed all aspects of the research received a small financial incentive (£20 Amazon voucher).

5.2.3 Procedures
Ethics approval was gained from the OU’s HREC and SRPP. Four weeks prior to the start of the activity, invitation emails were sent to all 245 students who were eligible to take part. Additionally, two further reminder emails were sent 1 and 2 weeks after the initial invitation email. Students who were interested in taking part were then asked to complete a short online consent form. Consenting students were then sent instructions on how to complete the online diaries as well as information explaining key terminology used throughout the study. Over a 6-week period (between March 2019 and May 2019), students taking part were then sent links to five online diary entries (all created and distributed using JISC Online Surveys) (described in Section 5.2.4). The timing of each entry aimed to capture various stages of the activity and were all agreed upon with the module team chair. Figure 19 illustrates the different time-points for each diary entry in relation to the suggested activity timeline provided to students. Participants had 48 hours to complete each diary entry; after this time, they were unable to access the online diary. A reminder email was sent out 24 hours after the initial email for each diary entry. Examples of each emotional state were provided during each diary entry. In total, 226 diary entries were completed out of a possible 230 (98.3% completion rate) for the 46 participants. The four uncompleted diary entries were due to four different participants failing to complete diary entries on time.
Data collection instrument

A solicited online diary was used in this study (see Section 3.5.2 for an overview of this data collection method), which was developed by the author of this thesis. A number of steps were undertaken to ensure methodological rigour and validity (Gehlbach & Brinkworth, 2011; Taherdoost, 2016). First, the instrument was development after an extensive literature search as well as an examination of similar instruments used in previous research (e.g., English et al., 2017; Hascher, 2007; Webster, 2019). Second, guidelines for effective diary design were taken into consideration (e.g., Bartlett & Milligan, 2015; Filep et al., 2018; Iida et al., 2012; Janssens et al., 2018; Milligan & Bartlett, 2019). For instance, this ensured: a) the diary used appropriate language; b) it was easy and logical to navigate through; c) the frequency and timing of the diary entries were suitable for the participants undertaking the study; and d) a small financial incentive was offered to participants for taking part. Third, the structure and content of the instrument were reviewed by the author’s PhD supervisors (all specialists in distance education and one a psychologist) as well as members of the SRPP committee.

To further ensure methodological rigour, a pilot study was also undertaken with 17 students studying an undergraduate ‘Physics and astronomy’ module. As part of the module, students were required to work in teams to undertake an 8-week group project based around the modelling processes of the Earth’s atmosphere (further details can be found in Appendix E). Over a 9-week period, students were asked to complete six diary entries (the first entry completed before the start of the project, the next four during the project and the final entry after the project had been completed). A number of lessons were learnt from undertaking the pilot study that led to changes in the main study design. Firstly, ensuring clear guidance and instruction on how to complete the diary entries was found to be highly important for participant engagement and for ensuring that entries were completed correctly and on time. For the main study, diary instructions were slightly adapted, making them easier to follow and understand. This included the inclusion of screenshots of diary entries and the re-phrasing of terminology and text. Secondly, regular communication ensured participants understood when diary entries should be completed and helped build rapport with the researcher. This consistent communication (including diary entry reminder emails) was maintained in the main study. Lastly, students found describing (i.e., using an open-ended response) the impact of pleasant and unpleasant emotions on their participation in the activity difficult. Due to this, it was decided that a
multiple response closed-ended question would be used to explore this aspect of the research.

Final diary design

The final online diary had a semi-structured design and included a mix of closed-ended and short open-ended questions. Diary entries 1-4 were undertaken concurrently with the group activity and aimed to capture students’ current emotional experiences directly before (diary entry 1), during (diary entries 2 and 3), and after (diary entry 4) the activity; whereas diary entry 5 was a retrospective evaluation and, therefore, asked students to reflect back over the group task and the emotions they experienced (see Figure 19). An example of diary entry 3 and 5 are provided in Appendix G and Appendix H, respectively. The specific items included in the online diary are discussed below.

- **Stage of the collaborative activity.** At the start of each diary entry, participants were asked to indicate (by ticking a box) what stage of the group activity they were working on at the time of completing the entry (from a list of seven statements). Example statements included: ‘Interacting with other group members and deciding who does what in the sub-group’ or ‘Combining information into the final wiki table’. To ensure that each statement accurately identified a different stage of the task, and would be easily understandably for students, the course was reviewed, and appropriate statements were developed in consultation with the module’s chair.

- **Emotions experienced.** In diary entries 1-4, students were asked about their current (or momentary) emotions in relation to the group activity; whereas in diary entry 5, students were asked to provide retrospective evaluations of the emotions they had experienced. The items were formulated as follows: ‘In relation to the collaborative activity, I am currently experiencing...[EMOTION]’ (diary entries 1-4); and ‘Overall, in relation to the collaborative activity, I experienced...[EMOTION]’ (diary entry 5). All emotions were assessed using single item measures on a 5-point Likert-type response scale ranging from 1 ‘Strongly disagree’ to 5 ‘Strongly agree’.

As indicated above, single-item measures were used to assess emotions in each of the five diary entries (i.e., using one item to assess each emotional state). The
decision to use this approach, over multi-item measures (i.e., scales which use multiple items to assess each emotional state), was selected for a number of reasons. First, multi-item scales take longer to complete and can compromise the assessment of momentary emotions (Goetz et al., 2016). Second, there is currently no context specific multi-item scale with established validity and reliability for measuring emotions in social and collaborative online learning. Third, these types of measures often use context-sensitive statements (e.g., ‘I felt anxious when interacting with other students in the group’ or ‘I was frustrated by the lack of participation by others’) which make assumptions about the stimuli that caused the emotion. As this study was also exploring the causes of specific emotions, such statements were not deemed suitable. Fourth, single-item scales of affective constructs have been shown to have comparable in terms of reliability and validity to their multi-item counterparts (Gogol et al, 2014). Finally, single-item measures have also been used previously when exploring students emotions in educational contexts (Bieg et al., 2013; Goetz et al., 2013, 2020; Goetz et al., 2014; Nett et al., 2011).

In the five diary entries, six pleasant emotions (hope, curiosity, enjoyment, relief, satisfaction, excitement) and six unpleasant emotions (anger, disappointment, confusion, frustration, anxiety, dissatisfaction) were investigated. These discrete emotions were selected for a number of reasons. First, they had previously been reported in literature related to online and online collaborative learning (e.g., Artino & Jones, 2012; Capdeferro & Romero, 2012; Hilliard et al., 2020; O’Regan, 2003; Renties & Rivers, 2014; Webster, 2019; Zembylas, 2008). Second, they were all frequently reported in Study 1 (see Section 4.3.1). Third, they varied not only in their valence (i.e., pleasant and unpleasant) but also in their activation (i.e., activating and deactivating). For example, pleasant activating (e.g., enjoyment) and deactivating (e.g., relief) emotions were included as were unpleasant activating (e.g., anxiety) and deactivating (e.g., disappointment) emotions. A decision was made not to include more emotions, as it was thought this may overwhelm students when completing each diary entry. Students also had the option to select ‘other’ if they felt that the predefined list did not capture the feelings they experienced. In each diary entry, the order of the emotions was randomised to prevent order bias.
• **Cause of emotions.** Before describing the cause of their emotions in diary entries 1-4, students were asked to select one pleasant and one unpleasant emotion they had experienced in relation to the group activity during the specific time period stated in each diary entry (e.g., the time since the previous diary entry). Participants could select from nine pleasant emotions (the same six pleasant emotions mentioned above plus *happiness*, *pride*, and *surprise*) and nine unpleasant emotions (the same six unpleasant emotions mentioned above plus *insecurity*, *guilt*, and *boredom*). Additional emotions were included as they had either been reported frequently in Study 1 (Section 4.3.1) or represented an emotion that was very dissimilar to any others already included in the diary. Furthermore, these emotions also gave participants a greater opportunity to respond. Participating students also had the option to select ‘*other*’ if they felt that the predefined list did not capture the feelings they experienced. If a student had not experienced any pleasant or unpleasant emotions, they could select ‘*No pleasant/unpleasant emotions experienced*’.

Participants who identified that they had experienced a pleasant and/or unpleasant emotion in diary entries 1-4 were then asked to explain (in an open-ended text box) the cause of the pleasant and/or unpleasant emotion that they had selected. It was decided that an open-ended text box would be included for this question, instead of a closed-ended response (e.g., multiple-choice options), due to the limited research that had been undertaken exploring causes of students’ emotions in assessed, online, group learning contexts. Additionally, this type of response allowed for data with greater richness to be gathered which can help gain a greater understand causes of specific emotions.

In diary entry 5, participants were asked two open-ended questions about what they thought were the main causes of pleasant and unpleasant emotions in the online collaborative activity. Asking students to describe the causes of a range of specific pleasant and unpleasant emotions in this final diary entry was considered too demanding and it was thought that this could have impacted diary completion rate.

• **Impact of emotions on participation.** In diary entries 2-4, participants were asked to report the extent to which they felt the pleasant and/or unpleasant emotion they
had selected had impacted on their participation in the activity (1 ‘Not at all’ to 5 ‘To a great extent’). This item was not included in diary entry 1 as it was thought that students would have not started the group activity at this time (this diary entry was timed to be completed before the activity had started). For occasions where students perceived that emotions had impacted participation (i.e., a score greater than 1), they were asked to identify the ways in which this had occurred by selecting one or more statements from a pre-defined list (based on feedback from the pilot study). This consisted of 17 statements which aimed to reflect the different ways emotions could impact engagement (primarily related to behavioural and social involvement) in the collaborative activity (both positively and negatively) and was based on findings from Study 1 and previous literature (e.g., Bond et al., 2020; Bond & Bedenlier, 2019; Fredricks et al., 2016; Hilliard et al., 2020; Linnenbrink-Garcia et al., 2011; Pekrun & Linnenbrink-Garcia, 2012; Rowe et al., 2015; Rowe & Fitness, 2018). For example: ‘I increased my effort and tried harder in the collaborative activity’ and ‘I didn’t contribute to the tasks as much’. Although other ways that emotions may have impacted student participation could have been measured (e.g., through pathways linked more closely to cognitive and motivational engagement; Pekrun & Linnenbrink-Garcia, 2012), behavioural and social aspects were frequently discussed in Study 1 and have been highlighted more often in previous literature. An ‘other’ option was also available for students to describe any other ways emotions had impacted their participation.

In diary entry 5, students were asked to respond to four statements about whether they thought pleasant and/or unpleasant emotions had positively or negatively impacted their overall participation in the assessed, online, group activity using a 4 point-scale, ranging from 1 ‘Not at all’ to 4 ‘To a great extent’. For instance, students were asked: ‘Overall, in relation to the collaborative activity, to what extent did pleasant emotions have a... positive impact on your participation in the activity?’ Students were also asked to indicate how the twelve emotions (described previously) had impacted on their participation in the collaborative activity. Students responded by selecting one or more of the following response options: ‘Positive impact’, ‘Negative impact’, or ‘No impact’.
• **Regulation of emotions.** In diary entries 1-4, participants were asked to report the extent to which they attempted to regulate, or manage, their selected pleasant and/or unpleasant emotions (1 ‘Not at all’ to 5 ‘A great deal’). For occasions where emotion regulation occurred (i.e., a score greater than 1), students were asked to provide descriptions of *how* (emotion regulation strategies) and *why* (emotion regulation goals) they had tried to regulate their feelings. Due to the lack of research exploring students’ emotion regulation strategies and goals in online collaborative learning settings, it was thought most appropriate to provide open-ended fields for students to enter their responses. Similar approaches have been used previously in emotion regulation research in both educational and more general settings (English et al., 2017; Webster & Hadwin, 2015).

In diary entry 5, students were asked to indicate whether they felt they were able to effectively regulate, or manage, both pleasant and unpleasant emotions during the assessed, online, group activity using a 5-point Likert-type response scale (ranging from 1 ‘Yes, definitely’ to 5 ‘No, definitely not’).

### 5.2.5 Data analysis

Quantitative data collected in this study were analysed using descriptive statistics. Frequencies (n) and percentages (%) were calculated and transformed into tables and graphs in Microsoft Excel 2016.

As discussed in Section 3.6.2, qualitative data were analysed using two different approaches to content analysis. First, data related to the causes of emotions and strategies of emotion regulation were coded using a directed approach (Hsieh & Shannon, 2005), using the pre-existing coding scheme formulated in Study 1. Data related to emotion regulation goals, on the other hand, were analysed using conventional, inductive approach (Hsieh & Shannon, 2005). This was due to emotion regulation goals not being explored in Study 1. All data were analysed using the NVivo 12. Both approaches followed similar analysis procedures:

• First, the researcher read and re-read the qualitative data to become familiar with, and immersed in, the open response comments from the online diary entries.
• Second, data related to the causes of emotions, emotion regulation strategies and emotion regulation goals were extracted and responses for individual discrete emotions were grouped together based on their valence.

• Third, data were then systematically worked through and coded. This stage is where the two approaches differ. Using the directed approach, causes of emotion and emotion regulation strategies were deductively labelled using codes identified in Study 1 (see Sections 4.3.2 and 4.3.4). Any data not coded were explored inductively to identify emergent codes. Once the emergent codes were identified, labels were provided, and a coding scheme created. For the conventional approach, interesting features that captured key thoughts or concepts in relation to emotion regulation goals were inductively labelled and a coding scheme generated.

• Fourth, codes were then organised and grouped into meaningful clusters, termed ‘categories’. Causes of emotions and emotion regulation strategies were grouped into the predefined categories identified in Study 1 (see Section 4.3.2 and 4.3.4, respectively). The emergent codes logically aligned themselves with these categories and it was, therefore, deemed redundant to attempt to create any new categories. Emotion regulation goals were grouped based on how they were related and linked to one another and results in three categories being presented (results are presented in Section 5.3.5).

• Last, frequency counts of each of the codes and categories were undertaken and tables and hierarchical structures were produced.

5.2.6 Trustworthiness
Like Study 1, various steps were taken to ensure the quality of the qualitative data analysis (following suggestions made by Elo et al., 2014). For instance, these included frequent debriefing sessions with the researcher’s supervisory team. These sessions allowed for analysis to be scrutinised and divergent opinions to be explored. Figures and tables were also created to ensure findings were presented in a clear and understandable way. To increase the reliability of the content analysis findings, all of the qualitative data for causes of emotions, emotion regulation strategies, and emotion regulation goals were also coded by another researcher (a different researcher for each of the datasets). All researchers had significant experience coding qualitative data and were not involved in
the development of the coding frame. Inter-rater reliability procedures were the same as those outlined in Study 1 (see Section 4.2.5). Due to the small amount of data collected for specific emotions, all tests for reliability were undertaken with data being grouped in relation to pleasant and unpleasant emotions (e.g., all strategies used to regulate pleasant emotions were grouped together and an inter-rater reliability test performed). The following Cohen’s kappa’s were yielded:

- .78 for the causes of pleasant emotions and .88 for the causes of unpleasant emotions in diary entries 1-4
- .80 for the causes of pleasant emotions and .86 for the causes of unpleasant emotions in diary entry 5
- .88 for strategies to regulate pleasant emotions and .93 for strategies to regulate pleasant emotions
- .88 for goals pursued when regulating pleasant emotions and .89 for goals pursued when regulating pleasant emotions

These results indicate inter-rater reliability with substantial agreement (Landis & Koch, 1977). The few disagreements were resolved through discussion. The principal researcher coded all remaining responses.

5.3 Results

5.3.1 Stages of the collaborative activity

Results revealed considerable variation in the stage of the group activity participants were working on when completing each diary entry (illustrated in Figure 20). For example, in diary entry 1 (which was aimed to be completed prior to the start of the activity) many participants had already begun interacting with other students and carrying out individual research, and by diary entry 3 numerous students had already reported completing all aspects of the activity. Results also revealed that one student had not started any aspects of the group activity when completing diary entry 5 (which aimed to be completed after the assignment had been submitted).
5.3.2 Emotions experienced

Students’ self-reported momentary emotions from diary entries 1-4 are presented first (see Figure 21). In diary entry 1, curiosity, anxiety, and hope were the most commonly experienced emotions by participants. The unpleasant emotions dissatisfaction and anger were found to be the least experienced at this time-point. In diary entry 2, the three most experienced emotions and two least reported emotions were the same as those reported in diary entry 1. Considerably more students, however, reported experiencing the pleasant emotions satisfaction and relief at this time-point. Slight changes were also found in other emotions in this diary entry, including increased frustration and reduced confusion. In diary entry 3, there was a more substantial shift in the emotions reported by participants. The pleasant emotions of relief and satisfaction were by far the most pervasive emotions at this time-point. Most other emotions were reported to be less experienced by students when compared with diary entry 2, particularly anxiety and curiosity. In diary entry 4,
relief and satisfaction were again found to be the most experienced emotions; although slightly less reported than in diary entry 3. Most emotions at this stage were found to be similar to those reported in the third diary entry, with a few slight changes. For example, reduced frustration and disappointment and increased anxiety. Anger was found to be the least experienced emotion in diary entries 1-4.
### Diary entry 1 (n=44)

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curiosity</td>
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<td>Anxiety</td>
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<td>Hope</td>
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<td>Excitement</td>
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<td>Dissatisfaction</td>
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<td>Anger</td>
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### Diary entry 2 (n=46)

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<thead>
<tr>
<th>Emotion</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
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<tbody>
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<td>Curiosity</td>
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Figure 21. Emotions experienced throughout the assessed, online, group activity. Note: The response format for emotions consisted of a 5-point Likert type scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Data from diary entries 1-4.
Participants’ post-activity evaluations of the emotions they experienced online group activity (reported in diary entry 5) are illustrated in Figure 22. Respondents reported relief and anxiety to be the most frequently experienced emotions, whilst anger and confusion were reported to be the least experienced emotions.

Diary entry 5 \((n=45)\)

Figure 22. Post-activity evaluation of the emotions experienced in the assessed, online, group activity. Note: The response format for emotions consisted of a 5-point Likert type scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Data from diary entry
5.3.3 Cause of emotions

In diary entries 1-4, students were asked to select one pleasant emotion and one unpleasant emotion they had experienced during the timeframe stated in each entry. A total of 134 pleasant emotions and 126 unpleasant emotions were selected (out of a possible 182 pleasant emotions and 182 unpleasant emotions) (see Appendix I). There were also 48 occasions where participants selected that they did not experience a pleasant emotion and 56 occasions where participants stated they did not experience an unpleasant emotion. The emotions of relief, anxiety, and frustration were the most selected by participants.

After selecting a pleasant emotion and/or unpleasant emotion, participants described what caused them. As some participants stated more than one cause in their responses, and a few students provided responses that did not describe a specific cause of emotion, the total number of causes found was different to the number of emotions selected. In total, 295 descriptions were found; 166 descriptions for pleasant emotions and 129 descriptions for unpleasant emotions. Table 9 provides an overview of how frequently participants described reporting causes in each of the categories identified in Study 1 (see Section 4.3.2) for each specific pleasant and unpleasant emotion.
Table 9. Frequency of the causes of both pleasant and unpleasant emotions in each category reported by participants. Data from diary entries 1-4.

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Self</th>
<th>Others</th>
<th>Group</th>
<th>Outcome</th>
<th>Learning model</th>
<th>Task</th>
<th>Technology</th>
<th>External</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>% a</td>
<td>n</td>
<td>% a</td>
<td>n</td>
<td>% a</td>
<td>n</td>
<td>% a</td>
<td>n</td>
</tr>
<tr>
<td>Pleasant</td>
<td>26</td>
<td>15.7</td>
<td>32</td>
<td>19.3</td>
<td>15</td>
<td>9.0</td>
<td>68</td>
<td>41.0</td>
<td>2</td>
</tr>
<tr>
<td>Relief</td>
<td>8</td>
<td>11.3</td>
<td>9</td>
<td>12.7</td>
<td>6</td>
<td>8.5</td>
<td>39</td>
<td>54.9</td>
<td>2</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>10</td>
<td>29.4</td>
<td>6</td>
<td>17.6</td>
<td>2</td>
<td>5.9</td>
<td>15</td>
<td>44.1</td>
<td>0</td>
</tr>
<tr>
<td>Curiosity</td>
<td>1</td>
<td>4.0</td>
<td>7</td>
<td>28.0</td>
<td>2</td>
<td>8.0</td>
<td>6</td>
<td>24.0</td>
<td>0</td>
</tr>
<tr>
<td>Hope</td>
<td>2</td>
<td>14.3</td>
<td>6</td>
<td>42.9</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>35.7</td>
<td>0</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>2</td>
<td>28.6</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>42.9</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Pride</td>
<td>3</td>
<td>42.9</td>
<td>1</td>
<td>14.3</td>
<td>2</td>
<td>28.6</td>
<td>1</td>
<td>14.3</td>
<td>0</td>
</tr>
<tr>
<td>Surprise</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>50.0</td>
<td>0</td>
</tr>
<tr>
<td>Excitement</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>66.7</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Happiness</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Anxiety</td>
<td>40</td>
<td>31.0</td>
<td>61</td>
<td>47.3</td>
<td>1</td>
<td>0.8</td>
<td>9</td>
<td>7.0</td>
<td>1</td>
</tr>
<tr>
<td>Frustration</td>
<td>2</td>
<td>6.1</td>
<td>27</td>
<td>81.8</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Disappointment</td>
<td>2</td>
<td>18.2</td>
<td>9</td>
<td>81.8</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Confusion</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>14.3</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>6</td>
</tr>
<tr>
<td>Insecurity</td>
<td>3</td>
<td>50.0</td>
<td>2</td>
<td>33.3</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>16.7</td>
<td>0</td>
</tr>
<tr>
<td>Anger</td>
<td>0</td>
<td>0.0</td>
<td>4</td>
<td>80.0</td>
<td>1</td>
<td>20.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Dissatisfaction</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>75.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>25.0</td>
<td>0</td>
</tr>
<tr>
<td>Guilt</td>
<td>3</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Boredom</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>93</td>
<td>16</td>
<td>77</td>
<td>3</td>
<td>39</td>
<td>0</td>
<td>1</td>
<td>295</td>
</tr>
</tbody>
</table>

Note. Categories are listed in descending order based on overall frequencies. % Percentage of row total.
Pleasant emotions

Overall, the majority of pleasant emotions stemmed from sources in the outcome-category ($n=68; 41.0\%$). Two of the most selected pleasant emotions in the first four diary entries, relief and satisfaction, were found to be largely responsible for the predominance of outcome-related pleasant emotions. For instance, both emotions were commonly found to be evoked by the completion of the activity (e.g., ‘Relief at getting the task completed’ or ‘Satisfied that the group wiki was completed on time’) and overall quality of the work produced (e.g., ‘Relieved that the finished work was completed to good standard’ or ‘satisfied with the end product’). Other emotions that were more frequently found to stem from causes in this category included: hope (e.g., ‘Now that the activity is finished I feel hopeful that the mark received will be a good one’); curiosity (e.g., ‘Curious to know the outcome and the grade for the activity’); and surprise (e.g., ‘On completion of the wiki activity I was pleasantly surprised at how well it went’);

The second most reported category for pleasant emotions was others ($n=32; 19.3\%$). Emotions in this category were often found to stem from the engagement and participation of other students when undertaking the group activity. For instance, one student described experiencing hope which stemmed from: ‘Noticing others’ activity on the forum’. Whilst another student explained how they experienced happiness when: ‘Seeing the other group members posting their work to the wiki’. The engagement of other students was also reported for feelings of relief (e.g., ‘That someone else finally joined in the activity and I was not doing work on my own’) and satisfaction (e.g., ‘I was satisfied once everyone had spoken in the forum’). Other more frequently reported causes of emotion in this category included: understanding other students’ thoughts, feelings and views (e.g., ‘The activity itself makes me curious to see what other people are thinking’; curiosity); the support and encouragement received from other students (e.g., ‘one of the member is my group was really encouraging’; relief); and the prospect of interacting and working with others (I looking forward to interacting with new people; excitement).

The third most reported category was self ($n=26; 15.7\%$). Pleasant emotions in this category were commonly caused by students’ own participation and performance in the activity. For instance, one student described their pride at the contributions they had made to the task, ‘Proud of my contributions towards the activity’. Another student highlighted their relief at completing a specific aspect of the task, ‘I managed to fill in my summary
section on the wiki’. Others causes of self-related emotions were much less frequently mentioned.

Sources in the task-category was the fourth most reported for pleasant emotions (n=22; 13.3%). The topic of the activity was the most prominent cause in this category, and this often related to the emotion of curiosity. For example, a student described that their curiosity was aroused by: ‘The idea of reading up to date papers on neurodegenerative diseases’. Whilst another stated their curiosity stemmed from: ‘Studying a topic that I have not looked at to in depth before’. This source was also reported for other pleasant emotions. For example, one student noted that their enjoyment stemmed from the topic of the activity, ‘I enjoyed researching the disease - I found it very interesting!’ The level of challenge or difficulty of the activity was found to be a cause of relief for a number of students. For instance, one student stated: ‘Because when I looked through the task, I realised it isn't near as bad as I thought it would be, there isn't an extensive amount of work’. Undertaking specific aspects of the task and assessment criteria were also highlighted as a cause of pleasant feelings.

Causes in the group-category were reported less frequently when compared to the previously mentioned categories (n=15; 9.0%). Responses primarily related to emotions evoked by group engagement and functioning (e.g., ‘My sub-group is working well together’; relief; or ‘Proud of the efforts of the group in working well and finishing early’; pride). As well as group support and encouragement (e.g., ‘Everyone was really supportive of one another; enjoyment).

The external-category was only described once (n=1; 0.6%). This related to a student’s performance in another module.

No causes of pleasant emotions were reported in the technology-category.

Unpleasant emotions

Unpleasant emotions were found to primarily derive from causes in the others-category (n=61; 47.3%). The most frequently reported cause in this category was the lack of engagement and participation of other students; this was the dominant cause of both frustration (e.g., ‘It was frustrating that other members of the team did not contribute very much to the task’ or ‘One member of our group has only posted one comment to the
forum!’) and disappointment (e.g., ‘Disappointment that people weren’t collaborating or doing their bit’). Other less frequently described causes in this category included: interacting and working with others (e.g., ‘Having to interact and share my thoughts with other people’; anxiety); fear of letting other group members down (e.g., ‘my insecurity stemmed from worrying about letting my teammates down’; insecurity), and others’ attitudes and behaviours (e.g., ‘A group member being negative and not being a ‘good team player’; anger).

Causes in the self-category were the second most reported by participants (n=40; 31.0%). Many causes in this category related to students’ lack of self-belief. These causes were found to be most frequently reported for anxiety. For instance, a student described how their anxiety resulted from their low confidence, ‘Lack of confidence in myself that I will be able to either contribute or complete the task sufficiently’. Whilst another student wrote: ‘I feel anxious about if I’m doing things correctly and making mistakes’. Another more commonly reported cause of unpleasant emotions in this category was students’ own participation and performance in the activity. For instance, one student described how they experienced guilt due to: ‘Not contributing to the tasks much’. Another student described how their feelings of anxiety stemmed from their performance in the activity, ‘I felt anxious as to whether I had completed the wiki to a high enough standard’. Other causes of emotions in this category included: having limited time to complete the activity (e.g., ‘Finding the time to do the next stage of the activity’; anxiety); feeling unprepared (e.g., ‘For not been ready to do the activity’; guilt); and mental health conditions (e.g., ‘I suffer from diagnosed anxiety anyway, so this is why this emotion is strong for me’; anxiety).

The third most reported category was task (n=17; 13.2%). When compared with the previously described categories, far fewer emotions were found to stem from this category. Task-related emotions were identified as being the dominant cause of confusion. This was often in relation to the difficulty in understanding the guidance and instruction about the activity (e.g., ‘It took about 3 read throughs of the task and watching the tutorial recording to understand exactly what I need to do’ or ‘the guidance information I have read and the online tutorial are very vague’). Unclear guidance was also reported as a source of frustration by another student, ‘The online information wasn’t clear about what had to be done, it was frustrating’. Aspects of the design of the activity were also found to evoke unpleasant emotions. For example, anxiety was found to stem from the workload
of the activity (e.g., ‘I was very anxious due to too much workload’), its compulsory nature (e.g., ‘Being told I had to complete group work’), and limited amount of time required to undertake the activity (e.g., ‘The very short time to finish the task’).

The remaining five categories were found to be the source of very few unpleasant emotions. Emotions in the outcome-category (n=9; 7.0%) were found to predominantly derive from the anticipated or actual grade or result of the activity (e.g., ‘Worrying about the grade related to the group work’; anxiety; or ‘Not getting a good mark even though I’ve done what I can’; dissatisfaction).

Both the learning model and group categories were only described once (n=1; 0.8%). Descriptions related to preconceived opinions about the learning model (frustration) and group conflict (anger), respectively.

No causes of unpleasant emotions were reported in the technology or external categories.

In diary entry 5, participants were asked to describe the main causes of pleasant and unpleasant emotions when reflecting back over the group activity. From the 45 participants who responded to this diary item, 117 descriptions of causes of emotions were found (63 related to pleasant emotions and 54 related to pleasant emotions). The frequencies of causes of pleasant and unpleasant emotions in each of the categories formulated in Study 1 are provided in Table 10. From participants descriptions, pleasant emotions were found to primarily stem from causes in the outcome and group categories. The completion of the group activity (outcome) and the positive group engagement and functioning (group) were the most described causes in these two categories. The main reasons for unpleasant emotions were found to derive from causes in the others, task, and self-categories. The lack of participation and engagement of other group members (others), small timeframe to complete the task (task), and low levels of self-belief (self) were the most frequently reported causes in these categories.
Table 10. Categorisation of the main pleasant and unpleasant emotions. Data from diary entry 5.

<table>
<thead>
<tr>
<th>Category</th>
<th>Pleasant emotions</th>
<th>Unpleasant emotions</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>n</td>
</tr>
<tr>
<td>Outcome</td>
<td>28</td>
<td>44.4</td>
<td>2</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
<td>9.5</td>
<td>21</td>
</tr>
<tr>
<td>Group</td>
<td>18</td>
<td>28.6</td>
<td>5</td>
</tr>
<tr>
<td>Self</td>
<td>6</td>
<td>9.5</td>
<td>10</td>
</tr>
<tr>
<td>Task</td>
<td>5</td>
<td>7.9</td>
<td>11</td>
</tr>
<tr>
<td>Learning model</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Technology</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>External</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>100</td>
<td>54</td>
</tr>
</tbody>
</table>

<sup>a</sup>Percentage of column total.

Note. Categories are listed in descending order based on overall frequencies.
5.3.4  Impact of emotions

Findings from diary entry 5 reflecting on the impact of emotions across the activity as a whole are presented first. When asked if pleasant emotions positively impacted their participation, a large majority of the 45 respondents (84%) said that they did. When asked if pleasant emotions negatively impacted their participation, the majority of students (71%) said they did not. When asked whether unpleasant emotions positively impacted their participation, slightly over half the respondents (56%) said that they did. When asked whether unpleasant emotions negatively impacted their participation, about two thirds (66%) of the respondents said they did. Findings are presented in Table 11.

Table 11. Students’ perceptions of the extent to which pleasant and unpleasant emotions impacted participation. Data from diary entry 5.

<table>
<thead>
<tr>
<th>What extent did pleasant emotions positively impact participation?</th>
<th>None at all</th>
<th>To a small extent</th>
<th>To a moderate extent</th>
<th>To a great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 (16%)</td>
<td>11 (24%)</td>
<td>13 (29%)</td>
<td>14 (31%)</td>
</tr>
<tr>
<td>What extent did pleasant emotions negatively impact participation?</td>
<td>32 (71%)</td>
<td>7 (16%)</td>
<td>5 (11%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>What extent did unpleasant emotions positively impact participation?</td>
<td>20 (44%)</td>
<td>10 (22%)</td>
<td>12 (27%)</td>
<td>3 (7%)</td>
</tr>
<tr>
<td>What extent did unpleasant emotions negatively impact participation?</td>
<td>15 (33%)</td>
<td>19 (42%)</td>
<td>5 (11%)</td>
<td>6 (13%)</td>
</tr>
</tbody>
</table>
Participants were also asked how specific pleasant and unpleasant emotions had impacted their participation in the collaborative activity (see Table 12). Overall, for pleasant emotions, substantially more participants reported them to have a positive impact on participation rather than a negative impact. A large proportion of participants also reported that pleasant emotions had no impact on their participation in the group activity. For the specific pleasant emotions, the three most reported that had a positive impact were: relief (reported by 69% of participants), satisfaction (reported by 58% of participants), and enjoyment (reported by 56% of participants). Although many participants stated that curiosity, hope and excitement had a positive impact (reported by 49%, 44% and 44% of participants, respectively), the same number of participants, or more, reported that these emotions had no impact on their participation in the group activity (reported by 49%, 56% and 53% of participants, respectively).

For unpleasant emotions, substantially more participants reported that they had a negative impact on participation rather than a positive impact (Table 12). A large proportion of participants also reported that unpleasant emotions had no impact on their participation in the group activity. This was higher than that reported for pleasant emotions. The most reported emotion that participants perceived had a negative impact on participation was anxiety (reported by 64% of participants). This emotion, however, was also the most
reported to have a positive impact of participation (reported by 29% of participants). Furthermore, it was the least likely emotion (either pleasant or unpleasant) to have no impact on participation (reported by 20% of participants). The second most reported unpleasant emotion that had a negative impact was frustration (reported by 42% of participants). This emotion was also reported by a few participants to have a positive impact on participation (reported by 13% of participants). Although a number of participants reported that dissatisfaction, disappointment, confusion and anger had a negative impact (reported by 31%, 26%, 33% and 24% of participants, respectively), considerably more participants reported these emotions had no impact on their participation in the group activity (reported by 67%, 69%, 62% and 76% of participants, respectively).

Results from diary entries 2-4 are now discussed. In these entries, 102 pleasant emotions were selected by participants (see Appendix I). Of these, 71 (69.6%) were reported to impact participation in the activity. From the 90 unpleasant emotions selected by participants in these diary entries, 69 (76.7%) were reported to impact participation in the task. Frequencies of specific ways respondents reported these emotions to impact participation are reported in Table 13.
### Table 13. Students’ perceptions of the specific impact of pleasant and unpleasant emotions on student participation. Data from diary entries 2-4.

<table>
<thead>
<tr>
<th>Pleasant</th>
<th>34</th>
<th>18</th>
<th>32</th>
<th>32</th>
<th>26</th>
<th>11</th>
<th>9</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relief</td>
<td>11</td>
<td>8</td>
<td>12</td>
<td>11</td>
<td>13</td>
<td>5</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>9</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Curiosity</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pride</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Surprise</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Hope</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Happiness</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Excitement</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

| Unpleasant | 18 | 12 | 5  | 19 | 15 | 11 | 12 | 4  |
| Anxiety    | 7  | 4  | 2  | 7  | 4  | 4  | 4 | 1  |
| Frustration | 4  | 4  | 1  | 4  | 2  | 2  | 3 | 1  |
| Disappointment | 3  | 3  | 1  | 3  | 3  | 2  | 4 | 1  |
| Insecurity | 3  | 1  | 1  | 3  | 4  | 1  | 1 | 1  |
| Anger      | 1  | 0  | 0  | 1  | 1  | 1  | 0 | 0  |
| Dissatisfaction | 0  | 0  | 0  | 0  | 1  | 0  | 0 | 0  |
| Confusion  | 0  | 0  | 0  | 1  | 1  | 0  | 0 | 0  |
| Boredom    | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0  |
| Guilt      | 0  | 0  | 0  | 0  | 0  | 0  | 0 | 0  |

| Overall | 52 | 30 | 37 | 51 | 41 | 22 | 21 | 19 |

| Positive impact | 2  | 6  | 0  | 0  | 0  | 6  | 3  | 2  |
| Overall | 18 | 8  | 7  | 6  | 5  | 9  | 3  | 5  |

| Negative impact | 4  | 4  | 0  | 0  | 1  | 3  | 1  | 2  |
| Overall | 18 | 8  | 7  | 6  | 5  | 9  | 3  | 5  |

| Other | 2  |

| Overall | 6  |

159
In general, pleasant emotions led to more positive impacts on participation. The four most frequently reported ways pleasant emotions impacted participation were as follows: ‘I posted more in the forums’; ‘I felt confident in expressing my thoughts and opinions to the group’; ‘I increased my effort and tried harder in the collaborative activity’; and ‘I made more effort to support other group members’. The ‘Other’ option was selected on 5 occasions. These responses included: increased levels of motivation (satisfaction); increased effort to start the activity (relief and curiosity); and having no impact (relief and hope). For the specific pleasant emotions, participants reported relief and satisfaction to have the most impact on participation overall; these emotions were, however, the most selected emotions by participants in diary entries 2-4 (see Appendix I).

Participants reported that unpleasant emotions had both positive and negative impacts on participation. The four most frequently reported ways unpleasant emotions impacted participation were as follows: ‘I increased my effort and tried harder in the collaborative activity’; ‘I posted more in the forums’; ‘I didn’t post as much in the forums’ and ‘I made more effort to support other group members’. The ‘Other’ option was selected on 6 occasions. These responses included: reducing effort near the end of the task (disappointment); withdrawing from the course (anxiety); becoming more self-focused on the task (frustration); and confronting others in the group (anger). For the specific unpleasant emotions, students reported anxiety and frustration to have the most impact on participation overall; again, these were selected substantially more frequently than other emotions in diary entries 2-4 (see Appendix I).
5.3.5 Emotion regulation

From the 134 pleasant emotions selected by participants in diary entries 1-4 (see Appendix I), 53 (39.6%) were reported to have been regulated. From the 126 selected unpleasant emotions, 95 (75.4%) were reported to have been regulated. When asked to describe how (i.e., the emotion regulation strategies used) and why (i.e., the emotion regulation goals pursued) they had attempted to regulate these emotions, some participants stated more than one emotion regulation strategy or goal in their responses and some descriptions could be coded as multiple strategies or goals. Furthermore, some participants provided descriptions that did not describe a specific regulation strategy or goal. This meant that the number of descriptions for emotion regulation strategies and goals for both pleasant and unpleasant emotions was different to the number of participants who had indicated they had regulated their emotions.

Emotion regulation strategies

Table 14 provides an overview of how frequently participants described emotion regulation strategies in each of the five categories identified in Study 1 (these are described in Section 4.3.4), for both pleasant and unpleasant emotions.
Table 14. Frequency of emotion regulation strategies in each category reported by participants for both pleasant and unpleasant emotions. Data from diary entries 1-4.

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Active task-related behaviour</th>
<th>Changing or directing thoughts</th>
<th>Social support</th>
<th>Modifying emotional response</th>
<th>Evasion or avoidance</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>n</td>
<td>%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>n</td>
<td>%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pleasant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relief</td>
<td>28</td>
<td>50.0</td>
<td>20</td>
<td>35.7</td>
<td>6</td>
<td>10.7</td>
</tr>
<tr>
<td>Curiosity</td>
<td>11</td>
<td>55.0</td>
<td>7</td>
<td>35.0</td>
<td>1</td>
<td>5.0</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>5</td>
<td>62.5</td>
<td>2</td>
<td>25.0</td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>Hope</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>50.0</td>
<td>1</td>
<td>25.0</td>
</tr>
<tr>
<td>Surprise</td>
<td>2</td>
<td>50.0</td>
<td>2</td>
<td>50.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>1</td>
<td>33.3</td>
<td>1</td>
<td>33.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pride</td>
<td>2</td>
<td>66.7</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>33.3</td>
</tr>
<tr>
<td>Excitement</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>100.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unpleasant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>60</td>
<td>42.3</td>
<td>28</td>
<td>19.7</td>
<td>30</td>
<td>21.1</td>
</tr>
<tr>
<td>Frustration</td>
<td>33</td>
<td>51.6</td>
<td>14</td>
<td>21.9</td>
<td>5</td>
<td>7.8</td>
</tr>
<tr>
<td>Disappointment</td>
<td>6</td>
<td>16.2</td>
<td>9</td>
<td>24.3</td>
<td>11</td>
<td>29.7</td>
</tr>
<tr>
<td>Insecurity</td>
<td>7</td>
<td>53.8</td>
<td>2</td>
<td>15.4</td>
<td>4</td>
<td>30.8</td>
</tr>
<tr>
<td>Confusion</td>
<td>8</td>
<td>66.7</td>
<td>1</td>
<td>8.3</td>
<td>3</td>
<td>25.0</td>
</tr>
<tr>
<td>Anger</td>
<td>5</td>
<td>71.4</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>28.6</td>
</tr>
<tr>
<td>Guilt</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>20.0</td>
<td>3</td>
<td>60.0</td>
</tr>
<tr>
<td>Dissatisfaction</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>Boredom</td>
<td>1</td>
<td>100.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>88</td>
<td>48</td>
<td>36</td>
<td>22</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Note. Categories are listed in descending order based on total frequencies. *Percentage of row total.

For pleasant emotions, 56 descriptions of emotion regulation strategies were found. From these, participants mainly described regulating their emotions through strategies in the active task-related behaviour-category (n=28; 50.0%). The most reported emotion regulation strategy in this category was maintaining or increasing effort and work rate. For instance, one student who had experienced surprise stated that they regulated this feeling by putting ‘more effort’ into the task. Examples of other strategies described by students in this category, included: increasing organisation and control of the situation (e.g., by ‘Staying organised’; satisfaction); actively monitoring group progress (e.g., ‘I regulated this emotion by constantly making sure my peers were carrying the tasks out to the best of their ability’; relief); exploring the topic of the activity further (e.g., ‘I did some additional research on the topic so I could better understand the research material.
provided - this really helped in keeping the interest going.’; curiosity); and creating a plan to complete the task (e.g., ‘I looked further into the activity instructions to plan my time effectively’; relief).

Changing or directing thoughts was the second most reported category of emotion regulation strategies for pleasant emotions (n=20; 35.7%). Descriptions of focusing on the task (e.g., ‘I just try to stay focused on the task in hand’; curiosity) and thinking positively (e.g., ‘I made a list of good things that will come from the exercise’; hope) were the most reported strategies by participants for regulating their pleasant feelings in this category. Examples of other strategies described, included: focusing on the pleasant feelings (e.g., ‘I tried to keep the feeling of relief in my mind’; relief); and keeping level-headed (e.g., ‘I tried to stay level-headed as I knew there was probably going to be more work afterwards, with the group wiki page’; relief).

There were a small number of responses which described regulating pleasant emotions through social support (n=6; 10.7%). These predominantly related to giving or receiving task-related support. For example, one student described how they regulated their enjoyment by supporting other group members: ‘I tried to support other members of the group to ensure the group stayed working well’. Whilst another student said: ‘When looking at the activity instructions I felt some relief, I furthered this emotion by communicating to my group about the task’. The support gained throughout this communication helped increase the student’s ‘feeling of release’. One student described how their feelings of pride were regulated by group members praising one another after the task had been complete: ‘It came at the end of task so it was more just praise on a job well done but it made me feel better about what I had done’.

There were only two descriptions of strategies in the modifying emotional response category (n=2; 3.6%). These related to taking breaks from the task and using relaxation techniques.

No descriptions of strategies in the evasion or avoidance-category were found for pleasant emotions.
For unpleasant emotions, 142 descriptions of emotion regulation strategies were found. As observed for pleasant emotions, participants predominantly described regulating their emotions using strategies in the active task-related behaviour-category (n=60; 42.3%). Increasing effort and work rate in the activity was found to be the most frequently reported strategy. For example, to regulate their feelings of disappointment, one participant said: ‘I tried harder and took on more tasks to cover for other people’. Whilst another student stated that they: ‘put in extra effort to make sure we got all the work completed’ to regulate their feelings of frustration. Examples of other strategies described by students in this category, included: increasing organisation and control of the situation (e.g., ‘To manage the anxious feelings I attempted to organise the tasks as much as possible to allow enough time to complete these’; anxiety); increasing interaction with group members (e.g., ‘I have been trying to interact as much as possible with the others’; insecurity); reading through task-related materials (e.g., ‘I try to read the instructions through a few times to try and understand them better’; confusion); ensuring own aspects of the task had been completed (e.g., I tried to reduce my anxiety by ensuring I had done my share of the work and submitted it on time; anxiety); and compensating for others (e.g., ‘I tried harder and took on more tasks to cover for other people’; disappointment).

Social support was the second most reported category of emotion regulation strategies (n=30; 21.1%). This category was much more prominent for unpleasant emotions than for pleasant emotion. Interestingly, strategies in this category were less frequently reported for regulating anxiety when compared with many of the other categories. In this category, participants described giving and/or receiving emotional, task-related, and motivational support. Emotional support was mainly sought from the tutor (e.g., ‘I emailed my tutor about the lack of participation’; frustration’) or family and friends (e.g., ‘I spoke to my husband about the situation’; anger). Task-related support was often provided to others in the group (e.g., ‘messaged on the forums helping others by listing the remaining tasks to be undertaken’; disappointment) and motivational support was often provided to encourage greater participation in the task (e.g., ‘Messaged the group to try and urge some movement in the right direction’; frustration).

Participants also described regulating their emotions through strategies in the changing or directing thoughts-category (n=28; 19.7%). Descriptions of reappraising the situation (e.g., ‘I tried to see it from others point of view - we do not know each other and our personal situation that may be affecting taking part’; frustration), thinking positively
(e.g., ‘I resolved to be enthusiastic no matter what, and get things done’; anxiety), and focusing on the task (e.g., ‘Remain focused on work production to prevent anxiety having a detrimental effect on my work output’; anxiety) were the most reported strategies by participants.

The modifying emotional response-category was also highlighted in students’ responses ($n=20; 14.1\%$). Strategies in this category were primarily used to regulate frustration and anxiety. Example responses included: using relaxation techniques (e.g., ‘I had to use headspace meditation to lower my unpleasant emotion of anger’; anger); taking breaks from the activity (e.g., ‘I just walked away from the computer to have a break’; anxiety); exercising (e.g., ‘Going for a run’; frustration); and suppressing emotions (e.g., ‘I will not allow my feelings to impact on others, so have to just put my frustration aside and get on with the job in hand’; frustration).

There were four descriptions of strategies in the evasion or avoidance-category ($n=4; 2.8\%$). These only related to the regulation anxiety and frustration. Responses described both mental disengagement (e.g., ‘I’m also putting it to the back of my mind while I complete other commitments’; anxiety) and physical disengagement (e.g., ‘By avoiding the situation’; frustration) from the activity.
Emotion regulation goals

In total, 148 descriptions of emotion regulation goals were found; 52 descriptions of goals aimed at regulating pleasant emotions and 96 descriptions of goals aimed at regulating unpleasant emotions. After undertaking conventional content analysis (Hsieh & Shannon, 2005), three distinct categories of the emotion regulation goals were generated. Descriptions of each category are presented in Table 15. It is important to acknowledge that students may have had more than one goal for regulating an emotion, and these may have been in different categories (e.g., regulating an emotion for both performance-oriented and wellbeing-oriented goals).

Table 15. Categories of emotion regulation goals.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description of category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance-oriented goals</td>
<td>This category includes goals aimed at enhancing performance in the group activity. Goals were primarily related to: enhancing participation in the task; increasing motivation; or improving overall chances of successful outcomes in the activity (e.g., passing the activity, improving quality of work, achieving a higher grade.). Goals aimed at enhancing cognitive performance (e.g., avoiding becoming cognitively overloaded or ensuring emotions do not cloud thoughts) were also included in this category. Although performance goals were predominately directed at the student themselves, there were instances where they were directed at other students (e.g., increasing the motivation of another student) or the whole group (e.g., to increase the group’s performance).</td>
</tr>
<tr>
<td>Wellbeing-oriented goals</td>
<td>This category includes goals related to enhancing a student’s wellbeing. Such goals are associated with increasing pleasant feelings and reducing unpleasant feelings. These goals were often found to be quite short-term and immediate. As well as increasing pleasure, or positive emotional states, wellbeing goals were found to relate to reducing unpleasant feelings to avoid, or reduce, potential negative impacts on students’ health (mental and physical) and their daily lives.</td>
</tr>
<tr>
<td>Social/relational-oriented goals</td>
<td>This category includes goals aimed at fostering positive social relationships with group members, maintaining social harmony, and eliciting positive social judgements from others. Examples of this category include reducing unpleasant feelings to avoid or reduce conflict and disagreements in the group or wanting to be ‘accepted’ or ‘valued’ by others. It is important to note that the social and relational aspects of these goals are the primary focus. Goals that involve, for instance, improving relationships with group members, but are more focused on performance outcomes (e.g., reducing group conflict to improve performance in the activity) were classified as performance-based goals. Differentiating such goals was at times challenging.</td>
</tr>
</tbody>
</table>
Table 16 provides an overview of how frequently participants described pursuing emotion regulation goals in each category for various pleasant and unpleasant emotions.

Table 16. Categories of emotion regulation goals reported by participants for both pleasant and unpleasant emotions. Data from diary entries 1-4.

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Performance-oriented goals</th>
<th>Wellbeing-oriented goals</th>
<th>Social/relational-oriented goals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%a</td>
<td>n</td>
<td>%a</td>
</tr>
<tr>
<td>Pleasant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relief</td>
<td>10</td>
<td>62.5</td>
<td>5</td>
<td>31.3</td>
</tr>
<tr>
<td>Curiosity</td>
<td>7</td>
<td>58.3</td>
<td>5</td>
<td>41.7</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>4</td>
<td>80.0</td>
<td>1</td>
<td>20.0</td>
</tr>
<tr>
<td>Hope</td>
<td>3</td>
<td>60.0</td>
<td>2</td>
<td>40.0</td>
</tr>
<tr>
<td>Pride</td>
<td>3</td>
<td>75.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>2</td>
<td>50.0</td>
<td>2</td>
<td>50.0</td>
</tr>
<tr>
<td>Surprise</td>
<td>2</td>
<td>50.0</td>
<td>2</td>
<td>50.0</td>
</tr>
<tr>
<td>Excitement</td>
<td>1</td>
<td>50.0</td>
<td>1</td>
<td>50.0</td>
</tr>
<tr>
<td>Unpleasant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>20</td>
<td>54.1</td>
<td>16</td>
<td>43.2</td>
</tr>
<tr>
<td>Frustration</td>
<td>19</td>
<td>63.3</td>
<td>8</td>
<td>26.7</td>
</tr>
<tr>
<td>Disappointment</td>
<td>9</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Confusion</td>
<td>6</td>
<td>85.7</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Insecurity</td>
<td>3</td>
<td>60.0</td>
<td>2</td>
<td>40.0</td>
</tr>
<tr>
<td>Anger</td>
<td>1</td>
<td>25.0</td>
<td>2</td>
<td>50.0</td>
</tr>
<tr>
<td>Guilt</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>100.0</td>
</tr>
<tr>
<td>Dissatisfaction</td>
<td>1</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Boredom</td>
<td>1</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>92</td>
<td>48</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

Note. Emotions are listed in descending order based on total frequencies. *Percentage of row total.

For pleasant emotions, participants predominantly described pursuing performance-oriented goals (n=32; 61.5%). Most goals in this category relate to enhancing one’s own engagement and performance in the activity. For example, when describing why they regulated their feelings of relief, one student said: ‘To push me to get my work in on time’. Another student described why they regulated their feelings of curiosity: ‘I regulated this emotion so that I don’t get bored or disheartened and stop participating’. Another described why they regulated their feelings of hope at the start of the activity: ‘it is always best to enter into these sorts of tasks as optimistically as possible, negativity
from one will affect the whole group and ultimately impact the final results’. A number of students descriptions highlighted that they regulated their emotions to increase their own motivation when completing the activity (e.g., I tried to maintain feelings of enjoyment to continue to feel motivated throughout the activity”; *enjoyment*, or ‘I tried to keep hold of the feeling the relief as it motivated me to keep the standard up for my next contribution’). Interestingly, there were a few descriptions in this category that alluded to trying to decrease or negate pleasant feelings due to their potential negative impacts on performance. For example, one student said: ‘I believe these feelings can cause bias in scientific work and should be kept to one side in task activities’, when discussing why they regulated feelings of *satisfaction*. Other examples included: ‘You try to regulate the emotion [excitement] as it can start to cloud your true aim for the experiment, thus, possibly getting results wrong’ and ‘I didn’t want to get ahead of myself and waited until we had completely finished our final summary before I fully experienced this emotion [relief]… if I had not managed it before hand and something had gone wrong I would have felt negative emotions’. A small number of descriptions in this category also described regulating emotions to enhance motivation, participation, and performance of other students in the collaborative task.

The *wellbeing-oriented* category was the second most described for pleasant emotions (*n*=18; 34.6%). Descriptions of participants wanting to avoid the experience of, or reduce, unpleasant feelings were the most prevalent goal reported in this category. For example, one student said: ‘keeping hold of positive feelings helps me personally avoid falling into a depressive episode that will affect my motivation’, when describing why they had regulated their feelings of *hope*. Whereas another student stated that they regulated their feelings of *curiosity* ‘to avoid negative emotions’. A small number of students specifically described regulating their emotions to maintain or increase their pleasant feelings. For instance, when describing why they had regulated feelings of *curiosity* one student wrote: ‘To increase the good thoughts and emotions’. There were also a small number of responses that referred to regulating pleasant emotions to have a more positive learning experience (e.g., ‘To make the whole experience beneficial and enjoyable”; *enjoyment*).

The *social/relational-oriented* category of emotion regulation goals was only described on two occasions (*n*=2; 3.8%). For example, when describing why they regulated their feelings pride, one student wrote: ‘I wanted to keep the positive group dynamic going, as everyone seemed friendly and it was nice to get to know others on the course’. 

168
For unpleasant emotions, participants primary described pursuing *performance-oriented* goals \((n=60; 62.5\%)\). The majority of descriptions in this category related to enhancing activity engagement or performance by reducing or negating unpleasant emotions. For instance, one participant wrote: ‘Completing work (professionally and academically) is more difficult when stressed or feeling anxious and so by reducing these feelings I will be better able to complete the work I am currently facing’, to describe why they regulated their feelings of *anxiety*. Another participant said: ‘Getting frustrated would affect the standard of work I would get done, the goal is to try and ignore this unpleasant feeling and focus on the positives and enjoy the work I am doing’. Other examples included: ‘It [confusion] was reducing how confident I felt completing work’; ‘Any negative emotion will affect how I carry the task out, so by getting rid of this emotion [anger] or managing it, allows me to better perform the tasks ahead’; ‘I didn’t want it [frustration] to affect my writing or any other aspect of my contribution so needed to reduce feelings of frustration’; and ‘Anxiety was not going to be helpful in the completion of the task, and negativity would be detrimental to the group’. Similar to findings for pleasant emotions, a few responses in this category described regulating unpleasant emotions to increase the engagement and performance of other students (e.g., ‘I tried to reduce my frustrations at group to try and increase participation, it worked with one or two of them’; *frustration*). There was also some evidence of regulating emotions to enhance overall group performance. For instance, one student described regulating their *disappointment* as would be detrimental to the group functioning. Regulating *anxiety* because of its impact of cognitive thinking was also highlighted by one student (e.g., ‘wanted to reduce anxiety as it prevents objective working’).

Pursuing goals in the *wellbeing-oriented* category were the second most described by participants for unpleasant emotions \((n=30; 31.3\%)\). The majority of responses in this category related to avoiding or reducing unpleasant feelings. For instance, one student who wanted to regulate their emotions to reduce feelings of *frustration* said: ‘I didn’t want to keep feeling frustrated, I wanted to keep positive’. Another student described that they wanted to lessen their *anxiety*: ‘I did not want to worry about it when we still had a few days to do the task’. Some of the students also described that they wanted to reduce their unpleasant emotions to stop experiencing the physical symptoms they induce. For example, in relation to *anxiety* one student said: ‘I do not like the physical feelings that manifest because of anxiety, or disturbed sleep’, whilst another stated: ‘If these feelings
go on then I feel physical pain (chest pain etc) which is distracting’. In this category, there were also descriptions of regulating unpleasant emotions to avoid or reduce impacts on daily life (e.g., ‘The anger was affecting my overall productivity in my daily life’; anger; or ‘It has an impact in the rest of my live’; insecurity) or mental health (e.g., ‘To help my mental health and not stress out every day’; anxiety).

Goals in the social/relational-oriented category were less described by participants for unpleasant emotions (n=6; 6.3%). These goals were often pursued to: avoid conflicts (‘I didn’t want to upset anyone in the group, especially as they may be dealing with unknown issues outside of the group project’; frustration); resolve tensions (e.g., ‘To rectify the matters with the other group member’; anger); prove own value to the group (e.g., ‘To prove to them that I could be a good member of the team and that I was reliable’; frustration); and be accepted by others students (e.g., ‘I want to combat this to feel 'accepted' by the group in a way’; anxiety).

5.4 Discussion

5.4.1 Interpretation of findings

The aim of this study was to build on the findings of Study 1 and gain a more in-depth understanding of students’ emotional experiences in an assessed, online, group activity. Findings are now discussed in relation to the study’s five main research objectives as well as relevant literature.

The first objective of this study was, ‘To explore the prevalence of, and change in, pleasant and unpleasant emotions when undertaking an assessed, online, group activity’ (linked to RQ1).

Similar to findings in Study 1 (see Section 4.3.1), this investigation found that anxiety and relief were frequently experienced by students when undertaking the online group activity. Findings also revealed that pleasant emotions were commonly experienced by students. For instance, feelings of relief, satisfaction, curiosity, and hope were amongst the most frequently reported emotions by students in each diary entry. Although these findings may seem a little surprising, due to the challenging nature of online group activities (especially when assessed) and the potential for unpleasant emotions to be evoked, they do support results from Study 1. These results also add to the growing
literature highlighting the positive experiences students can have when undertaking online group work (Donelan & Kear, 2018; Webster, 2019).

In contrast to findings from Study 1, frustration, and to some extent anxiety (primarily in diary entries 1-4), were found to be less frequently reported by students. There may be a number of reasons for these differences. For instance, it could be speculated that the extended recall times in Study 1 (i.e., judging emotions after a number of days/weeks), may have meant that students overemphasised the experience of certain emotions (e.g., unpleasant emotions or emotions experienced at a high intensity). The momentary measures in this study (in diary entries 1-4) may have allowed for a more precise measurement of emotions during the group activity. Furthermore, the stages of the activity students were working on when completing the diary entries may have also had an impact. For example, numerous students had already started collaborating by the first entry and many students had completed all collaborative aspects by diary entry three. This may have meant that initial anxieties and frustrations that can be experienced during online group learning (Capdeferro & Romero, 2012; Hilliard et al., 2020) may have been missed. Another reason that could help explain reduced reporting of frustration in this study, is the different self-selected sample used in this investigation.

One of the aims of this study was to explore how emotions changed during the different stages of the group activity. This, however, proved extremely difficult, due to students being at different stages of the activity when completing each diary entry (as discussed above; see Section 5.3.1). This was an unexpected finding, as it was thought that most students would be working on similar aspects of the activities at the different time points investigated in this study. Due to this variability, the emotions reported in each diary entry would have been impacted greatly. Therefore, it cannot be stated for certain which emotions were more prevalent at specific stages of the activity (e.g., before, during, and after) or how emotions fluctuated throughout the task. This finding does, however, have important implications for future research which employs longitudinal research designs. For instance, if possible, it might be prudent to ask students to complete emotion assessments when they are actually undertaking specific aspects of the task (e.g., ‘interacting with other students’ or ‘combining information into the wiki’), instead of at a set time point during the activity (as in this study).
The second objective of this study was, ‘To explore the causes of pleasant and unpleasant emotions experienced when undertaking an assessed, online, group activity’ (linked to RQ2).

In line findings from Study 1, this study found that pleasant and unpleasant emotions derived from a variety of causes and these were classified into the eight categories previously identified. This study moved beyond the results of this first investigation however, by exploring the causes of specific pleasant and unpleasant emotions, rather than only differentiating emotional states by their valence.

In relation to pleasant emotions, the causes of relief and satisfaction were described most by students. Both emotions were found to be primarily elicited from causes in the outcome-category. For instance, completion of the group task was the most cited reason for both emotions. Despite being strongly connected with such causes, relief and satisfaction were also found to take process-related forms. For example, a student’s current participation and contribution to the task as well as the realisation other group members were engaging and participating in the activity were cited as emotional triggers for both emotions. Although satisfaction and relief derived from similar sources, these pleasant deactivating emotions do differ from one another. Whilst relief is considered a tension-reducing emotion which is strongly related to the cessation (or avoidance) of aversive or stressful circumstances (Lazarus, 2000; Pekrun et al., 2002b), satisfaction can be viewed as being a more stable mental state where an individual is at ease with their current situation. Satisfaction is often the result of making progress towards, or the completion of, a task or goal(s) (Ceaparu et al., 2004; Pekrun et al., 2002b) and having high degrees of control and certainty (Ellsworth and Smith, 1988). This emotion is similar to the feelings of joy/happiness, yet it is thought to be of a lower arousal level (Fredrickson, 1998).

The causes of curiosity were found to be consistent with the core theme of this emotion, in that it is thought to be triggered by an information gap (i.e., a discrepancy between what one knows and what one wants to know) and the desire to close this gap (Pekrun, 2019c). For instance, in this study, the desire to learn more about the topic, understand what other students were feeling, and find out the result or grade of the activity were all described by students as sources of this emotion. Ensuring information gaps are not too large, and that students have adequate skills and knowledge to close these gaps, are
important considerations for educators. If the discrepancy is too big or incomprehensible, it is likely that students may experience unpleasant emotional states (Chevrier et al., 2019; Pekrun et al., 2018). For instance, in this study, a few students reported experiencing confusion due to difficulty in understanding task instructions and guidance. In addition to cognitive incongruity, novelty is also thought to be an important antecedent of this emotion (Pekrun et al., 2018). In this study, for example, the novelty of the assessed group project was cited as a cause of curiosity by one student.

Other pleasant emotions were also found to be consistent with their core themes (see Pekrun et al., 2018; Pekrun et al., 2002; Lazarus, 2000). For instance, hope was found to stem from uncertainty about positive future events (e.g., anticipation of gaining a good grade or successfully participating in the activity). Enjoyment occurred when situations were positively valued and were found to take both process-related emotion forms pertaining to the group activities (e.g., stemming from topic of the task and working with others), and outcome-related forms often pertaining to achievement and its related consequences. Pride was often associated with successful performance in the activity, which was attributed to an individual’s own abilities and actions. Additionally, retrospective thoughts about the positive performance of the group whom the student identifies with, was also found to be a source of pride.

In relation to unpleasant emotions, causes of anxiety were most described by students. Similar to hope, the emotion of anxiety implies subjective uncertainty about future events. In contrast to hope, however, anxiety is primarily evoked by the anticipation of possible negative future events and outcomes (Pekrun et al., 2018; Zeidner, 2014). Consistent with this meaning, this study identified various causes of prospective forms of anxiety. Many of these causes were grouped in the self-category and were often reported in the early stages of the group task (e.g., a lack of confidence on one’s own ability, worries about participation and performance in the task, and doubts about the time students had to participate). These findings are similar to those reported in Study 1 and as well as findings from existing research that has been undertaken in similar learning contexts (Allan & Lawless, 2003; Hilliard et al., 2020; Symeonides & Childs, 2015). Anxiety was also found to more commonly stem from various causes in the others-category (e.g., worries about other students’ engagement and performance). Although this unpleasant emotional state can also take retrospective forms (e.g., experiencing anxiety by thinking about something that has already occurred), these were not reported in this study.
Frustration is an emotion that is evoked when encountering an obstacle (either internal or external) that interferes with the achievement of a task, goal, or expectation (Lazar et al., 2006; Mandler, 1975; Muis et al., 2015). Consistent with this meaning, and similar to results found in Study 1 and findings from previous research exploring emotions in online group activities (Capdeferro & Romero, 2012; Robinson, 2013), this research found that frustration primarily stemmed from a lack of, or minimal, engagement and participation from other students during the activity. The lack of guidance and instruction (task-category), the enforced nature of social learning (learning model-category) and, interestingly, internal sources related to one’s own competence and understanding (self-category) were also identified as triggers of this unpleasant emotional state.

Fewer descriptions of the other unpleasant emotions were provided in this study. Disappointment, an emotion that is aroused when there is a mismatch between the expected and actual outcome, with the outcome being less than predicted (i.e., when the expectation is positive but the outcome is negative) (Dobrosovestnova & Hannibal, 2020; Pekrun et al., 2018), was primarily evoked when expectations of others participation and performance were not fulfilled. This emotion is similar, but opposite, to that of relief, in that it is aroused when a prior expectation is not fulfilled (Pekrun et al., 2018). Anger is considered an emotion that is induced when offense or harm is perceived to be caused by either another person (this could also relate to an event or institution) or oneself (Lazarus, 2000). In academic settings, this emotion is often evoked when students perceive barriers to goal attainment or wellbeing (Pekrun et al., 2018). The findings of this study revealed that anger was primarily aroused by other students’ negative behaviours and actions or their lack of engagement in the task. Guilt is thought to occur when one goes beyond the limits of what is morally, socially, or legally acceptable (Lazarus, 2000). In this study, students described how this emotion resulted from their own self-criticism about their lack of preparation and contribution to the activity.

The third objective of this study was, ‘To explore how pleasant and unpleasant emotions impact participation when undertaking an assessed, online, group activity’ (linked to RQ3).

Consistent with findings from Study 1, as well as previous theoretical and empirical work (e.g., Fredrickson, 2004; L. Linnenbrink, 2007; Pekrun et al., 2002b), findings revealed that students felt that pleasant emotions had positive consequences on their participation.
Pleasant emotions were also perceived to have more of an impact than unpleasant emotions in the group task. Although this may have largely been influenced by the greater occurrence of pleasant emotions experienced by students throughout the activity, this is still an interesting finding. Research in higher education settings has traditionally focused on the effects of unpleasant emotions in academic contexts (primarily of test anxiety), with pleasant emotions often being neglected (Pekrun, 2019b). Despite research emerging over the last two decades highlighting the importance of pleasant emotions (particularly enjoyment) (e.g., Camacho-Morles et al., 2021; Pekrun et al., 2002b), there is still little evidence of the functions of these emotions in online collaborative learning contexts in distance education environments. For instance, from the limited research that is available, a greater focus has been placed on investigating the effects of unpleasant emotional states, such as anxiety and frustration in these learning settings (Capdeferro & Romero, 2012; Hilliard et al., 2020; Robinson, 2013). The results from this study, therefore, add to the growing literature evidencing the importance of pleasant emotions in education settings, and contributes to a greater understanding of how pleasant emotions function in assessed, online, group activities.

Of the pleasant emotions explored in this study, relief was reported by students as having particularly desirable effects. For instance, students perceived this emotion to have the most positive impacts during the group task (e.g., by increasing effort and work rate, increasing interaction and support of others, and enhancing confidence to express thoughts and opinions). Intriguingly, this emotion, along with satisfaction (which was the second most reported pleasant emotion to have positive impacts), are often classified as a pleasant deactivating emotions (Linnenbrink, 2007; Pekrun, 2006). These emotions are thought to have complex relationships with task engagement and are often considered to have detrimental impacts (Pekrun & Linnenbrink-Garcia, 2012). For instance, it is believed that emotions like relief and satisfaction can decrease momentary motivation for effortful task engagement and reduce task attention and focus (Pekrun et al., 2002b; Pekrun & Stephens, 2012). On the other hand, these emotions can also have beneficial effects. For instance, relief can: help cope with, and protect against, more extreme levels of anxiety (Rowe et al., 2015); ease recovery from stress, which may help improve their immune system and physical health (Pekrun et al., 2018); and act as a positive reinforcer after task completion, strengthening motivation to engage in the next phase of learning (Pekrun et al., 2002b; Pekrun & Stephens, 2012).
In this study, relief and, to a lesser extent, satisfaction, were found to have energising effects during the activity itself; these are different to the longer-term or post-activity benefits of relief described above. It could be speculated that these facilitative effects may have been influenced by the learning context that this study was undertaken in and how such emotions were evoked. For example, previous research has primarily investigated the effects of pleasant deactivating emotions (such as relief and satisfaction) after the completion of solo learning activities or assessments (Pekrun et al., 2002b). Although such outcome-related forms of these emotions were reported in this study (e.g., the relief after completing the group activity), process-related forms were also found (see Section 5.3.3). For instance, both relief and satisfaction were found to stem from the realisation that other students were engaging in the group activity. The effects these process-related forms of pleasant deactivating emotions have on participation is, therefore, likely to be very different than the outcome-related forms experienced after learning activities have been completed. For example, they may help reinstate normal attention, concentration, and effort back on the task which may have been impaired by experiencing unpleasant emotions (especially if these feelings were intense). These findings highlight how the role and function of emotions can be different when learning in highly social learning contexts compared with more independent settings (Linnenbrink-Garcia et al., 2011). It also emphasises the need for further research to explore the specific functions of pleasant deactivating emotions (particularly relief) in assessed, online, group activities.

Although unpleasant emotions were generally found to have less of an impact on participation than pleasant emotions, anxiety was still found to have important functions in the group activity; this finding is in line with those from Study 1. For example, students reported this emotion to have both debilitative (e.g., reduced task involvement) and facilitative (e.g., increased effort and work rate) impacts during the activity. This finding further supports the position that it would be misleading to equate all unpleasant emotions with negative effects when undertaking in assessed, online, group activities. Although unpleasant emotions have often been thought of as being wholly deleterious, anxiety and other unpleasant activating emotions, such as frustration and anger, have been shown to have facilitative functions for learning and achievement (e.g., by enhancing motivation, effort and persistence, and task focus and attention) (Pekrun & Linnenbrink-Garcia, 2012; Pekrun & Stephens, 2012). As discussed in Section 4.4.1, the impact of unpleasant emotions (i.e., whether they will be beneficial or detrimental) depends on the complex...
interplay between the emotion (e.g., type and intensity), individual factors (e.g., ability to regulate emotions, personality traits), and task demands (e.g., availability of support, task importance). Although it is important that future research aims to understand how these different factors influence the effects of a variety of unpleasant emotions in online group learning activities from a theoretical perspective, it is also imperative that unpleasant emotions are not encouraged or promoted by educators. These feelings are generally associated with less adaptive outcomes and it would, therefore, be unethical to purposely evoke these emotions.

The fourth objective of this study was, ‘To explore the strategies used by students to regulate pleasant and unpleasant emotions in an assessed, online, group activity’ (linked to RQ4).

Consistent with findings from Study 1, students reported using a wide variety of strategies to regulate their emotions. This study extends findings from the first investigation of this thesis, however, by reporting that students regulated both unpleasant and pleasant emotional states (instead of emotions in general). This is an interesting finding as most research exploring emotion regulation in educational contexts has predominantly focused on the regulation of unpleasant emotions (Hilliard et al., 2020; Nett et al., 2011).

Of the five categories of emotion regulation strategies explored in this study, active task-related behaviour was the most frequently described by participants for both pleasant and unpleasant emotions. As noted in Study 1, it is thought that many of the strategies included in this category are adaptive, in that they have positive impacts on individual and group performance. However, it must also be noted that some of strategies in this category may also have negative consequences. For instance, ‘compensating for other students’ may increase negative feelings towards group members, and ‘taking more control of the activity’ may have detrimental impacts on group dynamics.

Cognitive strategies in the changing or directing thoughts category were found to be less described than task-related behavioural strategies for both pleasant and unpleasant emotions. This finding is slightly surprising, as in Study 1 (see Section 4.3.4) students reported using these strategies more frequently than those in the active task-related behaviour-category. There may be several possible reasons for these differences. For instance, previous research in social psychology has shown that behavioural regulation strategies can create larger hedonic shifts than cognitive strategies (Augustine &
Hemenover, 2009). Therefore, students may have adopted task-related behavioural strategies to cause a greater change in their emotional feelings. It has also been claimed that cognitive strategies require greater emotion regulation ability and cognitive resources than behavioural approaches (Augustine & Hemenover, 2009), meaning that they are not as easy to effectively implement. The use of behavioural strategies, which engage fewer cognitive resources and require lower emotion regulation ability, may, therefore, be a more effective approach for many students. This also supports findings that strategies in the changing or directing thoughts-category were used more frequently to regulate pleasant emotions than unpleasant emotions. As unpleasant emotions engage more cognitive resources (Augustine & Hemenover, 2009), it might be more suitable for students to select emotion regulation strategies requiring low levels of cognitive resources.

Emotion regulation strategies grouped in the social support category were found to be predominantly used to regulate unpleasant emotions in this study (particularly frustration, disappointment, and anger). These findings are consistent with previous literature that has highlighted the importance of interpersonal strategies when regulating unpleasant emotional states in social online learning settings (Ayoko et al., 2012; Hilliard et al., 2020; Webster, 2019; Xu et al., 2013). Interestingly, anxiety was found to be rarely regulated using strategies in this category. Although it cannot be stated for certain, this finding may possibly be linked to the cause of this emotional state. For instance, in this study, anxiety was often found to stem from students’ self-doubts (e.g., about themselves or in relation to others). This reduced confidence may have made it less likely for students to disclose their feelings to other individuals involved in the group activities (i.e., their tutor or other group members); especially if individuals did not know each other that well. Although beyond the scope of this thesis, future research should explore the links between the sources of students’ emotions and their use of emotion regulation strategies.

Overall, strategies in this social support category were found to be less reported in this study compared to findings in Study 1 (where they were found to be the most reported category of emotion regulation strategies). There may be a number of explanations for these contrasting findings. For instance, this study explored a specific set of pleasant and unpleasant emotions, whilst Study 1 allowed students to describe how they regulated any emotions that had experienced during the group activities. Furthermore, in this study, students predominately described their experiences of three emotional states: anxiety;
frustration; and relief. This, therefore, would have greatly influenced the types of emotion regulation strategy reported by students. For example, along with the limited use of interpersonal emotion regulation for anxiety (as discussed above), relief was also reported to be rarely regulated using social forms of emotion regulation (both of these emotions were primarily found to be regulated using strategies in the active task-related behaviour-category). Differences in findings may have also been influenced by the different sample of students taking part in this study (e.g., a smaller sample size only consisting of students from one module).

Emotion regulation strategies in the modifying emotional response category were also found to be primarily used to regulate unpleasant emotions. Students most frequently reported using relaxation techniques and taking breaks away from the task to calm down. Although such strategies have been reported in general emotion regulation literature (Augustine & Hemenover, 2009; Parkinson & Totterdell, 1999), very few studies have reported students using these strategies to regulate academic emotions. As noted in Study 1, this might be due to the limited research exploring emotion regulation strategies used by students outside of when they are undertaking learning activities and assessments themselves. Furthermore, it may reflect affordances offered by the asynchronous online learning environment, such as the ability to step away from the task to relax which may not be possible in face-to-face group work settings.

Evaporation or avoidance emotion regulation strategies were only described when regulating unpleasant emotions and were primarily related to feelings of anxiety. Again, it could be speculated that the use of such regulation strategies could be linked to the cause of this emotion. For instance, if self-doubts lead to a reluctance to disclose feelings to others, then avoidance strategies may appear to be one of the only ways to avoid the anxiety provoking situations or thoughts. Due to the negative outcomes that can stem from using avoidance type emotion regulation strategies (Aldao et al., 2010; Penley et al., 2002; Schäfer et al., 2016; Webb et al., 2012), it was an encouraging finding that these strategies were reported infrequently in this study. However, it must be acknowledged that these findings may have been influenced by the self-selected sample of students that took part (e.g., students who wanted to avoid the collaborative activity may have not taken part in this research project) and the demographics of these participants (e.g., many students are older which may make them more effective at regulating emotions; English and Carstensen, 2013). Understanding how prevalent the use of evasion and avoidance
emotion regulation strategies are in social and collaborative online learning settings, is an important area for future research.

The final objective of this study was, ‘To explore the goals pursued by students when regulating pleasant and unpleasant emotions in an assessed, online, group activity’ (linked to RQ4).

Findings revealed that students pursued various goals when regulating their pleasant and unpleasant emotions; however, these were predominantly oriented towards enhancing performance in the group activity. In relation to Tamir’s (2016) taxonomy of emotion regulation motives, performance-oriented goals would be classified as instrumental motives. Such motives target the potential benefits/outcomes that will occur from changing the experience itself or expression of an emotion (English et al., 2017). Due to the assessed nature of the collaborative task, and the importance of doing well in the activity to complete, or succeed in, the module, engaging in emotion regulation to further one’s success is quite understandable. Despite the scarcity of research exploring emotion regulation goals in online collaborative learning settings, the pursuit of performance goals when regulating the emotion of anxiety has been found previously (Hilliard et al., 2020).

Participants in this study were largely motivated to regulate emotions to promote desired performance behaviours (e.g., to increase own participation and performance in the activity or to ensure progress is made in the task). However, evidence was also found for improving cognitive performance (e.g., to avoid becoming overly focused on the task or to be able to think more clearly to and process information). The idea that individuals regulate emotions to enhance both behavioural and cognitive aspects of performance is supported by research in other settings (see Tamir, 2016, for an overview).

It was apparent that students often aimed to amplify or maintain pleasant emotions and dampen unpleasant emotions when describing their performance goals. There was, however, also some evidence that students aimed to negate or reduce pleasant emotions during the group activity. For instance, several students described not wanting to fully experience their pleasant emotions as they believed they may negatively impact their assessment work (e.g., by causing complacency or ‘clouding’ their thoughts). Given that this study only aimed to explore the specific reasons for students wanting to regulate their emotions and not the direction in which students tried to change their emotions (i.e., amplify or dampen positive or negative emotions), firm conclusions cannot be drawn.
Emotion regulation goals oriented towards enhancing one’s wellbeing were found to be the second most frequently reported by students, both for pleasant and unpleasant emotions. Typically, this related to increasing pleasant emotions and decreasing unpleasant emotions. The hedonistic motive of creating and maintaining positive emotional states has been commonly reported in previous emotion regulation literature (Riediger et al., 2009; Tamir, 2016; Taxer & Gross, 2018) and the desire to reduce unpleasant emotions in social contexts might be quite expected due to their low hedonic value and disruptive potential (English et al., 2017). Although goals aimed at decreasing pleasant emotions and increasing unpleasant emotions (i.e., contra-hedonic motives; Tamir, 2016) have been discussed in prior literature (Riediger et al., 2009; Tamir, 2009; Taxer & Gross, 2018), there was no evidence of such goals in this study; this may highlight that such motives are not very common in this learning context. Future research may wish to explore this area further, as it could be possible, for example, that students can be motivated to reduce pleasant feelings to protect themselves against, or lessen the impact of, future unpleasant emotions.

In addition to regulating emotions purely for feeling more positive, this study also identified a few instances where students were motivated to reduce unpleasant emotions (mainly anxiety) to avoid or reduce potential negative impacts on their health (mental and physical) and daily life. Experiencing excessive unpleasant emotions at university is thought to have negative impacts on mental health and wellbeing (Hagenauer et al., 2018; Lister et al., 2021; Pekrun, 2019b) and, therefore, being able to successfully regulate one’s emotions plays an important role in reducing mental health issues (Gross, 2013). This is especially important for university students as in recent years there have been increasing levels of mental illness, mental distress, and low wellbeing reported among learners in higher education (Brown, 2018; Thorley, 2017). Additionally, there are a higher proportion of students with a disclosed a mental health condition studying at the OU in comparison to other UK universities (Lister et al., 2021). It is, therefore, imperative that those students who are struggling to cope with unpleasant feelings are identified and supported as quickly as possible when undertaking online group activities. This, however, is challenging when learning online, as students’ emotions and their wellbeing can often be largely invisible to educators.

This study also found that some students had emotion regulation goals focused towards fostering positive social relationships, maintaining social harmony, and eliciting positive
social judgements from others. Due to the social nature of the group activity, as well as the fact that many of the students had not previously met or worked together, it was not a surprise that students regulated their emotions for such reasons. In previous research, these instrumental types of motives have been found to be commonly pursued by individuals in social environments (Gong et al., 2013; Sutton, 2004; Tamir, 2016; Taxer & Gross, 2018). There may be a number of reasons why these goals were less frequently mentioned than performance and wellbeing categories. For example, as this study explored a limited number of discrete emotions, it could be postulated that if more socially related emotions (e.g., admiration, empathy, sympathy, gratitude) were investigated more evidence of social motives may have been found. The limited prevalence of such goals may, alternatively, indicate that creating or maintaining positive relationships is not an important goal for many students in this learning context. For instance, by studying at a distance, often alongside work and other additional responsibilities, getting to know other students and creating positive social impressions may not be a high priority for many OU students. This possibility should be explored further in future research.

5.4.2 Study limitations

Beyond limitations related to relying solely on self-report data and using diaries (as discussed in see Sections 3.5 and 3.5.2, respectively), there were several other limitations to this study that should be noted.

First, the pre-defined lists of emotions and their impacts used in the online diary may have meant that other important aspects of students’ emotional experiences may have been missed. Although it was important to limit the emotions investigated in this study so that a fine-grained analysis could be gained, it is important future research explore a more diverse range of emotions. Similarly, even though it was thought to be appropriate to list impacts due to students finding it difficult to explain their effects during the pilot investigation, it is important that studies in the future examine other ways that emotions may affect participation (e.g., cognitive and motivational dimensions) as well as the impacts other emotions may have. For instance, in Study 1, it was found that socially related emotions (e.g., empathy, sympathy, resentment, admiration) may have important functions in these learning contexts. Undertaking such research will allow a more
complete picture of the ways in which emotions effect student participation and performance.

Second, although this study aimed to explore the fluctuating nature of emotions throughout the collaborative activity (i.e., before, during, and after collaboration), it was observed that many students were working at very different stages of the activity when completing each diary entry. For example, numerous students noted that they had already started collaborating by the first diary entry and many students had completed all collaborative aspects of the assessment by diary entry three. This, therefore, made it extremely difficult to understand how emotions changed at different stages of the activity. The differences noted in this study will have also impacted the types of emotions reported in each of the four time-points and may have led to an over- or under-representation of specific emotions, or a blurring/spreading of when emotions occurred over time in the data. Future research using longitudinal research designs in naturalistic online group activities should take this into consideration. For instance, this may involve collecting data at more time-points throughout the activity or getting students to complete diary entries when they are undertaking specific aspects of the activity.

Third, when asked to select a specific pleasant and unpleasant emotion in each diary entry, students primarily selected the same emotions (see Appendix I). This meant that it not possible to gain a detailed understanding of the causes, impacts, and regulation of an array of different emotions. More research is, therefore, needed to gain a deeper understanding in various emotional states.

Last, the sample also had a much higher percentage of female students in comparison to males. As previous research has shown that there are gender differences in emotional experiences (Frenzel et al., 2007; McRae et al., 2008), results must be interpreted carefully.

5.5 Chapter Summary

This study used an online diary to explore students’ emotional experiences throughout an assessed, online, group activity. In doing so, it extended findings from Study 1 in a number of important ways. First, by exploring specific pleasant and unpleasant emotions at multiple time points throughout the activity, a more in-depth and fine-grained analysis
of their occurrence, impacts, and regulation was achieved. Second, this study investigated students’ goals for regulating their emotions; an area of study that has received very little prior invitation. Findings revealed that students primarily engaged in this process to enhance their performance in the group activity. Goals related to well-being and fostering social relationships were also identified. In Chapter 6, the final empirical study that comprises this thesis is described. This study explores the perspectives of tutors, the individuals who teach and support students during the group activities.
6 Study 3 (Tutor Perspectives): Methods, Results, and Interpretation

This chapter describes the methods and findings of the final study of this thesis. Study 3 aimed to explore tutor perspectives of students’ emotional experiences in assessed, online, group activities. This chapter is divided into four sections. First, ‘Study Purpose and Objectives’ (Section 6.1) provides a brief background to the study and outlines the research objectives of the investigation. Second, ‘Materials and Methods’ (Section 6.2) describes the context of the investigation as well as the specific data collection and analysis techniques used. Third, ‘Results’ (Section 6.3) reports the findings of the research in relation to the study’s research objectives. Fourth, the ‘Discussion’ (Section 6.4) interprets and describes the significance of the study’s findings and reviews the limitations of the investigation.

6.1 Study Purpose and Objectives

The main purpose of this study was to explore tutors’ perspectives of students’ emotional experiences when undertaking assessed, online, group activities. This was a particularly intriguing area of investigation for several reasons. First, gaining tutor perspectives allowed for a comparison with student perspectives (from Study 1 and Study 2), and, therefore, the extent to which students’ and tutors’ views aligned could be gauged. Second, findings from Study 1 and Study 2 highlighted the important role tutors play in the management and regulation of emotions during assessed, online, group activities. Gaining perspectives from the tutors themselves, therefore, allowed such areas to be explored in further detail. Third, it was thought that gaining tutors’ perspectives would provide a more comprehensive and complete picture of students’ emotional experiences in these learning contexts than that which could be generated by student perspectives alone.

Due to the scant research that has previously been undertaken into investigating tutors’ perspectives of students’ emotional experiences (in both traditional and in online learning settings), an exploratory, qualitative research methodology was adopted. This approach helped develop new and interesting insights into the topic and for the generation of ideas, questions, and hypotheses for future research. This was undertaken using a two-phase multi-method approach. Initially, data were gathered using online discussion forum threads created in existing tutor forums with the sole intention of collecting data for this
study (tutor forums are a pre-existing online discussion forum on the OU’s VLE specifically created for module staff to share key module information and communicate with one another). Qualitative interviews were then undertaken in the second phase of the study. This research sought to address the following research objective:

1. To explore tutors’ understanding of students’ emotions, their causes, impacts, and regulation in assessed, online, group activities (Linked to RQ’s 1-4)

6.2 Materials and Methods

6.2.1 Study context

This study was undertaken using the same five OU undergraduate modules used in Study 1 (modules: ‘Cell biology’, ‘Business’, ‘Computing’, ‘History and literature’, and ‘International development’). The reasons for selecting these modules and a general description of the study context are provided in 4.2.1. A more detailed description of each of the five assessed, online, group activities used in this study is also provided in Appendix E.

Every module at the OU has a number of tutors (also known as Associate Lecturers) who are responsible for supporting students as they study at a distance. The number of tutors on each module is dependent on the number of students on the course. Each tutor will usually be responsible for a group of between 15-20 students. A tutor’s role primarily involves: making contact with students at key points during their study (primarily online); helping students understand module material and activities (including end of year exams and assessments); marking assessments and providing feedback; and providing additional support and guidance throughout the course. In relation to an assessed, online, group activity, tutors would be responsible for: a) ensuring all students are assigned to a group; b) explaining what was involved in the activity; c) providing support to students when needed; and d) assessing students’ completed work. Contact between students and tutors is predominantly undertaken online and can be both synchronous (e.g., using Adobe Connect to deliver online sessions, known as ‘tutorials’) and asynchronous (e.g., via email for one-to-one contact or via online tutor-group forums for group communication). Both
Adobe Connect and forums are hosted on the module’s VLE. Additionally, telephone communication between tutors and students may be used to make individual contact.

6.2.2 Sample and methods of data collection
Tutors from the five purposely sampled OU modules were selected to take part in this study. The population of tutors on each module varied (see Table 17). There was a much greater population of tutors teaching ‘History and literature’ due to the larger student population.

Table 17. Population of tutors on each module.

<table>
<thead>
<tr>
<th>Module</th>
<th>Number of tutors on module</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Cell biology’</td>
<td>27</td>
</tr>
<tr>
<td>‘Business’</td>
<td>15</td>
</tr>
<tr>
<td>‘Computing’</td>
<td>19</td>
</tr>
<tr>
<td>‘History and literature’</td>
<td>78</td>
</tr>
<tr>
<td>‘International development’</td>
<td>11</td>
</tr>
</tbody>
</table>

Data were collected from tutors in two phases. First, data from intentionally created online discussion forum threads were collected in the 2017/2018 academic year, and second, qualitative interviews were undertaken in the 2018/2019 academic year. Due to module team chair permission being a part of the process to recruit modules for this study, tutors from the ‘History and literature’ and ‘Business’ modules were not invited to contribute to the online discussion forum threads. Tutors from all five modules, were, however, invited to take part in the qualitative interviews.

In total, 13 tutors (female = 7, male = 6) provided responses to the forum threads and 16 tutors (female = 10, male = 6) undertook qualitative interviews (further details of participants are provided in Sections 6.2.3 and 6.2.4). Only one tutor provided both forum responses and completed a qualitative interview; all remaining participants undertook one phase of the research. It must also be acknowledged that the sample of all of the tutors were self-selected and this would obviously have potential biases (Olsen, 2008; O. . Robinson, 2014). For instance, participating tutors may be individuals who have a strong interest in the use of social and collaborative online learning (e.g., those who believe such learning is highly beneficial or those who dislike this approach to learning) or are
particularly interested in supporting learners’ emotions and feelings. These views would, therefore, be reflected in their responses. No financial incentives were offered to participants in this study.

Before contacting tutors for either aspect of the research, ethical approval was gained from the OU’s HREC and SSPP (see Section 3.7 for more information). A description of the data collection techniques, procedures, and further participant details for each phase are provided below.

6.2.3 Phase 1: Online discussion forum threads

Intentionally created online discussion forum threads were initially used to explore tutor perspectives of students’ emotional experiences in assessed, online, group activities. These were placed in existing tutor forums of the three participating modules. The use of online discussion forum threads had a number of key benefits that made it suitable for this study; these were discussed in Section 3.5.3.

Two forum threads were created for this study. Each thread aimed to explore a specific theme related to tutors’ perspectives of students’ emotional experiences. The first thread aimed to explore the different emotions tutors thought students experienced, the causes of these emotions, and what impact these emotions have on how students participated and performed in the collaborative tasks. The second thread explored tutors’ experiences of monitoring and managing students’ emotions. In each thread, an introductory message was included outlining the purpose of the research project and several questions were included to help guide tutors with the sort of things they could comment on and discuss. To help enhance the clarity and comprehensiveness of the two online discussion forum threads, both of these introductory messages were reviewed by: 1) the author’s three PhD supervisors (all specialists in distance education and one a psychologist); 2) two PhD students who are also part-time OU tutors; and 3) members of the SSPP committee. Feedback led to minor alterations to the introductory text and questions included in the two forum threads. Questions from the threads are provided in Figure 23, and the full forum threads are provided in Appendix J.
In the 2017/2018 academic year, the forum threads were placed into the tutor forums of three modules by a member of the module team. This occurred two weeks after the completion of the assessed, online, group activity in each module. After forum threads were posted, an email was sent to tutors by the researcher inviting them to contribute. If tutors did not feel comfortable posting messages into the forum, the invitation email stated that they could also email their responses to the researcher. All forum threads in the three modules stayed open until the end of the academic year (June 2018) and were open for approximately one month (‘International development’) or two months (‘Cell biology’ and ‘Computing’) (dependent on the timing of the activity in the module). During this time, one reminder message was sent (2 weeks after the initial invitation email). As the researcher did not have access to the forum threads (this was restricted to tutors and members of the module team), the module team chair provided updates regarding the response rates from tutors. They also placed reminder messages in the threads themselves.

A total 12 tutors posted comments into the threads (5 from the ‘Computing’ module and 7 from the ‘Cell biology’ module; no comments were posted by tutors from the ‘International development’ module). One tutor from the ‘Computing’ module also emailed their responses directly to the researcher. This resulted in a total of 10 posts in the forum threads (and one email response) for the ‘Computing’ module and 13 posts in the ‘Cell biology’ module threads. The absence of response from ‘International development’ tutors, and the generally low participation from tutors in the ‘Computing’

**Figure 23. Questions included in the two online discussion forum threads**

<table>
<thead>
<tr>
<th>Forum thread 1: Students’ emotions and their impact on participation and performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What are the main pleasant and unpleasant emotions students experience before, during and/or after the group activity? What causes these?</td>
</tr>
<tr>
<td>• What pleasant and unpleasant emotions do you feel have the biggest impact on how students participate and perform in the group activity?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Forum thread 2: Tutors’ experiences of monitoring and managing student emotions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• To what extent do you feel that you monitor student emotions in the group activity? If you feel that you have done this, could you provide examples? Do you think it is difficult to monitor emotions in an online group work environment?</td>
</tr>
<tr>
<td>• Have you had experiences where you have had to help students manage their emotions in the group activity? If so, could you provide examples? Do you think it is difficult to help manage student emotion in an online group work environment?</td>
</tr>
</tbody>
</table>
module (6 out of 19 tutors) and ‘Cell biology’ module (7 out of 27 tutors), might be explained by the fact that tutors at the university work on a part-time basis and therefore have other responsibilities that might have inhibited their participation in this study. In addition, tutors’ employment contracts do not foresee any contributions to research activities. The forum threads in ‘International development’ were also placed in the tutor forum near to the end of the academic study year in this module, when many tutors would been marking end of year assessments and have a high workload. However, this was unavoidable due to the timing of the group activity.

6.2.4 Phase 2: Qualitative interviews

To gain a more in-depth and broader understanding of tutor perspectives, telephone interviews were conducted in the next academic year. The benefits of using this data collection method were highlighted in Section 3.5.4. The use of telephone interviews allowed key topics and ideas identified from the online forum discussions to be explored further. Tutors were not only asked to reflect on the assessed, online, group activity in the module they currently tutored on but also any similar online group activities they had taught previously on any OU module.

To direct the focus of the interviews, a pre-planned interview guide was created. This adopted a semi-structured approach which allowed key topics and issues to be pursued (e.g., in relation to the research questions and the findings from the online discussion forums), whilst, at the same time, allowing participants freedom to explore their own thoughts. The final interview guide comprised 20 questions and was split into six main sections:

- Section 1 provided the participants with information about the study, such as: its purpose; ethical considerations (e.g., right to withdraw, confidentiality); and instructions about how the interview would be conducted. This section also aimed to build rapport with participants and invited them to voluntarily proceed with the interview.
- Section 2 consisted of introductory questions. These aimed to further build rapport with the participants and gain an insight into their background and experience of teaching assessed, online, group activities.
• Section 3 explored what emotions tutors perceived students to experience, as well as their causes. It also explored whether tutors thought emotions impacted participation and performance in the group activities.

• Section 4 invited tutors to discuss their beliefs and experiences of emotions being experienced at a group (or collective) level by students in online group activities. These questions were included as they had been discussed by a few tutors in online discussion forum thread responses.

• Section 5 explored tutors’ perspectives of how students regulate and manage their emotions. It also asked tutors about their experiences of monitoring and managing students’ emotions.

• Section 6 invited tutors to add any other information that they might not have mentioned during the interview, and thanked them for participating in the study. Throughout the interview guide, probing questions were used, aimed at eliciting more information and elaboration from the tutors.

Example interview questions are given in Figure 24 and the full interview guide is provided in Appendix K.

<table>
<thead>
<tr>
<th>Section 3: Emotions experienced, causes and impact (at an individual level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What emotions do you feel students experience [before, during, after] undertaking assessed, online collaborative group activities?</td>
</tr>
<tr>
<td>• What do you think causes these emotions?</td>
</tr>
<tr>
<td>• Do you feel that a student’s emotions can impact their [participation, performance] in assessed, online, group activities?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 4: Emotions experienced, causes and impact (at a group level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Do you feel that emotions may have also been experienced at a group level?</td>
</tr>
<tr>
<td>• What do you think causes group level emotions?</td>
</tr>
<tr>
<td>• Do you feel group level emotions can lead to group level engagement or disengagement?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 5: Emotion regulation and management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have you had experiences where you have had to help students manage their emotions in the assessed, online, group activities?</td>
</tr>
<tr>
<td>• Do you feel that social interaction and support from tutors can influence the emotions students experience and how they regulate their feelings?</td>
</tr>
<tr>
<td>• Have you observed students helping each other regulate, or manage, their emotions in assessed, online, group activities?</td>
</tr>
</tbody>
</table>

Figure 24. Example interview questions.
To ensure the integrity of the interview guide, a number of steps were taken. First, the content of the questions was created based on an extensive literature search of similar studies. Second, design recommendations outlined by Bryman (2016) were followed. For example: the purpose and structure of the interview were outlined at the beginning; two general questions about the group activity were asked at the start of the interview to help the participant feel more relaxed and engage them in conversation; questions were grouped by topic and followed a logical order to help the flow of the interview; the language of the questions was made comprehensible and relevant to participants taking part; and questions were not leading. Third, the authors’ three PhD supervisors, and members of the SSPP committee, reviewed and provided feedback on the questions and structure of the interview guide. Finally, a pilot interview was undertaken with an experienced OU tutor who had previously taught on an OU module that incorporated an assessed, online, group activity. This resulted in a number of small changes to the wording of questions as well as the inclusion of several further clarification and elaboration probes aimed at attaining a deeper understanding of the tutors’ experiences.

Interviews were conducted over a three-month period (between September 2018 and December 2018). The time of year was selected based on module team chair suggestions (e.g., in relation to when tutors would be more likely to participate). At the start of the 2018/2019 academic year, tutors from each of the five modules were sent an email inviting them to take part in an interview. Two reminder emails were sent out 2 and 3 weeks after the invitation email was sent to tutors. Those that were interested in participating filled out a short online consent form and provided some additional information about their experience of delivering assessed, online, group activities. They were then contacted about arranging a date and time for the interview and about their preference for telephone or Skype interviews (all chose to complete telephone interviews).

The 16 tutors who agreed to take part were located across all five OU modules used in this study (interviewee details can be found in Table 18); however, the majority were from the ‘History and literature’ module (9 out of 16). The predominance of tutors from this module is reflective of the much higher number of tutors on this module (see Section 6.2.2). The level of experience in delivering assessed, online, group activities varied considerably (see Table 18). Age demographics were not collected from tutors as it was not deemed relevant. Participating tutors were emailed an information sheet one week
prior to the interview; this aimed to provide further details of the research study and define key terms that would be used in the interview (e.g., emotion, emotion regulation). Each interview lasted between 42 and 95 min (M = 56.94, SD = 15.40). All interviews were recorded with participant permission and transcribed verbatim.

**Table 18. Interviewee details.**

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Gender</th>
<th>Module</th>
<th>Experience delivering assessed, online, group activitiesa</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Female</td>
<td><em>History and literature</em></td>
<td>Very little</td>
</tr>
<tr>
<td>B</td>
<td>Female</td>
<td><em>History and literature</em></td>
<td>A substantial amount</td>
</tr>
<tr>
<td>C</td>
<td>Male</td>
<td><em>History and literature</em></td>
<td>Quite a bit</td>
</tr>
<tr>
<td>D</td>
<td>Female</td>
<td><em>History and literature</em></td>
<td>Quite a bit</td>
</tr>
<tr>
<td>E</td>
<td>Male</td>
<td><em>History and literature</em></td>
<td>Quite a bit</td>
</tr>
<tr>
<td>F</td>
<td>Male</td>
<td><em>History and literature</em></td>
<td>A substantial amount</td>
</tr>
<tr>
<td>G</td>
<td>Female</td>
<td><em>History and literature</em></td>
<td>Quite a bit</td>
</tr>
<tr>
<td>H</td>
<td>Female</td>
<td><em>History and literature</em></td>
<td>Quite a bit</td>
</tr>
<tr>
<td>I</td>
<td>Female</td>
<td><em>History and literature</em></td>
<td>Some</td>
</tr>
<tr>
<td>J</td>
<td>Male</td>
<td><em>Computing</em></td>
<td>Quite a bit</td>
</tr>
<tr>
<td>K</td>
<td>Female</td>
<td><em>Computing</em></td>
<td>A substantial amount</td>
</tr>
<tr>
<td>L</td>
<td>Male</td>
<td><em>Computing</em></td>
<td>A substantial amount</td>
</tr>
<tr>
<td>M</td>
<td>Female</td>
<td><em>Computing</em></td>
<td>A substantial amount</td>
</tr>
<tr>
<td>N</td>
<td>Female</td>
<td><em>International development</em></td>
<td>Some</td>
</tr>
<tr>
<td>O</td>
<td>Female</td>
<td><em>Science</em></td>
<td>Some</td>
</tr>
<tr>
<td>P</td>
<td>Male</td>
<td><em>Business</em></td>
<td>A substantial amount</td>
</tr>
</tbody>
</table>

*aResponse options: 1 ’Very little’; 2 ‘Some’; 3 ‘Quite a bit’; 4 ‘A substantial amount’

**6.2.5 Data analysis**

Data from the online discussion forum threads and semi-structured interviews were analysed using two techniques: 1) word count analysis; and 2) thematic analysis (as discussed in Section 3.6.2). Both sets of data were analysed together.

Word count analysis was used to explore the types of emotion-related words used by tutors in forum responses and qualitative interviews to describe the emotions experienced
by students when undertaking the assessed, online, group activities. This technique was used in Study 1 (described in Section 4.2.5); due to the different data types used in this study, the preparatory phase of analysis was slightly differed. First, forum threads and transcribed interviews were read and re-read to become familiar with the content. Second, all data were systematically worked through and all emotion-related words were highlighted. When analysing the data, the emotion-related words found in Study 1 (Section 4.3.1) were used as a reference for the types of emotions that could be coded; however, coding was not limited to these categories. Third, the context of the emotion-related words was checked to ensure that they described emotions experienced by students when undertaking group activities. Any emotion-related words used in different contexts were deleted. For instance, these included: emotions experienced by tutors themselves; emotions experienced by students in other academic contexts or situations; mental health issues (e.g., anxiety disorders); or trait type dimensions. This was undertaken to ensure precision and accuracy of the analysis. Fourth, data were imported into NVivo 12 and a Word frequency analysis was undertaken (see Leech and Onwuegbuzie, 2011, for guidelines). Fourth, emotion-related words were explored and the noun and adjective for the same words were combined together. For example, the words ‘anxiety’ and ‘anxious’ were counted under the same emotion-related category: ‘Anxiety’. Fifth, a word-cloud for all emotion-related categories was created and each category was then grouped as either pleasant, unpleasant, or unclassified/neutral.

Thematic analysis followed the six-phase procedure outlined by Braun and Clarke (2006) (described in Section 3.6.2). In the first stage, data were read and re-read with the aim of becoming familiar and immersed in the qualitative content, and initial ideas were identified and refined. During the second stage, data were systematically worked through and interesting features coded. The third stage involved grouping codes into potential themes. During this stage, six initial themes were identified, and an initial thematic map was produced (see Appendix L). In the fourth stage, themes were reviewed further and four of the initial themes were collapsed into two broader themes. This resulted in four main themes being generated (presented in Section 6.3.2). The final stage involved selecting extracts that would help illustrate the themes and provide a “voice” to participants in a written report. All data were analysed using NVivo 12.
6.2.6 Trustworthiness

A number of steps were taken to ensure the quality and trustworthiness of this research investigation. These aimed to address matters of credibility, transferability, dependability and confirmability (Lincoln & Guba, 1985), and followed strategies outlined by Shenton (2004) and Korstjens and Moser (2018). First, throughout the study, frequent debriefing sessions occurred with the researcher’s supervisory team. These sessions allowed for scrutiny of the design of the study and the analysis and interpretation of the data. Second, the researcher sought to critically self-reflect on his own biases, preferences, and preconceptions throughout all stages of the study by keeping a reflexive diary. This process facilitated repeated reflection on all aspects of the research process, aiding conceptual understanding and data interpretation. Third, a detailed description of steps taken from the start of a research study to the development and reporting of the findings was written. This aimed to ensure transparency of the study. Fourth, data were gathered from participants who teach in different academic disciplines and have varying levels of experience facilitating assessed, online, group activities. These diverse viewpoints helped provide more in-depth data that was used to compare and verify perspectives and opinions. Finally, the employment of two data collection methods (discussion forums and qualitative interviews) allowed for methodological triangulation. This aimed to explain, more fully, the richness and complexity of the phenomena being investigated than could be achieved though one standpoint alone.

6.3 Results

6.3.1 Word count analysis

A total of 455 emotion-related words were counted in the tutor forum discussions and interview transcripts. From these, 55 specific emotion-related categories were reported (see Figure 25); 24 represented pleasant emotion-related categories (a total of 118 words; 25.93%) and 30 represented unpleasant emotion-related categories (a total of 334 words; 73.41%). It was thought that the emotion-related category of surprise could be classified as both pleasant and unpleasant (a total of 3 words; 0.66%), therefore, this was not classified as either (unclassified/neutral emotion-related category). The three most frequently reported emotion-related categories were: anxiety (mentioned by 10 out the 16 interviewees and 4 out of the 13 tutors in the online discussion forums); worry (mentioned by 10 out the 16 interviewees and 5 out of the 13 tutors in the online discussion forums);
and frustration (mentioned by 11 out the 16 interviewees and 9 out of the 13 tutors in the online discussion forums) (as shown in Figure 25 and Table 19).

Figure 25. Word cloud of the emotion-related categories used by tutors to describe students’ emotions when undertaking assessed, online, group activities (pleasant emotion-related categories: non-underlined; unpleasant emotion-related categories: underlined; unclassified/neutral emotion-related categories: *).
Table 19. The 20 most reported emotion-related categories by students (pleasant emotion-related categories: non-underlined; unpleasant emotion-related categories).

<table>
<thead>
<tr>
<th>Emotion-related categories</th>
<th>Example emotion-related words used</th>
<th>Frequency reported</th>
<th>% of the 455 emotion-related words reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>Anxiety, Anxious</td>
<td>64</td>
<td>14.07%</td>
</tr>
<tr>
<td>Worry</td>
<td>Worry, Worried</td>
<td>51</td>
<td>11.21%</td>
</tr>
<tr>
<td>Frustration</td>
<td>Frustration, Frustrated</td>
<td>46</td>
<td>10.11%</td>
</tr>
<tr>
<td>Nervousness</td>
<td>Nervousness, Nervous</td>
<td>32</td>
<td>7.03%</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>Enjoyment, Enjoy, Enjoyed</td>
<td>25</td>
<td>5.49%</td>
</tr>
<tr>
<td>Stress</td>
<td>Stress, Stressed</td>
<td>23</td>
<td>5.05%</td>
</tr>
<tr>
<td>Fear</td>
<td>Fear, Fearful</td>
<td>19</td>
<td>4.18%</td>
</tr>
<tr>
<td>Concern</td>
<td>Concern, Concerned</td>
<td>11</td>
<td>2.42%</td>
</tr>
<tr>
<td>Confidence</td>
<td>Confidence, Confident</td>
<td>11</td>
<td>2.42%</td>
</tr>
<tr>
<td>Annoyance</td>
<td>Annoyance, Annoyed</td>
<td>10</td>
<td>2.20%</td>
</tr>
<tr>
<td>Apprehension</td>
<td>Apprehension, Apprehensive</td>
<td>10</td>
<td>2.20%</td>
</tr>
<tr>
<td>Enthusiasm</td>
<td>Enthusiasm, Enthusiastic</td>
<td>10</td>
<td>2.20%</td>
</tr>
<tr>
<td>Happiness</td>
<td>Happiness, Happy</td>
<td>9</td>
<td>1.98%</td>
</tr>
<tr>
<td>Unhappiness</td>
<td>Unhappiness, Unhappy</td>
<td>9</td>
<td>1.98%</td>
</tr>
<tr>
<td>Excitement</td>
<td>Excitement, Excited</td>
<td>8</td>
<td>1.76%</td>
</tr>
<tr>
<td>Reluctancy</td>
<td>Reluctancy, Reluctant</td>
<td>7</td>
<td>1.54%</td>
</tr>
<tr>
<td>Anger</td>
<td>Anger, Angry</td>
<td>6</td>
<td>1.32%</td>
</tr>
<tr>
<td>Elation</td>
<td>Elation, Elated</td>
<td>6</td>
<td>1.32%</td>
</tr>
<tr>
<td>Pride</td>
<td>Pride, Proud</td>
<td>6</td>
<td>1.32%</td>
</tr>
<tr>
<td>Relief</td>
<td>Relief, Relieved</td>
<td>6</td>
<td>1.32%</td>
</tr>
</tbody>
</table>

6.3.2 Thematic analysis

Four themes were generated through thematic analysis of the telephone interviews and online discussion forum responses. These were: 1) students demonstrate varied and changing emotional experiences; 2) social influences play a significant role in students’ emotional experiences; 3) understanding students’ emotional experiences online is challenging; and 4) various factors influence students’ emotions and their emotional expression. All four themes had sub-themes, as illustrated in Figure 26. Each theme and sub-theme are now discussed.
Theme 1: Students demonstrate varied and changing emotional experiences

Tutors’ comments highlighted that they perceived students to demonstrate varied and changing emotional experiences when undertaking assessed, online, group activities. This theme is considered through two sub-themes: types of emotions, and effects of emotions.

(Theme 1) Sub-theme: Types of emotions
Assessed, online, group activities were viewed by most tutors as being highly emotional for students. In fact, a number of tutors described how these activities were one of the
most emotionally charged aspects of OU modules, with only exams being thought to evoke similar, or more intense, emotional reactions from students. Tutors described how online group activities provoked a diverse range of pleasant emotions (e.g., excitement, enjoyment, pride, relief) and unpleasant emotions (e.g., anxiety, frustration, overwhelmed, disappointment). On the whole, however, most tutors believed that these activities aroused more unpleasant feelings in students than pleasant feelings. As Interviewee F stated: ‘I think overall there is a definite feeling of doom and gloom from students about collaborative group work’.

Many tutors reported that students’ emotions fluctuated and changed throughout the activities and that emotional responses can vary between students. Prior to the activities beginning, tutors expressed that students were more likely to experience unpleasant emotions, particularly feelings of anxiety, nervousness, apprehension, and worry. These feelings were often linked to uncertainty about the task as well as reduced feelings of confidence and self-belief.

‘… there’s kind of trepidation and various anxieties and so on and worries about whether they will be able to work together or how they are supposed to do it, even what they are supposed to be doing.’ (Interviewee I)

Not all students were thought to feel this way, however. A number of tutors commented that some students had a more positive outlook towards the activity and were excited about taking part. Tutors also described how students could experience a mix of pleasant and unpleasant emotions before undertaking the group activities. For instance, Interviewee G stated that some students may report feeling ‘a bit apprehensive’ and ‘a bit worried’ but at the same time also say they are ‘looking forward to taking part’.

Once the activities start, most tutors commented that students’ emotions change. This change was predominantly related to a reduction in unpleasant emotions and a slight increase in pleasant emotions. For instance, Interviewee A commented that:

‘During it, there is more kind of excitement, hope and enthusiasm, so still a bit apprehensive but generally a bit more confident’.

For some students, however, tutors reported that unpleasant emotions persist and may even increase in intensity. Interviewee K, for example, described how the group activities can confirm the ‘worst fears’ of some students and this can lead to more unpleasant
feelings. A small number of tutors also described instances where students’ pleasant emotions changed to unpleasant emotions after the activity had begun. For instance, a tutor on the ‘Computing’ forum commented that a few students may be excited about taking part in the activity but then become ‘deflated’ after a while, primarily due to other students not taking part. Tutors again often linked changes in students’ emotions during the activities with their confidence and self-belief as well as their feelings of control when undertaking the tasks.

After completion of the activities, most tutors reported that students experienced more pleasant emotions. These often related to feelings of pride, satisfaction, enjoyment, surprise. For example, Interviewee H stated:

‘Afterwards, loads of students say things like I’m really proud I did this, it was really enjoyable to have contact with other students, I was surprised what we were able to produce. These are the kind of things that I hear.’

A few tutors also mentioned that some students experience relief when the activity is over. Interviewee K believed that this emotion was often evoked, as many students consider group activities as being more ‘onerous’ and ‘demanding’ when compared to other learning activities at the OU. Interviewee I described how such feelings may also stem from students’ initial fears being unfounded and how students often ‘dread’ taken part but end up enjoying it.

(Theme 1) Sub-theme: Effects of emotions

Most tutors believed that emotions impacted students’ engagement and learning in the activities. The effects were thought to vary however, depending on the type of emotion being experienced as well as the individual experiencing the emotion(s). Most commonly, tutors described the detrimental or debilitative effects of unpleasant emotions. These negative effects were often related to how anxiety, and other similar emotions (e.g., nervousness, fear, worry), caused students to disengage from the activities (e.g., lowered effort and involvement in the task) and impaired their social functioning and communication (e.g., reduced communication with other students).

‘I think the main thing is initially a nervousness which can then become a complete reluctance to get involved’ (Interviewee D)
‘The emotion I would say that is the most significant one, is that if they are worried, you know the fear of putting yourself on the line, exposing their lack of understanding. That is the emotion that becomes a barrier for their learning’ (Interviewee L)

There were a few instances where tutors described how unpleasant emotions can lead to more extreme disengagement and withdrawal from the activities. These comments were often linked to more intense emotional responses.

‘… if they let their [unpleasant] emotions bring them down to the extent to which they think oh god this is dreadful I can’t do this and you know it’s not good enough and all of those awful demons really that haunt so many people, then that’s very destructive.’ (Interviewee F)

The beneficial, facilitative effects of unpleasant emotions were also discussed (although much less frequently than the debilitative effects). A number of tutors discussed how these emotions can enhance students’ engagement in the activities. For instance, a respondent on the ‘Cell biology’ discussion forum commented that the fear of failure can motivate some students to increase their effort and engage more in the activities. Interestingly, the long-term benefits of experiencing unpleasant emotions when learning were also discussed by a few tutors. Interviewee B, for example, stated that they believed greater learning can occur when students are ‘pushed out of their comfort zone’ and made to feel ‘slightly uncomfortable’. They also highlighted that:

‘With the collaborative activities, there seems to be a distinct correlation with retention and progress … some people might not like it but something is happening in terms of their learning or their commitment that it is actually having a very positive effect.’

A few tutors felt that the intensity of unpleasant emotions was very important in terms of the effects an emotion has. For instance, the more intense an unpleasant emotion, the more likely it was thought to have detrimental impacts. This was highlighted by Interviewee K, who commented:

‘I think it depends how strong the unpleasant emotion is, some level of, let’s say anxiety, might actually be beneficial but if it’s too strong it could really be detrimental to their learning’.
The effects of pleasant emotions were much less frequently mentioned by tutors. However, all of the tutors who did comment on the effects of these emotions perceived them to have beneficial and facilitative effects on engagement and learning in the group activities.

‘I think overall, when people are experiencing positive emotions and they develop a sense of belonging to their group, then they will engage more and this will be beneficial for the overall success and outcomes of the activity.’ (Respondent, ‘Cell biology’ forum)

Theme 2: Social influences play a significant role in students’ emotional experiences

It was evident that the majority of tutors believed that social influences played a significant role in students’ emotional experiences during the assessed, online, group activities. Two sub-themes emerged: causes of emotions; and management of emotions.

(Theme 2) Sub-theme: Causes of emotions

Tutors thought that emotions were primarily influenced by other students in the group activities. These social sources of emotion were discussed much more extensively for unpleasant emotions than for pleasant emotions.

For example, disengagement of other group members was viewed by tutors as the primary source of unpleasant emotions during the assessed, online, group activities. This included emotions related to anticipated events (e.g., worry before the activity about whether other students will take part) or events that had actually occurred (e.g., frustration due to a student not interacting with the group). This source of emotion was frequently discussed in relation to feelings of frustration and anxiety. Tutors described how these emotions were often intensified due to the importance of the group tasks (i.e., they are assessed and count towards the module grade) and how disengagement from one student could impact the groups’ overall grade.

‘Anxiety is caused by the fear of marks being negatively affected by other student’s lack of engagement (before) and stress is caused when other students do not contribute (during).’ (Respondent, ‘Cell biology’ forum)
‘Students not taking part or responding in a timely manner to forum messages or activity requests creates frustration, in a belief that this will result in poor marks for the team members who do take part.’ (Respondent, ‘Computing’ forum)

The idea of working with other students online was also a frequently cited source of unpleasant emotions. For instance, tutors often reported that students may feel anxious when working with students they have never met or worked with before, as they may worry about what others are going to think of their work and how critically their efforts will be judged. This was often related peer assessment or feedback.

‘I think one of the kind of key ones [cause of anxiety] is the vulnerability of other people reading and seeing your work, so it’s one thing for your Tutor to see it and mark it, it’s another for your peer to do so’ (Interviewee A)

A number of tutors commented that unpleasant emotions were thought to derive from students being asked to undertake an activity they had not anticipated when they joined the OU. For instance, Interviewee N stated that: ‘…a lot of students maybe don’t expect it [group learning], so, you know, it’s not what they see as the OU way of doing things, perhaps that why people sign up to The Open University so they don’t have to deal with other people’. The preference for independent type learning activities among OU students was described by numerous tutors and this predisposition was often thought to stem from the dislike of having to work to other students’ schedules, the reliance on other students to complete activities and assessments, and/or the potential for disagreements and conflict with other group members.

Interestingly, numerous tutors described how negativity expressed by one or two students could cause other students in the group, or even the whole group, to experience negative feelings. Tutors felt that these students were typically quite domineering.

‘I’d say there can be a cause and effect relationship where you get one member give a negative approach and that causes negativity elsewhere’ (Interviewee E)

Many pleasant emotions were also thought to derive from other group members. For instance, this often related to the opportunity to interact and collaborate with other students. A few tutors noted that OU modules often lack opportunities for students to
communicate and work together and the group activities offered students the chance to interact with, and get to know, their peers.

‘Positive emotions included being really excited about actually doing something with students in their group, possibly because being an OU student with no F2F contact with tutor or students can be very lonely.’ (Respondent, ‘Cell biology’ forum)

Pleasant emotions were also thought to derive from the support received by other students. For instance, when discussing the causes of pleasant emotions, a respondent on the ‘Cell biology’ forum commented:

‘I think the students also feel supported by each other while they’re taking part. They feel validated/affirmed by getting positive feedback and encouragement from their group’.

Other socially related causes of pleasant emotions described by tutors included: positive engagement and contribution from other students; working with experienced and encouraging group leaders; learning from other students; and receiving tutor support.

Similar to unpleasant emotions, a few tutors also described how they thought that pleasant emotions expressed by an individual (either a student or tutor) could be transferred to another student or group of students.

‘I think positivity can be quite catching for want of a better phrase, so I think if you have some students who start off quite positively about it and express positive feelings and everyone else can get on board with that as well, I think then the whole group can become very positive and interact well together’ (Interviewee O)

Tutors felt that emotions could exist at a collective level (i.e., where students experienced similar, or shared emotions with most, or all, of their group). Tutors perceived these to be more macro-level emotional states and were thought to primarily stem from students displaying and sharing their emotions with one another. Although such emotions were thought to be much less frequently experienced than individual emotions (i.e., students experiencing their own individual emotions that are unique to themselves), tutors did feel that these emotions were more likely to manifest at the start (e.g., a ‘collective nervousness’) or end (e.g., a ‘shared sense of achievement and triumph’) of the group
activities. Interviewee N discussed how they felt that such shared feelings were more identifiable in students’ language and discourse by the end of the group activities:

‘Beforehand, the discourse and language is quite individualistic, about my fears and anxieties and things like that and by the time they finish I normally get more emails like oh, I really enjoyed working with this person and that person, and I feel we did well, so you can see where it’s changed, that similar emotions are shared between students’

(Theme 2) Sub-theme: Management of emotions

Social support was viewed as an important strategy for helping students manage and regulate their emotions during the assessed, online, group activities. Tutors most frequently discussed their own role in the process. For instance, many tutors discussed how they supported students by providing encouragement and reassurance throughout the activities. It must be noted, however, that for a number of tutors, much of the support they offered was primarily viewed as general teaching assistance, rather than emotional support per se. Interviewee E, for example, stated that:

‘…if they [students] need reassurance or encouragement then that’s what I would do, not so much for an emotional reason as more for a practical one of getting them through the module’.

All tutors acknowledged that their supportive actions can, to varying extents, influence the emotions of their students.

‘I do think tutors’ support can help manage emotions. We can mitigate frustration and aggression, support worries and anxieties, help to engender excitement and enjoyment, and I would like to think we can help promote a positive outlook’ (Interviewee J)

There were a number of specific occasions where tutors felt their support and encouragement was particularly important for managing students’ emotions. For instance, before starting the activities, many tutors stated that they would contact students (e.g., via email or phone call) to make sure they were aware the activity was coming up and to reassure them that tutors were there to provide support and answer any questions they may have. Tutors thought that this was important as they believed that many students
experience increased levels of anxiety about the activity at this stage, or may not have thought about the task (e.g., due to having busy schedules outside of their study), and, therefore, providing support may reduce the likelihood of experiencing more extreme unpleasant emotions when the activities begin.

‘When you have the pre group session briefing a lot of people can sometimes express their concerns, doubts and anxieties, and as long as the tutor can perhaps give them a steer on how to approach it prior to the event then that can have quite a positive impact on how they feel about the activity’ (Interviewee P)

Many tutors noted that they were conscious of the language and tone they used with students in these early communications. For instance, Interviewee C stated that:

‘I spend a lot of time before and at the start of these group activities trying to adopt a very encouraging tone and a very positive tone because I am aware that many may be hesitant and fearful of taking part’.

This tutor further commented that, to encourage students to take part, they often tried to promote the activity very positively by highlighting the range of ‘employability skills’ that can be developed by taking part, such as teamwork, communication, and problem-solving. A number of tutors also discussed how the use of a negative tone could easily have harmful consequences on students’ emotions.

‘…if a tutor does not value the activity and introduces the whole assessment with quite a negative or passive aggressive tone, this will not be helpful and will probably increase students’ dislike of the task’ (Interviewee A).

Several occasions were mentioned where tutors felt they influenced students’ emotions during the group activities. Most frequently, comments related to the support offered to students experiencing unpleasant emotions (typically frustration and anxiety) due to the lack of engagement and participation by other group members. In these circumstances, most tutors described interacting directly with the student(s) experiencing the unpleasant emotions (rather than posting a message onto the group forum) and reassuring them that their marks will not be impacted by the non-engagement of other students (often by sharing the mark scheme for the assessment). For instance, Interviewee L commented:

‘Some students get very fearful if they find that other people are not participating … because it’s an assessment-oriented task. It’s really my job to try
and assuage that and keep them confident about what they are doing counts and that they will not be penalised for inactivity of others’

Other occasions where tutors thought their support helped manage students’ emotions during the activities included: encouraging anxious students who lack confidence in their own ability (often students with mental health difficulties); calming negative situations, such as conflict between group members or tensions caused by overactive, or dominant, group members; and providing general group encouragement (e.g., praising good work or reassuring students).

Although all tutors acknowledged that supporting students was an important part of their role, the level of support they provided was found to vary. For instance, some tutors described being more supportive during group activities when compared to more traditional assessment activities (e.g., writing an essay), whilst others stated they stepped back and only provided support if students came to them for help.

‘I would take a large step forward with the support I provide, because a lot of students are more confident when it comes to say writing an essay on their own because they are just more custom to that kind of working practice. Whereas, when I talked to students about the online collaborative assessment, that’s the one they tend to be anxious about, so that’s where you really want to make sure they are told there is a lot of support, the more supportive the better’ (Interviewee A)

‘I take a bit of a step back. I set up the activities, tell students what’s expected of each other and let them know who is in each group…I don’t proactively monitor what’s going on I will leave them to it but I will respond to it if they come to me with an issue.’ (Interviewee E)

A few tutors also expressed their conflicted views about the level and type of support they provided to students. Interviewee B, for instance, commented that some groups will inevitably require more help and guidance than others, which can, therefore, make it challenging to ‘create a level playing field’. Interviewee F further stated that there can be danger of offering too much support to students during the activities, which can potentially negatively impact the development of students’ independence during the tasks. Providing increased support was also viewed by some tutors as going beyond their contractual responsibilities and what they are paid for. For instance, both Interviewee A and O discussed the benefits of phoning students at regular intervals throughout the group
activities. Yet, as this is not a requirement of their role, it is not something undertaken by all tutors. A small number of tutors also highlighted that although providing pastoral care and individual support are important responsibilities of being a tutor, specifically supporting the emotional welfare of students goes beyond their responsibilities. As Interviewee D commented:

‘we’re not psychologists, we’re not psychiatrists, we’re not counsellors, we’re not therapists, you know? I think there’s a real danger that is considered to be one of our roles which is shouldn’t be, you would be doing students a disservice to expect that’

Tutors also described how social support from other students can play an important role in managing students’ emotions during the group activities. For instance, Interviewee L stated:

‘I have found that most students are very sympathetic, empathetic and supportive … so when students are saying I’m finding this hard, I don’t understand this, they are very proactive in posting supportive messages, content support or just actual emotional support’

There were a number of specific occasions identified by tutors where emotional support from other students was more commonly observed during the activities. For instance, at the beginning of the group activities, a number of tutors indicated that students were often very sympathetic in such instances as many of them were experiencing similar struggles whilst studying, such as working a full-time job, looking after young children, or having a lack
of confidence. Emotional support offered to students who were experiencing more traumatic events was also highlighted by tutors (e.g., a death in the family).

‘You do get students who say things like I’m really sorry I haven’t been there for a while I was ill, or my child was ill, or a more traumatic and devastating event has occurred like a death in the family. Sometimes they will come out and say I wasn’t feeling very good about the task, my lack of confidence got the better of me. On all these occasions I’ve found OU students to be incredibly supportive. They will often quite quickly jump in and say we’re really sorry to hear that, let us know if there’s anything we can do. Or in terms of your confidence, the work you’ve already done is really good.’ (Interviewee C)

It was evident from tutors’ descriptions that gaining emotional support from other students during the activities was often dependent on students being able to openly express their emotions to the group. As Interviewee N highlighted:

‘…if they [students] are honest about their feelings then other students will then be very supportive of them’.

A few tutors discussed the importance, therefore, of fostering a learning environment where students felt confident in sharing their feelings and emotions with their fellow learners; something which many tutors believed students find difficult. Interviewee D, for instance, described how asking students to discuss their feelings about the activity prior to it starting, can be a useful way to increase emotional sharing and support among students:

‘I ask them to introduce themselves and discuss their feelings about the activity in the forum before starting the groupwork. This appears to be useful. Some are upfront about their apprehension/fears and will usually receive support from others. Perhaps this is something all tutors should do.’

Although the majority of tutors believed that students were genuine with the sympathy and empathy shown to other students and the emotional support they provided during the activities, a couple of tutors suggested that some students may have ulterior motives behind providing such support. For instance, Interviewee J believed that some students are fully aware that they get marked for offering ‘a positive contribution to the group
dynamic...being positive and helpful, and being supportive’ and that this may be the driving reason for their supportive actions.

**Theme 3: Understanding students’ emotional experiences online is challenging**

Although tutors were able to provide details of students’ emotional experiences, the vast majority acknowledged that being aware of, and understanding, students’ emotions when undertaking assessed, online, group activities can be extremely difficult. This theme is considered through two sub-themes: students regulate the expression of emotions; and detecting emotions online is difficult.

**(Theme 3) Sub-theme: Students regulate the expression of emotions**

Many tutors believed that students regulated, or controlled, their emotional expression in the group activities. Overall, tutors felt that the majority of students were unlikely to freely express their genuine emotions, to either other students or tutors, when undertaking the online group activities or, more generally, when learning in online contexts. The general lack of emotional expression by students was one of the main reasons cited for the challenging nature of understanding students’ emotional experiences online. For instance, in relation to online group activities, a respondent on the ‘Computing’ forum stated:

‘On the whole, most students do not appear to express emotions - at least not in the forums or to me directly - before, during or after the event.’

A few tutors also highlighted that this limited emotional expression meant overall perceptions of students’ emotional experiences can easily be influenced by the small minority of students that do openly express their feelings when learning online. Interviewee B, for instance, described how a small number of vocal students expressing negative opinions about online group learning nearly swayed their perceptions about how all students felt about this type of learning.

‘Others don’t worry about that and post freely their frustrations (they rarely post they are happy with this type of activity until it is over or going well). So it can feel all very negative when in fact it may only be a couple of students who feel
like this. Once a thread/discussion group has gone negative it can be difficult to bring it back to positive.’ (Respondent, ‘Cell biology’ forum)

Many tutors believed that students suppressed or masked their true feelings about the group activities by displaying a ‘neutral and positive’ public persona or by putting on a ‘good face’ instead of displaying their real feelings during the activities. Interviewee D even commented that some students would go to ‘great lengths’ to disguise their emotions. Students’ ability to hide emotions in online learning contexts, where interaction is primarily text-based, was thought to be much easier than in face-to-face settings. For instance, tutors commented that students would frequently write in a formal style and refrain from using any emotional language when interacting on the group forums or when emailing their tutor. A respondent on the ‘Computing’ forum, for instance, commented that students’ written communication is often ‘polite’ and conforms to ‘Netiquette principles’.

Although tutors discussed students hiding their pleasant emotions, most felt that masking unpleasant emotions was a more frequent occurrence. One of the main reason’s tutors believed that students often disguised their unpleasant emotions during the group activities is because they know they are being assessed by tutors and that expression of negative feelings and unpleasant emotions may have a detrimental impact on their overall mark for the activity. A number of tutors also noted that students were more likely to express their unpleasant emotions after the activity had been completed (e.g., in the end of year feedback surveys), when their grades could not be affected.

‘I suspect there are probably more negative feelings that don’t get expressed, or don’t come to the surface because they might feel like this may be reflected you know, negatively on their mark’ (Interviewee B)

Another reason many tutors thought that students tried to mask and suppress their unpleasant emotions, was that they (students) believed that this may have damaging impacts on the group’s functioning and cohesion. For instance, Interviewee P described how students would rarely express their frustrations on the group forums because of the potential detrimental effects it may cause to group productivity. Interviewee F commented that students are often reluctant to post messages expressing their unpleasant feelings on forums just in case the discussion becomes overly argumentative or confrontational. Interviewee K further commented that students may find it difficult to
express negative feelings when using online text-based communication, as it is easy for comments to be misinterpreted and cause unintentional offence.

‘I think it’s very difficult for some people to know what to say depending on whether they’re feeling frustrated, as it very easily comes over as being rude and may cause offence. It is very, very difficult.’ (Interviewee K).

The lack of emotional expression by students meant that many tutors felt it was difficult to provide emotional support to students during the activities. For instance, a respondent on the ‘Computing’ forum stated:

‘I think that is difficult to manage student emotion in an online group work environment because most students do not generally show emotions and, in any case, most are polite or too polite to make a fuss’.

Experiencing more intense and persistent unpleasant emotions (e.g., frustration because of non-participating group members or anxiety due to the fear of interacting with others), was, however, thought to increase the likelihood that students would express their emotions directly to their tutor (i.e., via email or phone call). This was thought to be more likely than expressing their emotions on the on the group forum.

‘so from a negative point of view … people tend to not express those feelings directly into the group, especially if they’re quite strong, they would more than likely send me an email saying I can’t cope with this, I feel out of my depth, or so on, then it’s down to the tutor to give them some advice and guidance about how to get back into the group’ (Interviewee P)

It was also thought that students were more likely to express their emotions in online spaces that were not ‘OU owned’, such as Facebook, WhatsApp, Twitter, or on other open forums (e.g., The Student Room or Reddit). Many tutors commented that this was because they are considered ‘safe’ as they were not being ‘watched’ or ‘assessed’ by tutors.

‘I think that the context is very important and a formal Open University forum is seen as a fairly formal place, I think, whereas Facebook is a place for typing in capital letters and using emojis…You know, the tone of communication there is very different. (Interviewee J)’
Interviewee L compared such online spaces, and the types of conversations that occur in them, to canteens at regular face-to-face universities:

‘…like a regular institution you’d all be down to the canteen making comments…this has manifested itself through alternative social media communication, and that’s Facebook, and I know it’s an open forum, and it’s a far more anything goes forum’.

There were mixed opinions from tutors about the use of these informal spaces to communicate and express more emotive language about the group learning activities. Interviewee L, for instance, described how they felt it is important that students have a space to interact in such a way, and to be able to ‘let off steam’ about the activity, but was wary that the expression of negative comments by one student, or a small number of students, may cause other students to experience similar feelings. Other tutors commented that the lack of moderation of the Facebook groups, and other similar social media platforms, meant that discussions and comments can easily be damaging and harmful to students reading them.

(Theme 3) Sub-theme: Detecting emotions online is difficult

Another reason described by tutors for the challenge understanding students’ emotional experiences, was due to the general difficulty of detecting emotions in online learning environments. Numerous tutors commented that the lack of emotional cues afforded by text-based communication meant that it was often nearly impossible to be fully aware the emotions students were experiencing. These difficulties were highlighted by Interviewee D, who commented:

‘I’m not a mind reader, I don’t know what people are feeling and how they are coping with their emotions… there is no body language or eye contact, there is plenty of scope for misinterpreting students’ feelings. It makes a huge difference compared to teaching someone face-to-face.’

Interviewee K described how such constraints often meant they were left to make their own assumptions about students’ thoughts and emotions during the group activities.

‘…because it’s all online, you often have no idea what they are thinking, feeling or what they’re doing at all, you just make an assumption that they are just about
doing it and they’re doing ok, but within that there will be a whole range of people that you have got no idea what’s happening to them, they might be in complete turmoil, there’s nothing you can do about it.’ (Interviewee K)

Despite these difficulties, tutors did describe a variety of ways in which they could gather information about students’ emotions in online learning settings. Interviewee E described this the process as ‘a detection game’ in which they tried to build up ‘clues’ to determine what emotions students were experiencing. These ‘clues’ were primarily gathered through direct interaction with students (i.e., through email or phone call) or by monitoring the interaction and behaviour of students on the online group forums. Additionally, tutors were also able to detect emotions through feedback after the completion of the activities (either as a reflective aspect of the assessment or in online tutorials).

‘In an online distance learning environment, where few students now attend face to face tutorials, the mechanisms by which students’ emotions will be manifested are limited to their assignments, their contribution to forums, and their email and telephone contact, so beyond that it is hard to know’ (Interviewee E)

Being able to understand the ‘tone’ of students’ written or verbal communication was thought to be extremely important when determining emotions from these approaches. For instance, when reading emails or monitoring online forums, Interviewee P stated that:

‘...you are obviously just looking at what words people are using, the font, the way they have kind of structured it to try and derive from that what they might be feeling’.

Being able to detect emotions in the written word was, however, viewed by most tutors to be very difficult. Verbal communication was, therefore, thought to provide a greater sense of students’ feelings when compared with written forms of communication, as emotions were also able to be detected through the student’s tone of voice. Interviewee A commented that:

‘…the lack of being able to read physical body language and facial expressions… forced me to really focus on carefully listening to the tone of people’s voices and words people use when talking on the phone’.
Although one to one phone calls were seen by some tutors as ‘essential’ when trying to derive how students were feeling about the group activities, many noted that that this form of communication is quite rare with students at the OU.

How well a tutor could ‘read’ a student’s emotions was also thought to relate to how well they already knew the student prior to the group activities. A few tutors commented that if a connection had already been established, then it was easier for them to understand what emotions a student was experiencing.

‘With some students I have a connection - I have spoken to them at tutorials/on email/phone - so it is easier to ’read' their emotion. With others I have less contact they don't come to tutorials, rarely email etc.’ (Respondent, ‘Cell biology’ forum)

Trying to monitor emotions in online environments, especially group forums, was deemed to be far more time consuming when compared to face-to-face group learning contexts. This again was predominantly due to not being able to pick up instant emotional cues, such as facial expressions and body language, as well as the lack of emotional expression and general interaction and engagement from some students. Although a number of tutors indicated that they purposefully monitored emotions during the group activities, others felt that this was far too time consuming and went beyond their role as a tutor.

‘I don’t / can’t monitor student emotions on purpose as I don't have equal access to all students. No matter what I try, some students will not engage or respond. There are also many students that won’t express their feelings to me or even members of their group. Besides, by monitoring emotions, I would feel obliged to respond to many more situations than I have the time for or I am paid for.’ (Respondent, ‘Computing’ forum)

A few tutors also acknowledged that there could often be long delays between when an emotional event occurs and when this is detected or acted upon by the tutor. For instance, tutors may only monitor group forums, or read their emails, on a few occasions per week. Therefore, the time-period from when a tutor identifies and/or responds to a situation could be long after it happened.
‘In reality, what happens is, you pop in there [online discussion forums] two or three times a week, and if I look in there tonight and then again on Tuesday an awful lot could have gone on in there during that time, there could have been disagreements or arguments, and you’re reacting after the event if you like.’
(Interviewee C)

**Theme 4: Various factors influence students’ emotions and their emotional expression**

According to tutors, students’ emotions and their emotional expression are influenced by various factors. These factors, such as a student’s personality, gender, previous experiences, and familiarity with other group members, were thought to help explain the differences that occur in emotional experiences between students (i.e., individual differences). For instance, the reasons why one student may be more likely to experience pleasant emotions and why another may be more likely to experience unpleasant emotions during the activities. Or the reasons why one student is more likely to express or disclose their emotions compared to another student. This theme is considered through two sub-themes: individual factors, and situational factors. The various individual and situational moderators described by tutors, are presented in Figure 27.
**Figure 27.** Factors that influence students’ emotions* and their emotional expression#.
(Theme 4) Sub-theme: Individual factors

A variety of influencing factors described by tutors were related to an individual’s characteristics and experiences (Figure 27). Previous experiences of working in similar situations (in both employment and educational contexts) were thought to be particularly important in relation to the emotions experienced by students. Tutors described how students with more experience, for instance, at managing group projects, working with other people, and dealing with conflict, were likely to experience more pleasant emotions and fewer unpleasant emotions compared with those with little experience in these areas.

‘...there are other people who obviously revel in it, you know they really enjoy it and often those people tend to be those who in their professional life have worked in teams or they have managed teams’ (Interviewee D)

A number of tutors also discussed how previous positive or negative experiences of undertaking online group activities could play a significant role in the types of emotions experienced. Experiencing pleasant emotions in prior activities was thought to increase the likelihood of experiencing more pleasant feelings, whilst experiencing unpleasant emotions in these was thought to increase the likelihood of experiencing more unpleasant emotions. For instance, Interviewee C described how negative experiences can reinforce a lack of confidence in students which can lead to negative experiences in future group work situations; whereas positive experiences are likely to strengthen students’ self-belief and lead to more positive experiences.

A student’s attitude and trait self-confidence were also identified as factors that many tutors thought had a strong influence on emotional experiences during the group activities. The relationship between these psychological constructs was also discussed by tutors. For instance, Interviewee F thought that pleasant emotions were more commonly experienced by students who are ‘… fairly confident in themselves and have a positive attitude’, whilst unpleasant emotions were more associated with students who have a negative attitude and lower confidence in their own ability.

Similarly, enduring personality traits/ dispositions were thought to have a strong influence on the emotions experienced by students. For example, numerous tutors suggested that outgoing and open-minded students were more inclined to experience pleasant emotions during the activities whilst reserved students were more likely to experience unpleasant emotions.
‘I think basic personality traits have a huge impact; people who are more outgoing are less likely to be put off by, perhaps, a slightly ambivalent response from somebody else or someone not taking part in the activity’ (Interviewee B)

Students with mental health conditions were perceived by numerous tutors as being more prone to unpleasant emotions. Most frequently mentioned by tutors, were conditions that: caused students to fear social situations (e.g., social anxiety); made communication more challenging (e.g., autism or dyslexia); and caused extreme shifts in moods (i.e., bipolar disorder).

‘Students with special educational needs can find it really difficult for all sorts of reasons; certainly people with dyslexia or autism who have weaknesses in their communication, they are really exposed, and this can increase their anxieties.’ (Interviewee M)

Having the skills or ability to manage, or cope with, unpleasant emotions was described as another important individual moderator. A number of tutors described how students lacking such skills were more likely to suffer from more unpleasant emotions and be more likely to suffer from the detrimental impacts of these emotions. For instance, Interviewee D stated that students suffering from anxiety who were ‘…not well equipped to deal with, or can’t cope with, the situation’ were more likely to suffer negatively from this emotion. Similarly, Interviewee I commented that:

‘…there’s definitely some students that actually drop out of the activity because they can’t cope with stress of it, they haven’t got the skills needed to deal with their emotions’.

Less frequently mentioned individual factors included culture and gender. A small number of tutors believed that some cultures were less likely to express their emotions than others. For instance, Interviewee J stated:

‘There is a cultural thing anyway, English people tend to talk about the weather, not about their emotions’.

In regard to gender influencing emotional experiences, three tutors commented that they felt females were more likely to experience more unpleasant emotions. For instance, Interviewee A commented:
Female students, in my experience, are a bit more nervous about having to talk to other students, what they might think of their work, things like that.’.

(Theme 4) Sub-theme: Situational factors

Tutors also described a variety of situational factors that they believed influenced students’ emotional experiences. These were, however, less frequently discussed than individual factors.

Many situational factors were related to the group students were placed in. In particular, the familiarity of, and relationships between, group members were thought to be important moderators. Interviewee O stated that the emotions experienced by students often ‘…end up linking to how well students know each other, the relationships and trust they have between one another’.

In general, students were thought to experience more pleasant emotions when working with students they had already formed strong positive relationships with, or students they trusted to work hard and engage in the activity. Whereas, working with complete strangers or with students that may not engage or take part, was thought to increase students’ unpleasant feelings (particularly feelings of anxiety). Numerous tutors also believed that the familiarity of the group, and trust between group members, were important factors for being able express emotions to, and seek support from, other members of the group.

The relationships between group members, and the overall group cohesion, were also identified by a few tutors as having an important influence of the experience of shared group emotions during the assessed, online, group activities.

‘I think that sense of camaraderie, when students are all enjoying working with each other, that shared positivity, comes from good working relationships, when people trust and support one another. You can see a real sense of cohesion.’

(Interviewee K)

Interviewee I believed that the difficulty of developing a strong cohesive group identity when undertaking online group activities was the main reason for the general lack of such collective emotions during these activities.

‘I think one of the things that prevents group emotions is the kind of lack of a really cohesive group identity because it’s so difficult for people to achieve when
they haven’t met each other and they don’t really know who they are dealing with.’

The type and combination of students in each group (i.e., the group makeup or formation) was also thought to have an important influence on the students’ emotional experiences. In particular, numerous tutors highlighted that groups with positive, self-appointed group leaders were more likely to have positive emotional experiences, whereas groups with overly domineering personalities or characters were more likely to have negative emotional experiences.

‘In my experience if the team have a coordinator/leader who encourages teams to work together and suggests activity in a more democratic way those teams still shine but enjoy the experience. This can be created at tutorials by running exercises around team building.’ (Respondent ion the ‘Computing’ online discussion forum)

‘I have experience of a leader who ran his team like a military exercise, they conformed and produced a good result, but they did not feel positive with the experience.’ (Respondent, ‘Computing’ forum)

Group size was considered an important mediating factor for emotional expression. A number of tutors believed that students were more likely to express their emotions when working in smaller groups and less likely to do so when working in larger groups.

Factors related to the task itself were also thought influence students’ emotional experiences. These predominantly related to the assessment and the timing of the activity. The assessed nature of the group activities was thought to influence emotions by increasing the importance and relevance of the activities to students. Interviewee B commented:

‘…the assessment and the group grade are very much part and parcel of how they [students] feel about the collaborative activity’.

Whilst Interviewee E stated:

‘I think the link to assessment makes it very high stakes to the student and I think this has a strong influence on their emotions throughout’.
The assessment of the activities was also thought to influence students’ emotional expression. Many tutors believed that students felt like they were ‘watched’ and would, therefore, often refrain from using emotional language in the group forums. As Interviewee C stated: ‘In the forums they mindful of who might be watching and therefore they behave as what they deem to be appropriate ways’. In relation to the timing of the activities, those scheduled over holiday periods or at times when other assessments are being completed, were also thought to induce more unpleasant emotions.

6.4 Discussion

6.4.1 Interpretation of findings

This study aimed to gain tutor perspectives of students’ emotional experiences when undertaking assessed, online, group activities. After analysis of online forum discussion responses and telephone interviews, several key insights were identified. These are now discussed.

The first main insight from this study was, tutors described students’ emotions as being varied, fluctuating, and having differing impacts on engagement and learning.

Overall, tutors perceived students to experience substantially more unpleasant emotions in these learning contexts, than pleasant emotions. In particular, emotions related to anxiety (e.g., anxiety, worry, nervousness) and the emotion of frustration were found to be the most frequently described by tutors. Other than enjoyment, pleasant emotions were reported much less frequently by tutors in this study compared to students in studies 1 and 2. For instance, tutors scarcely described students experiencing relief, curiosity, hope, and excitement (all emotions commonly reported by students in this thesis). Although it cannot be stated for certain, discrepancies between students’ and tutors’ perspectives, such as the increased reporting of unpleasant emotions and reduced reporting of pleasant emotions by tutors, could be related the challenging nature of understanding students’ emotions in online settings and the general lack of emotional expression/disclosure by students in these learning environments (these are discussed in more detail later in this discussion). It also highlights that tutors can misjudge the emotional experiences of their students in these learning environments, which may impact the level and type support they provide during the activities.
While tutors primarily perceived assessed, online, group activities as being unpleasant experiences for many students, they did feel that emotions often fluctuated throughout the activities. Typically, tutors believed that students experienced more unpleasant emotions (often anxiety) before or at the start of the activities and more pleasant emotions by the end of the activities or after they had been completed. This is similar to findings reported by students in Study 1 as well as previous research in similar learning contexts (Hilliard et al., 2020; Webster, 2019).

Tutors also believed the effects of emotions to be varied. Whilst it was thought pleasant emotions had mostly positive impacts on engagement and learning, unpleasant emotions were reported to have both positive and negative impacts during group learning activities. These findings suggest that unpleasant emotions have a more complex relationship with learning compared to pleasant emotions; a view supported by existing literature (e.g., Hilliard et al., 2020; Rowe and Fitness, 2018) as well as findings from Study’s 1 (see Section 4.3.3) and 2 (see Section 5.3.4). Facilitative and debilitative effects of unpleasant emotions were primarily related to anxiety, and other similar emotions (e.g., nervousness, fear, worry). For instance, on the one hand, tutors felt these emotions could increase students’ engagement, by enhancing their motivation and effort, and on the other hand, they believed that they could inhibit performance, by reducing levels of effort and involvement in the activities as well as impairing social functioning and communication with other group members. More extreme negative impacts from these emotions, such as complete disengagement and withdrawal from the tasks, were also noted by a few tutors. These varied detrimental effects of unpleasant emotions (i.e., from mild to severe), have been reported previously in similar learning contexts (Hilliard et al., 2020).

The view that unpleasant emotions can also have short-term facilitative and adaptive functions (e.g., increased motivation and effort), and act as enablers to learning and achievement, is supported by various emotional theorists (e.g., Pekrun, 2006; Lazarus, 2000). Interestingly, in this study, tutors also discussed how experiencing unpleasant emotions can have longer-term benefits for student learning. For example, some tutors believed that the stress and unpleasant emotional states experienced when undertaking the group learning activities (e.g., due to being pushed outside of their comfort zone), can, if students are supported appropriately, benefit their learning experiences and wellbeing when working in similar settings in the future. These findings are similar to those reported by Howell et al. (2009), who explored the momentary happiness of undergraduate
students when pursuing competence-prompting behaviours (e.g., undertaking activities aimed at developing knowledge and/or new skills). The researchers found that although students may experience increased levels of stress and reduced levels of enjoyment in the short-term, the development of these competence-promoting behaviours could potentially maximise wellbeing and enjoyment in the long term.

These findings also relate to other research that has been undertaken at the OU. In a study undertaken by Rienties and Toetenel (2016b), it was found that the time students spent on communication activities (i.e., activities where students were required to discuss learning themes with at least one other person), significantly and positively predicted academic retention (i.e., the number of students that completed or passed the module). Interestingly, such student-centred activities were found to receive lower satisfaction scores by students compared to passive learning approaches (e.g., reading, writing, watching), which were found to have a negative impact on academic retention. The authors concluded that ‘…learning does not always need to be a nice, pleasant experience. Learning can be hard and difficult at times, and making mistakes, persistence, receiving good feedback and support are important factors for continued learning’ (Rienties and Toetenel, 2016b, p.340).

It is evident that the short- and long-term impacts of students’ unpleasant emotions can be extremely complex and further research is needed to gain a greater understanding of this area of research. For instance, longitudinal research designs which explore the impacts of students’ emotions during and after the group activities might help understand the longer-term impacts of experiencing unpleasant emotions.

The second main insight from this study was, **students’ emotions are highly influenced by, and can considerably influence, others around them.**

Research exploring emotions in educational contexts has tended to focus on independent learning activities, where students have little interaction with other people (Pekrun et al., 2018). This is quite peculiar, as learning does not occur in a social vacuum; it is often highly social, with students frequently interacting with others around them (e.g., their fellow students and teachers). Findings that the social context of the group learning activities plays a significant role in students’ emotional experiences, support those from Study 1 and Study 2, as well as existing research exploring emotions in online group learning (e.g., Hilliard et al., 2020; Xu et al., 2013; Capdeferro and Romero, 2012;
Wosnitza and Volet, 2005; Vuorela and Nummenmaa, 2004). In fact, social ties in online group learning can be viewed as both assets and liabilities for students’ emotions; a view supported by numerous emotional theorists (e.g., Pekrun, 2006; Lazarus, 1991). For instance, interacting and working with others during the activities can, on the one hand, ignite pleasant emotions, and social support provided by others can help students manage, and cope with, negative feelings. On the other hand, social aspects of the online group activities can trigger various unpleasant emotions which can inhibit engagement and have detrimental impacts on students’ learning and achievement.

In this study, there were a number of ways in which tutors believed the social context of the activities can benefit students’ emotional experiences. For example, tutors believed that students’ pleasant emotions often derived from the opportunity to interact and collaborate with their peers. This cause of pleasant emotions has previously been reported when exploring students’ perspectives of online collaborative learning at the OU (Donelan & Kear, 2018), and was also described by students in studies 1 and 2. Encouragement and support from others (primarily tutors but also other students) was also thought to be extremely beneficial for students’ emotions. Such interpersonal support was described as both a trigger of pleasant emotions, as well as an important strategy for helping students manage, and cope with, unpleasant emotions during the activities. These findings support those from studies 1 and 2 which found that social support (from both tutors and students) was a frequently used strategy for regulating emotions (primarily unpleasant) during online group activities. This is also in line with previous research which highlights the importance of interpersonal emotion management in social online learning environments (Hilliard et al., 2020; Symeonides & Childs, 2015) and social support for the experience of pleasant academic emotions (Forsblom et al., 2021; Lei et al., 2018; Mainhard et al., 2018). Although many tutors viewed the support they provided as ‘general teaching assistance’, rather than ‘emotional support’, they all acknowledged that their actions and behaviours could influence the emotions of their students. In particular, encouraging anxious students before, or at the start, of the activities (e.g., through emails or phone calls) and supporting frustrated students during the activities, were both viewed as important ways of helping students manage their emotions. A number of tutors also discussed how they purposely focused their language to be positive and supportive when interacting with students (especially at the start of the activities) to promote more pleasant emotions and reducing unpleasant feelings in students.
The social environment of the group activities was, however, also thought to be detrimental for students’ emotional experiences in some ways. According to tutors, the most frequently reported cause of students’ unpleasant emotions was the general lack of engagement and contribution of other students. This has previously been identified as a primary source of frustration and anxiety (Capdeferro & Romero, 2012; Hilliard et al., 2020), and was reported as the most common cause of unpleasant emotions in both Study 1 (see Section 4.3.2) and Study 2 (see Section 5.3.3) of this thesis. Various other causes of unpleasant emotions that related to the social aspects of the activities were also described by tutors. These included: working with strangers; potential conflicts and tensions between students; and working with students who have dominant personalities. Again, these causes were reported by students in studies 1 and 2 and have been reported in previous studies in similar learning settings (Allan & Lawless, 2003; Capdeferro & Romero, 2012; Donelan & Kear, 2018; Hilliard et al., 2020; Robinson, 2013). Although tutor support was thought to greatly benefit the management of students’ emotional experiences during the activities, the level of support provided by tutors and their general attitudes about undertaking online group work was found to vary. For instance, some tutors described being very hands-on, whilst others indicated they took a step back and allowed students to solve any issues and problems between themselves. And whilst some tutors were very positive and enthusiastic about the online group work, others were less keen on this type of learning activity. Such reduced levels of support as well as cynical attitudes could potentially have detrimental consequences to students’ emotions and emotion regulation throughout the activities.

Interestingly, a few tutors believed that emotions could be transmitted among students, and from tutors to their students, during the activities. Such emotional transmission was also viewed as being both an benefit and detriment depending on whether pleasant or unpleasant emotions were being transmitted. One process that has been proposed to explain this phenomenon is emotional contagion (Pekrun et al., 2018). This has been defined by Goldenberg and Gross (2020, p.317) as ‘…the process by which emotions of the perceiver become more similar to those of others as a result of exposure to these emotions’. Frenzel et al. (2018, p.629) note that this phenomenon depicts the idea that emotions can be ‘caught’ like a cold and transmitted from one individual to another. For example, hearing others laugh can automatically make us feel amused even if we have little information related to the reason behind the laughter. Similarly, observing someone
experience extreme sadness is likely to increase similar feelings in ourselves. Although emotional contagion is thought to play an important role in education (Frenzel et al., 2018; Frenzel et al., 2009), there is currently little research exploring this phenomenon in academic settings. This is especially true for online learning contexts, where the transmission of emotions may be more challenging compared to face-to-face settings, due to many non-verbal emotional cues often being reduced or completely absent (Cheshin et al., 2011). Although beyond the scope of this thesis, it is evident that further research is needed to understand the causes of emotional contagion and the extent to which this phenomenon occurs in assessed, online, group learning.

Linked to the idea of emotional contagion, another interesting finding from this study was that tutors thought groups of students could experience emotions together. Although these shared emotional experiences were thought to be rare, there were a few occasions where tutors believed students were more likely to experience such collective emotions. Often, these were in situations where students were more likely to share and express how they were feeling about the group activities with their fellow students. For instance, before group activities begin, a few tutors described that collective feelings of anxiety could occur when students shared and discussed their worries and doubts with one another. Furthermore, after successfully completing the activities, collective feelings of triumph and pride were also thought to be aroused by group members celebrating and congratulating each other. Although students may experience the same emotions as one another in many situations – for example, feeling frustrated when a student is not engaging in the group task – these emotions are only thought to be deemed ‘collective emotions’ when individuals become mutually aware of each other’s feelings (i.e., through interaction) and when emotional convergence occurs (see Goldenberg et al., 2020, for an overview). In other instances, emotions are deemed as ‘individual emotions’, which occur without the awareness of, and convergence with, others’ emotions (Smith et al., 2007).

Although research is starting to explore macro-level psychological phenomena (e.g., collective emotions) in collaborative learning contexts (e.g., Törmänen et al., 2021), more research is needed to understand the causes and prevalence of these affective states in assessed, online, group activities. These findings may have significant theoretical and practical implications.

The third main insight from this study was, **tutors found it challenging to understand students’ emotional experiences when learning online.**
In contrast to traditional face-to-face learning contexts, tutors noted that their ability to recognise, and generate an informed understanding of, students’ emotions was often significantly impaired due to the limited availability of non-verbal emotional cues. For example, in a face-to-face environment, a tutor might be able to identify an anxious or frustrated student by their facial expressions and/or body language. However, in an asynchronous online context, these cues are not readily available, making the detection of emotions extremely difficult (Eligio et al., 2012; Marold Wosnitza & Volet, 2005). To substitute for reduced non-verbal emotional cues, tutors described using a variety of other approaches to gather ‘clues’ about students’ emotions in the group activities. Primarily, this involved focusing on features in students’ written text, such as the words used, the font, and the general tone in emails, online discussion forum posts, and written reflections. Additionally, some tutors noted that phoning students was ‘essential’ for gaining a more detailed understanding of their emotions. This form of communication was thought to afford a greater sense of students’ affect, as it allowed tutors to listen to students’ tone of voice. Phone calls were, however, deemed rare as they are not a typically part of the tutor’s role and responsibilities during the group activities at the OU. Ultimately, detecting emotions in online settings was viewed by most tutors as being difficult, more time-consuming, and less accurate (e.g., an increased chance of misjudging emotions) than that which could be achieved in face-to-face settings. These findings raise important questions about how to better support tutors in understanding students’ emotions when online learning is primarily text-based (see Laflen and Fiorenza, 2012, for a more detailed discussion of this topic).

The difficulty of understanding students’ emotions was further thought to be impacted by students regulating, or controlling, their emotional expression during the group activities (primarily in relation to unpleasant emotions). For instance, many tutors felt that students would not use, or significantly limit the use of, negative emotional language when communicating with other students and tutors. As Wosnitza and Volet (2005) note, in contrast to face-to-face situations which offer the possibility of detecting emotions through non-voluntary disclosures of emotions (e.g., expressions and body language), emotions in social online learning are expressed via technology and emotional disclosure is voluntary. In this study, language in online forums posts and emails was typically viewed as being quite formal and often related to aspects of the task rather than students’ feelings and emotions. Additionally, tutors believed that many students would regulate
their genuine emotions and display a neutral or positive persona throughout the tasks. This supports findings from research exploring norms of emotional expressions on social media which has found that individuals consider it more appropriate to express positive emotions when interacting with others online compared to with negative emotions (Waterloo et al., 2018).

It could be postulated that the learning context restricted students’ emotional expression and disclosure. For instance, tutors felt that students are less likely to express their emotions during the assessed, online group activities (e.g., in online discussion forums) than they would be in when interacting in other online contexts (e.g., when talking to their friends via social media). It is evident from previous research that students often freely express their emotions when communicating in computer-mediated communication discussions, however, the context can be an important mediating factor in whether students express their emotions or not (Derks et al., 2008; Laflen & Fiorenza, 2012).

Previous studies provide support for the reduced expression of emotions in online collaborative learning settings. For example, in a blended undergraduate writing course, Kim and Ketenci (2020) also recently observed that students tended to express regulated emotions when writing online discussion forum posts which disguised their genuine feelings. The authors suggested that it was much easier for students to hide their emotions and regulate emotional cues when communicating via text online (i.e., compared to face-to-face settings) by carefully selecting the words they used when communicating. This allowed students to either exaggerate or down-regulate their real emotions. During computer-supported collaborative learning projects, Järvenoja and Järvelä (2005) also observed that a student’s emotional expression may differ considerably from their genuine emotions. For instance, although two students may have very similar emotional experiences during an online collaborative task, one may openly express their feelings, another may suppress their emotions, providing very few observable indicators about how they actually feel.

Tutors in this study indicated that they believed there were two main reasons why students regulated the expression of their true feelings. First, because students knew they were being assessed and that the expression of certain emotions (such as unpleasant emotions) may have a detrimental impact on their overall mark. Second, because the expression of unpleasant emotions may have damaging impacts on group functioning and cohesion, which may ultimately hinder group performance. These findings help contribute to a
greater understanding of why students may regulate the expression and disclosure of their emotions in online group learning situations, adding to research which has been undertaken in more general online contexts (e.g., Waterloo et al., 2018). Tutors did, however, feel that students were more likely to express their true emotions in other, less formal, online spaces, such as Facebook, WhatsApp, and Twitter. This supports findings from Hilliard et al. (2020), who reported that some OU students preferred expressing their emotions in a private Facebook group rather than on the online discussion forums during an assessed, online, group project, as it constituted to a more personal and private area for discussion. These findings also support research investigating the norms of expressing emotions online. For instance, Waterloo et al. (2018) found that social media users were more likely to express unpleasant emotions on more private platforms (e.g., WhatsApp), than on platforms viewed as being more public (e.g., Twitter or Instagram). The expression of emotions in private spaces outside of the OU may, therefore, be deemed as more appropriate by students than expressing emotions on public OU owned platforms (e.g., online discussion forums) which can be viewed and monitored by others (e.g., the tutor). Further research is needed to gain a more in-depth understanding regarding the conditions which cause students to either express or suppress their emotions during online group learning, which emotions are more likely to be expressed or suppressed, and for what purposes.

As discussed above, it is evident that tutors’ awareness and understanding of students’ emotions during the assessed, online group activities can be significantly limited due to the constraints of learning online (typically asynchronously) as well as the regulated and/or reduced expression and disclosure of emotions by students in these learning settings. Although teachers’ judgements of students’ emotions can be very different from students’ self-view, even in face-to-face environments (Pekrun et al., 2018), the challenges faced by tutors in online learning contexts are thought to make misjudgements of affective responses even greater (Rienties & Rivers, 2014). This may ultimately impact how effectively tutors can teach and support their students in these online contexts (Boekaerts & Pekrun, 2016). For instance, research has highlighted that a teacher’s ability to understand the emotions of their students is an important facet of high-quality teaching and learning (Hargreaves, 2000, 2001). Without such awareness, it is not possible to provide appropriate and timely assistance to students (Marold Wosnitza & Volet, 2005). Furthermore, for emotional interventions to be effective, it is particularly important that
remedial action is as immediate as possible, especially when intense unpleasant emotions are experienced (Boekaerts & Pekrun, 2016). This is particularly problematic in online learning settings due to the inevitable long delays between when a student experiences an emotional event and when (if at all) the tutor can detect this and then provide suitable support and assistance. Raising tutors’ awareness of students’ emotional experiences in online group activities is, therefore, an important consideration for educators when designing assessed, online, group activities.

The final main insight from this study was, *tutors perceived various individual and situational factors to influence students’ emotions and their emotional expression.*

Individual factors were primarily related to a student’s personal characteristics (e.g., personality traits, mental health conditions, enduring attitudes) and previous experiences (e.g., working in similar group learning settings), whereas situational factors were predominantly related to features of the group activity learning environment (e.g., group composition, quality of relationships with other students) and specific task demands (e.g., assessed nature of the activity, timing of the activity). Many tutors believed that these factors helped explain individual differences in students’ emotions and their emotional expression when undertaking the group activities. For instance, many tutors believed that these factors could help explain: why some students experience more pleasant, or unpleasant, emotions than other students; why the same student may experience completely different emotional experiences when undertaking two similar group learning activities on different occasions; or why one student is more likely to express their emotions than another.

The findings of this study are in line with existing theoretical literature (e.g., Pekrun, 2006; Lazarus, 1999) which has attempted to explain the formation of emotions and how emotions can differ between individuals. For instance, in Pekrun's (2006) CVT, various individual factors (such as trait emotions, beliefs, goals, cognitive abilities, and gender) are proposed to affect students’ achievement emotions by first influencing their control and value appraisals. The CVT also acknowledges that environmental factors can act in a similar way (Pekrun & Perry, 2014). For instance, the quality of the tasks being completed, the cognitive demands of the task, the amount of support and encouragement provided by the teacher, and the overall learning climate are all purported to influence students’ control and value appraisals, which, in-turn, can modify their achievement
emotions (Pekrun & Perry, 2014). As such, in the CVT, both individual and environmental factors are referred to as distal antecedents of achievement emotions, whereas cognitive appraisals are known as proximal determinants (Pekrun, 2006). Although the CVT helps explain how distal factors influence the emotions experienced by students, it does not account for how such factors influence students’ emotional expression (although recent research has attempted to expand the CVT to include the role of expressed emotions; Kim & Ketenci, 2020). Emotional expression research has, however, shown that both individual factors (e.g., age, ability to control the expression of emotions) and situational factors (e.g., social presence, comfort/quality of relationships with others) play an important role in this process (Derks et al., 2008; Waterloo et al., 2018).

Currently, the exploration of factors that can influence students’ emotions and emotional expression in social and collaborative online learning settings remains underexplored. This is a surprising, as calls for such research have been made for well over a decade (Angelaki & Mavroidis, 2013; MacFadden, 2007; Marold Wosnitza & Volet, 2005). More research in this area does, however, appear to be emerging in a variety of online settings (e.g., Buhr et al., 2019; Harley et al., 2020; Loderer et al., 2020). The exploration of how individual and situational factors can influence emotions in traditional, face-to-face learning settings has received more attention (e.g. Sun et al., 2020; Tze et al., 2016; Goetz et al., 2013; Daniels et al., 2009; Frenzel et al., 2007). For instance, Rowe and Fitness (2018) found that faculty staff were able to identify a range of mediating factors that influenced students’ unpleasant emotions when learning at university.

It is evident that more research is needed gain a detailed understanding of the influence of individual and situational factors on students’ emotions and emotional expression when undertaking, assessed, online, group activities. In addition to the use of qualitative, exploratory approaches, it is advised that such research also use quantitative approaches, using large sample sizes, to examine and test relationships between various individual and situational factors and students’ academic emotions. Findings from such research may have important implications for practitioners, such as the potential for tailored emotional support based on students’ personal characteristics, or adaptations to learning environments to make them more emotionally sound.
6.4.2 Study limitations

In addition to limitations related to relying solely on the use of self-report data and using retrospective research methods (as discussed in see Section 3.5), there were a few other limitations to this study that should be noted.

First, although qualitative methodology has commonly been used to explore subjective emotional experiences in prior research (Hascher, 2008; Linnenbrink, 2006), this approach may increase social desirability bias (Bergen & Labonté, 2020) and increase the potential to over-report more intense emotions and under report less intense emotional states (Rowe & Fitness, 2018). Despite this, educators in similar learning contexts are encouraged to use their own judgements about the potential applications of the findings of this research.

Second, the small, self-selected sample of tutors used in this study would have obvious potential biases (Olsen, 2008; Robinson, 2014). For example, it is possible that the tutors who participated in this research had a strong interest in the use of social and collaborative online learning and/or affective issues in online learning; therefore, their views may not be representative of the cohort as a whole. Furthermore, there were substantial differences with the numbers of participants from each module. For instance, three out of the five modules did not undertake discussion forum threads and the majority of interviewees were from one module.

6.5 Chapter Summary

In summary, this study has provided an alternative perspective of students’ emotional experiences by exploring the views of tutors. This perspective has received little attention in previous emotion research undertaken in educational settings; however, gaining the views of tutors was found to provide valuable insights into students’ emotional experiences. For example, these included: details about the support tutors provide to students, which can help manage their emotions; ideas that emotions can be transmitted between individuals and be experienced at a collective level; and discussion of various factors which may influence students’ emotions and emotional expression. Such findings have helped generate a more complete understanding of students’ emotional lives than that which could be attained through gaining students’ perspectives alone. In the next chapter, Chapter 7, findings from studies 1, 2 and 3 are integrated to answer the four main
research questions this thesis aimed to address (see Section 3.1). Findings are also used to discuss the research implications (theoretical, methodological, and for teaching practice), overall research limitations, and suggestions for future inquiry.
7 Discussion

In the previous chapters, findings from the three empirical studies that comprised this thesis were presented and discussed. In this chapter, a general discussion of the key findings and implications of these investigations is provided. First, the findings are summarised in relation to the four main research questions that this project aimed to address and contributions to knowledge are highlighted (Section 7.1). Second, the implications of this empirical research are discussed (Section 7.2). Third, the limitations of this research project and directions for future research are outlined (Section 7.3). Fourth, a conclusion to this research project is provided.

7.1 Contribution to knowledge

To start this section, a table illustrating the new contributions of this research as well as findings that confirm those found in previous work is presented. Each of the four main research questions of this thesis is then addressed with an extended summary of how findings were generated and how they relate to existing empirical and theoretical literature.

Table 20. Novel and confirmatory findings of this research.

<table>
<thead>
<tr>
<th>Novel findings</th>
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<tr>
<td>Relief was found to be commonly experienced by students and was perceived to</td>
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<td>have important functions during the group activities.</td>
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<td>In addition to experiencing emotions at an individual level, there was some</td>
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<td>evidence that students also experience emotions together at a shared, collective</td>
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<td>level.</td>
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<td>A range of social emotions were experienced in the group activities and a</td>
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<td>number of these were identified as being important for student engagement.</td>
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<td>The online asynchronous environment offered several affordances and constraints</td>
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<td>when regulating emotions in the group activities.</td>
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<td>Students reported regulating their emotions to enhance participation and</td>
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<td>performance, improve health and wellbeing, and foster social relationships.</td>
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<td>There was some evidence that students attempted to support and regulate other</td>
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<td>students’ emotions in the online group activities.</td>
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### Key confirmatory findings

- Lack of engagement by other group members was found to be the most common cause of unpleasant emotions.
- The emotions of anxiety and frustration were found to be commonly experienced when undertaking the group activities.
- Anxiety was reported to have important functions during the group activities and was found to have both facilitative and debilitative effects.

### 7.1.1 What emotions do students experience when undertaking assessed, online, group activities?

#### Key findings

- Students experience a wide variety of pleasant and unpleasant emotions (Study 1, 2, and 3).
- *Anxiety, frustration, and relief* were found to be highly pervasive (Study 1, 2, and 3).
- A fluctuation, or change in, students’ emotional trajectories was found, with more unpleasant emotions being reported before and during the group activities, and more pleasant emotions being reported after the activities had finished (Study 1, 2, and 3).
- Although primarily investigated as an individual psychological process, tutors felt that, on occasions, students may experience emotions together, at a collective level (Study 3).

This research has revealed that assessed, online, group activities are often highly emotionally charged, with students experiencing a diverse range of pleasant and unpleasant emotional states. In relation to circumplex models of affect (Feldman Barrett & Russell, 1998; Linnenbrink, 2007), emotions reported in this research could be classified as:

- pleasant activating emotions (e.g., *curiosity, enjoyment, excitement, hope, pride*)
- pleasant deactivating emotions (e.g., *relief, satisfaction, calmness*)
- unpleasant activating emotions (e.g., *anxiety, frustration, confusion, anger*)
- unpleasant deactivating (e.g., *hopelessness, disappointment, sadness, boredom*)
It is also important to note that a range of social emotions were reported in this research. For instance, feelings of admiration, gratitude, empathy, sympathy, and resentment were all reported by students. These emotions are very specific to the highly social nature of the group activities explored in this research. Furthermore, because emotion research in educational contexts has tended to focus on solo learning situations (Pekrun et al., 2018), such emotions are rarely reported in empirical enquiry in academic contexts.

Several emotions were found to be especially pervasive. These included: anxiety (particularly before the activities); frustration (particularly during the activities); and relief (particularly after the activities). Whilst anxiety and frustration have previously been highlighted as commonly experienced emotions in assessed, online, group learning (e.g., Hilliard et al., 2020; Robinson, 2013; Capdeferro and Romero, 2012), the experience of relief has been less commonly identified. In fact, despite the pervasiveness of relief in most educational settings (Pekrun et al., 2018; Sweeny & Vohs, 2012), little research has investigated this emotional state (Camacho-Morles et al., 2021). This scarcity of research, in both online collaborative learning contexts and general educational settings, may be due to much emotion research focusing on a small range of emotions which often occur before and during learning activities and assessments (e.g., anxiety, enjoyment, boredom) and not on emotions that primarily occur after they have been completed (e.g., relief, satisfaction, disappointment). This finding, therefore, highlights the importance of assessing emotions across all three stages of the online group learning (before, during, and after). Furthermore, tracking emotions throughout the activities (particularly in the ‘after’ stage) is especially important as previous research (Järvenoja & Järvelä, 2005; Linnenbrink-Garcia et al., 2011), and findings from this investigation (see Section 4.3.2), suggest that students’ previous experiences can influence their emotions and engagement towards future online collaborative activities.

Several pleasant emotions, other than relief, were found to be frequently reported. These included: curiosity; satisfaction; hope; excitement; and enjoyment. This is an encouraging finding, as online group learning activities are often viewed as being less satisfactory to students than more independent approaches to online learning (Evans & Galley, 2016). This also adds to literature that has shown that positive experiences that can be experienced by students when undertaking online collaboration (Dewiyanti et al., 2007; Donelan & Kear, 2018; Webster, 2019; Zhu, 2012). Although assessed, online group activities can evoke unpleasant emotions in students (sometimes which can be very
intense), they can also arouse many pleasant emotions. It can, therefore, be viewed that pleasant emotions may be no less of a characteristic of students’ affective lives than unpleasant emotions when undertaking these activities. Ensuring that students understand this before undertaking this form of learning (e.g., by previous students sharing their positive experiences of undertaking online group learning) may help enhance students’ confidence and willingness to engage in these activities.

The emotions described in the preceding paragraphs were all found to be commonly experienced when undertaking the activities. These could, therefore, been termed the ‘emotional topography’ of the activity (as described by MacFadden, 2007). It is also important to note that multiple emotions were often reported by students to be experienced at the same time and not in isolation. Another defining feature of the emotions experienced by students was their fluctuating nature. For instance, in Study 1, it was evident that students perceived that they experienced unpleasant emotions more frequently before and during the activities and to a lesser extent after the activities had been completed. Such an emotional trajectory is illustrated in Figure 28. Although this type of trajectory represents a change from unpleasant to pleasant emotions, it might not be the most desired emotional journey for students to experience. For instance, a trajectory with more pleasant activating emotions (e.g., excitement before the activities, enjoyment during, and pride after) and fewer unpleasant emotions (e.g., those that can have deleterious impacts such as strong feelings of anxiety and frustration) would be preferable. Understanding how to generate such a positive learning trajectory (e.g., by creating an emotionally sound learning environment) is an essential area of future investigation. The changing and fluctuating nature of emotions reported in this study also further highlights the importance of using research approaches that can accurately capture emotions at different stages throughout online group learning activities (e.g., by using longitudinal self-report methods such as diaries and experience sampling method).
Although emotions were primarily considered at an individual level in this research, tutors believed that students could experience emotions at a shared, collective level. For instance, before or at the start of the group activities, tutors felt that a collective sense of anxiety could be experienced by students when they shared and discussed their worries with one another. And after activities had been completed, a collective sense of pride and triumph were thought to occur when students celebrated their success and congratulated one another. The idea that students’ individual emotional experiences can converge to form collective emotional states in collaborative and group learning environments has been discussed previously (Kelly & Barsade, 2001; Törmänen et al., 2021). However, little literature has explored these collective emotional experiences in distance learning environments.

**Figure 28.** Example emotional trajectory throughout an assessed, online, group activity.
At an individual level, students’ emotions result from their own individual appraisals of situations or events inside, or outside, of the learning activities, and occur without emotional convergence (i.e., the synchronisation of emotions among individuals occurring when emotions are shared across individuals, either implicitly or explicitly) (Amit Goldenberg et al., 2020; Smith et al., 2007). As illustrated in Figure 29, examples of individual level emotions in the online group activities include: (a) students independently experiencing different emotional states to one another; or (b) students independently experiencing similar emotions in response to the same situations or events (e.g., all group members feelings anxious before the group activity). These examples are classified as individual level emotions as a student’s emotions have not become influenced and become more similar to those of other students through emotional sharing.

At a collective level, students’ emotions converge and synchronise. As illustrated in Figure 29, this can involve: (c) a small number of students in a group experiencing emotions together in relation to the same situations or events (e.g., two students experiencing shared frustration about another group member not taking part in the activity); or (d) all students in a group experiencing emotions together (e.g., experiencing collective enjoyment and pride after successfully completing the task). Although experiencing collective level emotions is reliant on interactions, it is important to note that this alone will not lead to collective emotional experiences. These are dependent on individuals influencing each other’s emotions as well as emotions converging and synchronising across individuals in response to specific events or situations (Goldenberg et al., 2020). In instances with limited interaction and sharing of emotions (e.g., a group where students have little communication or where interaction is very task-focused), there are fewer opportunities for these emotions to be experienced.

It is important that future emotion research in online collaborative learning settings aims to differentiate between, and measure, individual and collective level emotions. Such research will provide a deeper understanding of how students experience emotional states in these online learning contexts and will help advance current emotion theory which primarily views emotions as an individual psychological process (Pekrun, 2019b).
Figure 29. Individual and collective level emotions in assessed, online, group activities (↔ = sharing and convergence of emotions).
7.1.2 What causes students to experience emotions in assessed, online, group activities?

**Key findings**

- Eight distinct categories of the causes of emotions were formulated: self; others; group; outcome; learning model; task; technology; and external (Study 1 and 2)
- Pleasant emotions were often found to stem from causes in the outcome-, others-, and self-categories, whereas unpleasant emotions were often found to derive from causes in the others- and self-categories (Study 1 and 2).
- A lack of engagement and participation from other group members was found to be the most common stimulus of unpleasant emotions (primarily related to frustration and anxiety) and completion of the activity was the most reported source of pleasant emotion (primarily related to relief) (Study 1 and 2).
- Interestingly, tutors felt that emotions could be transmitted among students, and from tutors to students (Study 3)
- Various individual and situational factors were thought to influence the causation of students’ emotions (Study 3)

This research revealed that there were a wide range of situations and events that caused emotions in assessed, online, group activities. These were classified into eight categories, as illustrated in Figure 30. As can be seen in this figure, emotions were found to stem from the students themselves, social factors related to others and the group, features of the task and learning environment, and external situations outside of the group activity. These findings support, and build upon, research that has explored the causes of emotional responses in online collaborative learning settings (Järvenoja & Järvelä, 2005; Vuorela & Nummenmaa, 2004; Marold Wosnitza & Volet, 2005) as well as research that has specifically investigated students’ experiences of unpleasant emotions in assessed, online, group activities (Capodeferrro & Romero, 2012; Hilliard et al., 2020).
Findings from all three studies showed that social situations and events were a prevalent cause of emotions during the online group activities. For instance, other students were found to provoke various pleasant and unpleasant emotions (others-category). In fact, the lack of engagement or participation from other group members was the most common cause of unpleasant emotions (particularly frustration and anxiety). Furthermore, social situations related to whole group processes, such as group engagement and support, were also found to arouse pleasant and unpleasant emotions (group-category). Although the prevalence of emotions stemming from other students has been reported in previous studies in similar learning contexts (Allan & Lawless, 2003; Capdeferro & Romero, 2012; Donelan & Kear, 2018; Hilliard et al., 2020; Robinson, 2013), emotions deriving from group processes have been less frequently reported.

**Figure 30.** Causes of emotions in assessed, online, group activities.
One particularly interesting finding in relation to the social causes of emotions in this study, was that tutors believed that emotions could be transmitted from one individual to another or from an individual to a group of individuals. Therefore, the cause of emotions in one student (or a group of students) can be the emotions of other students. One explanation that could help explain this unique social cause of emotion, is the process of emotional contagion (as discussed in Section 6.4.1). This phenomenon has been highlighted in traditional learning environments (Frenzel et al., 2018) as well as various online settings (Goldenberg & Gross, 2020; Xing et al., 2019), however, it has been scarcely reported in online group learning environments. Gaining further evidence for emotion contagion in these learning settings (e.g., from the students themselves) is, therefore, an important area for future investigation.

The outcomes of the group activities were another prominent cause of emotions in this research (outcome-category). These were often found to be connected with pleasant emotions. In fact, the completion of the activity was found to be the most frequently reported cause of pleasant emotions (primarily related to relief). Emotions stemming from the students themselves (self-category) were also found to be a more prominent source of emotions. Of note, unpleasant emotions (often anxiety) deriving from students’ lack of confidence before or at the start of the group activities were found to be commonly reported by students. Despite causes in the task-, learning model-, and technology-categories being less reported than those previously described, these categories do highlight the importance of contextual factors for students’ emotional experiences. The external-category was found to be least commonly reported. Causes in this category do, however, highlight that emotions generated outside of the learning context can intrude online group activities.

Although many of the causes of students’ emotions are beyond the control of educators, the quality of the task design is something that can be significantly influenced. For instance, this research has highlighted that pleasant and unpleasant emotions can stem from: the topic of the activities; the guidance and instruction provided; the overall workload of the activities; task challenge/ difficulty; how the activities are assessed (e.g., overall weighting and whether they take into consideration individual and group contributions); the timing of the activity; and the length of time students have to undertake the activity. These factors highlight how decisions made by educators in the design phase of activities can impact the emotional experiences of students undertaking the activities.
Ensuring high quality activity and assessment design is, therefore, essential for developing positive learning experiences for students in online group learning.

Although this research has predominantly focused on the situations and events that can trigger emotional responses, it is important to discuss these findings in relation to emotional theory related to the causation of emotion. As discussed in the literature review (see Section 2.1.6), appraisal theories postulate that emotions are evoked by how an individual interprets a situation or event, rather than the situation or event itself. As such, it could be thought that the sources of students’ emotions identified in this study relate to their appraisals of these events or situations. In relation to Pekrun’s (2006) CVT, for example, many causes of students’ pleasant and unpleasant emotions reported in this research may reflect their appraisals of whether or not they feel in control of the situations or events causing their emotions (control appraisals) and whether the situations or events are subjectively important to them (value appraisals). For instance, many pleasant emotions experienced by students were typically associated with causes that are likely to relate to higher perceived control (e.g., high levels of motivation and determination, feeling prepared for the activity, positive engagement from others and the group, increased understanding of the task); whereas many unpleasant emotions were linked to causes that are likely to reflect lower perceived control (e.g., lack of self-confidence and belief, negative previous experiences, concern about others’ engagement and performance, a lack of task guidance and instruction). Furthermore, many causes of both pleasant and unpleasant emotions may have also been associated with feelings of increased perceived value (e.g., importance of passing and gaining a good grade) or decreased perceived value (e.g., reservations over the relevance and importance of the learning model). It is also thought that reduced levels of control may be more prevalent before, or in the early stages of, the activities when there are increased uncertainties and doubts about, for instance, the task itself, other students, and the student’s own ability to successfully complete the group activity. Once these uncertainties are resolved and/or reappraised (which they might not be), increased perceptions of control may emerge and more pleasant emotions aroused (Graesser, 2019; Hilliard et al., 2020).

While perceived control and value appraisals are likely important for many emotions in assessed, online, group activities, other appraisals may also be vital in these learning contexts. For example, curiosity was found to be triggered by a new type of learning activity and studying interesting topics that had not been previously studied before; for
such an emotion, the appraisal of novelty may be of greater importance than either control or value (Chevrier et al., 2019; Pekrun et al., 2018). In this research, there were also many social emotions (e.g., admiration, gratitude) that may not have not been related to appraisals of perceived control and value. For these types of emotions, appraisals related to social relationships (e.g., social relatedness and connectedness) may be of higher importance (Hareli & Parkinson, 2008; Pekrun, 2019b). Furthermore, for emotions experienced at a collective level, socially shared cognitive appraisal structures may play a significant role (Von Scheve & Ismer, 2013). Although beyond the scope of this research project, more investigation is needed to examine the relevance and importance of different cognitive appraisals for emotions experienced in online group activities.

Results from this research also highlighted that various individual factors (e.g., personality traits, mental health conditions, enduring attitudes, previous experiences of working in groups) and situational factors (e.g., group composition, familiarity and quality of relationships with other group members) were thought to influence the causation of students’ emotions (see Section 6.3.2). These findings are consistent with existing theoretical literature (Lazarus, 1999; Pekrun, 2006). For instance, in Pekrun's (2006) CVT, personal characteristics and environmental factors are referred to as distal antecedents of emotions, as they are believed to impact students’ achievement emotions by first impacting their subjective appraisals of control and value. These influencing factors are thought to be very important for understanding students’ emotional experiences, as they can help explain individual differences between students’ emotions (e.g., why one student may experience more unpleasant emotions and why another student may experience more pleasant emotions during the same learning activities) as well as why the same student may experience different types of emotions when undertaking similar learning activities on different occasions.

Based on the findings of this research as well as appraisal theories of emotion, a conceptual model highlighting the links between the situations and events causing emotions in assessed, online, group activities, factors influencing emotions, subjective appraisals, and emotions is presented in Figure 31.
Figure 31. Conceptual model of the causes of emotions, factors influencing emotions, subjective appraisals, and emotions in assessed, online, group activities.
7.1.3 How do emotions impact students’ participation and performance in assessed, online, group activities?

Key findings

- Students largely perceived pleasant emotions to have positive impacts on their participation and performance and unpleasant emotions to have negative impacts (Study 1, 2, and 3).
- Several unpleasant emotions (e.g., anxiety, frustration) were also reported to have facilitative effects by some students (Study 1, 2, and 3).
- The emotions of anxiety and relief were thought to have important functions (Study 1, 2, and 3).
- A range of social emotions (e.g., admiration, gratitude, resentment), and other socially related feelings (e.g., supported, belonging, isolation, devalued), were identified as influencing engagement (Study 1).

In line with existing theoretical and empirical work (e.g., Linnenbrink-Garcia et al., 2011; Pekrun, 2006; Fredrickson, 2004), results from this research revealed that pleasant emotions were predominantly associated with positive impacts and unpleasant emotions were primarily associated with negative impacts. Furthermore, emotions were found to influence several different pathways that are important for learning and achievement. For instance, both pleasant and unpleasant emotions were found to impact:

- behavioural involvement (e.g., effort and persistence, frequency of participation and interaction)
- motivation and self-confidence (e.g., determination to take part, self-belief in ability)
- social functioning (e.g., content and tone of interactions, support and encouragement offered to others)
- cognitive processes (e.g., attention and focus, decision making)

Findings that pleasant emotions were associated with positive impacts may not be surprising. Previous research has repeatedly shown that emotions like enjoyment and hope can strengthen motivation and interest, increase effort, promote the use of more flexible and creative learning strategies, and encourage positive interactions (Kahu et al., 2015; Linnenbrink-Garcia et al., 2011; Rowe et al., 2015); thus, exerting beneficial impacts on students’ learning and achievement. These findings do, however, highlight the benefits
of experiencing these emotions in assessed, online, group activities, and emphasise the
importance of aiming to foster learning environments that promote these emotions (see
Section 7.2.3 for suggestions on how this can be achieved).

A more surprising finding was that emotions typically classified as pleasant deactivating
were perceived by many students to have immediate performance benefits when
undertaking the group activities (e.g., increased effort) (see Section 5.3.4). When
compared to pleasant activating emotions (such as enjoyment and hope), emotions like
relief and satisfaction have been reported to have ambivalent effects on engagement and
learning in educational settings (Pekrun et al., 2002b). For instance, although these
emotional states have been reported to have beneficial effects in the long term (such as
reinforcing motivation to invest effort in future learning), it has been suggested that such
emotions may also reduce short-term motivation and effort, and therefore, have
detrimental effects during academic situations (Pekrun et al., 2018).

The facilitative effects of relief and satisfaction observed in this research might be
influenced by how emotions were evoked and the social nature of the group learning
activities. For instance, previous studies have often investigated retrospective forms of
relief and satisfaction that have derived from completing solo type of learning situations
or assessments (e.g., the end of an exam) (Pekrun et al., 2002b). In this research, however,
process forms of these emotions were also reported. These were experienced during the
learning activities and typically occurred when negative expectations were not fulfilled
(e.g., when students realised other students were not actively participating). The effects
of such forms of relief and satisfaction, may, therefore have beneficial effects when
learning in group activities (e.g., by promoting positive group interactions, increasing
willingness to interact, and facilitating feelings of cohesion; Linnenbrink-Garcia et al.,
2011). Based on these findings, it is important that future research explores the specific
functions of pleasant deactivating emotions in these education contexts. This echoes
wider calls for more research to explore the functions of these emotions in general
academic learning contexts (Camacho-Morles et al., 2021).

Unpleasant emotions were primarily associated with detrimental impacts in the group
activities. In particular, the emotions of anxiety and frustration were reported to have
negative impacts. For instance, both of these emotional states were reported to: reduce
participation; decrease motivation to take part; and impair social interactions. These
findings are consistent with research in both general learning contexts (Pekrun, 2006) and online group learning settings (Capdeferro & Romero, 2012; Hilliard et al., 2020; Robinson, 2013). Interestingly, results from this research also revealed that unpleasant emotions (again, primarily feelings of anxiety and, to a lesser, extent, frustration) were perceived as having beneficial impacts during the activities (e.g., by investing more effort in the tasks). These findings highlight the complexities of the relationship between some unpleasant emotions (typically those classified as unpleasant activating emotions) and student participation and performance (Pekrun et al., 2018). For instance, in many students, anxiety and frustration would have deleterious consequences, however, as highlighted here, such emotions may have facilitative and energising effects in other individuals. Although research in educational settings has highlighted that unpleasant activating emotions can act as enablers for some and inhibitors for others (Artino & Jones, 2012; Kahu et al., 2015; Rowe & Fitness, 2018), very few studies have reported this phenomenon in online group learning (Hilliard et al., 2020).

Despite the potential benefits that can stem from emotions such as anxiety and frustration for learning and achievement, it must be emphasised that these emotions should not be encouraged or promoted. Generally, unpleasant emotions are associated with detrimental impacts when learning, especially when they are strong and persistent. Furthermore, beyond the impacts on learning, these emotions can negatively influence students’ health and wellbeing. For instance, in Study 1, a small number of students commented that anxiety and stress: induced physical symptoms (such as fatigue and weakness); disrupted sleep; contributed to ill health; and negatively impacted mental wellbeing (see Section 4.3.3). These findings demonstrate that although academic emotions are important for students’ learning and achievement, they can also significantly influence students’ emotional wellbeing (often negatively).

With increasing concerns about the mental health of university students globally (Lister et al., 2021; Macaskill, 2013) and the far-reaching consequences of experiencing unpleasant academic emotions (e.g., stress from university has been cited as a reason for attempting suicide; Westefeld et al., 2005), it is imperative that assessed, online, group activities are designed to support student wellbeing and not cause any undue stress and anxiety (suggestions to help engender emotionally sound learning environments have been provided later in Section 7.2.3). It is, however, important to consider that unpleasant emotions cannot always be avoided when learning. In addition to creating positive and
supportive learning environments, it is also encouraged that educators create a learning culture that enables students to use the energy provided by unpleasant emotions to promote their learning and increase their resilience. This is line with movements in education that position resilience and wellbeing as central to education (Slep et al., 2017; Marold Wosnitza & Peixoto, 2018).

Another interesting finding from the study was that social emotions, and other socially related feelings, were reported by students as having important effects in the group activities. For instance, several pleasant social emotions (e.g., empathy, sympathy, admiration, and gratitude) and feelings (e.g., supported, belonging, camaraderie) were identified by some students as having positive impacts, whilst the unpleasant emotion of resentment and several other unpleasant socially related feelings (e.g., isolation, devalued, unsupported, and alienation) were identified by some as having negative impacts. The exploration of social emotions in academic contexts has received very little investigation (Rowe & Fitness, 2018), predominantly due to much emotion research being undertaken in more independent learning settings (e.g., when studying, attending class, and taking tests) and primarily focussing on achievement emotions (e.g., enjoyment, anxiety, frustration, and hope). Social emotions are, however, likely to be of great significance in online collaborative learning environments (Kreijns et al., 2003; Rourke et al., 1999; Rovai & Wighting, 2005; Wegerif, 1998). For example, in social psychology literature, social emotions have been shown to be of great importance for guiding and shaping social behaviours, interactions, and relationships (Hareli & Parkinson, 2008; Van De Ven, 2015). Further research exploring the roles and functions of these emotions in online group learning is, therefore, needed. This finding not only underscores the importance of these emotions, but it also emphasises the importance of fostering positive relationships between students who take part in assessed, online, group activities (see Section 7.2.3 for suggestions on how to achieve this).

It is evident that the effects of pleasant and unpleasant emotions in online, group, learning contexts are complex. They are also likely to dependent on an interplay between: the emotion (e.g., type, intensity, form); individual characteristics (e.g., ability to control and regulate emotions, personality traits), and environmental factors (e.g., availability of support, task demands) (Pekrun et al., 2018; Strack et al., 2017; Yerkes & Dodson, 1908). In this research, anxiety and relief were found to be the two most commonly occurring emotions and both were found to have important functions during the activities. It is clear
that these two emotions are linked. For instance, anxiety will often transition into relief after the anxiety inducing circumstances come to an end or are avoided (Pekrun et al., 2002b). If such circumstances are not resolved, however, anxiety can persist, and if these feelings become overly intense, they may have detrimental consequences on a student’s learning and health. Based on the findings of this research, as well existing research in educational settings (Pekrun et al., 2002b; Rowe & Fitness, 2018), the potential consequences of both relief and anxiety are illustrated in Figure 32.
Figure 32. Potential consequences of relief and anxiety in assessed, online, group activities.
7.1.4 *How and why do students regulate their emotions in assessed, online, group activities?*

**Key findings**

- Students reported regulating both pleasant and unpleasant emotions (Study 2).
- Five distinct categories of emotion regulation strategies were generated: *social support; changing or directing thoughts; active task-related behaviour; modifying emotional response;* and *evasion or avoidance* (Study 1 and 2).
- The asynchronous online learning environment offered a number of affordances and constraints to the selection of emotion regulation strategies (Study 1 and 2).
- Three categories of emotion regulation goals were formulated: *performance-oriented; wellbeing-oriented;* and *social/relational-oriented* (Study 1 and 2).
- Although this study explored *how* and *why* student regulated their own emotions, there was some evidence of students regulating other students’ emotions during the group activities (Study 1).

Findings from this research highlight the importance of regulating not only unpleasant emotions (which has often been the focus of much previous emotion regulation research) but also pleasant emotions when undertaking assessed, online, group activities. Although emotion regulation was more prevalent for unpleasant emotional states, the regulation of pleasant emotions was also found to be commonly pursued. This research has, therefore, extended current understanding and knowledge of this process in these social online learning settings.

In relation to *how* students regulated their emotions, this research classified regulation strategies into five district categories. These are illustrated in Figure 33. As shown in this figure, both intrapersonal and interpersonal emotion regulation strategies were described by students. Although existing categories of emotion regulation strategies could have been used when analysing data in this research, it was thought important to generate categories that reflected the context-specific nature of how students managed their emotions while engaged in assessed, online, group activities, rather than using frameworks developed for other contexts (e.g., Schutz et al., 2004; Gross, 1998; Lazarus and Folkman, 1984).
Students predominantly reported regulating their emotions by using strategies in the active task-related behaviour category (e.g., increasing effort and work rate, increased frequency of task-focused interaction), changing or directing thoughts-category (e.g., focusing on the task, thinking positively), and social support-category (e.g., sharing feelings and gaining emotional support from others). Strategies in the modifying emotional response-category (e.g., took breaks away from the task, relaxed) and evasion or avoidance-category (e.g., avoided taking part, purposely distracted oneself from the situation) were less reported. Findings also highlighted that some categories may also be more associated with the regulation of pleasant or unpleasant emotions, respectively.

**Figure 33.** Emotion regulation strategies employed by students in assessed, online, group activities.
instance, the *modifying emotional response, evasion or avoidance*, and *social support* categories, were primarily linked with the regulation of unpleasant emotions, whereas the *changing or directing thoughts* category was found to be slightly more connected with the regulation of pleasant emotions (although strategies in this category were also found to be commonly used to regulate unpleasant emotions). More investigation is needed to explore these associations further.

It is evident that students use a wide range of strategies when regulating their emotions during assessed, online, group activities. The qualitative approach adopted in this research was able to identify an array of strategies that have been less frequently found in prior investigation. For instance, in addition to strategies that students used to regulate their emotions when actively taking part in the learning activities themselves (which have often been the focus of previous investigation), this study also identified strategies that students employed to regulate their academic emotions when they were not taking part in the activities. This included: exercising; speaking to family and friends; and sleeping. This study also identified a range of interpersonal regulation strategies, both inside and outside of the educational context, which have been less frequently discussed in educational emotion regulation literature. It is important that future research has a greater focus on exploring interpersonal emotion regulation in social online learning settings, as investigation from a traditional, intrapersonal perspective may miss regulation strategies that are unique to this learning context or may not be within the repertoire of the individual.

When compared with traditional, face-to-face learning environments, the asynchronous online learning settings investigated in this research were found to afford students different opportunities for how they regulated their emotions. For instance, this included being able being to take breaks away from the task to relax and calm down (thus, allowing students to deal with emotion eliciting situations when they are in the best frame of mind) and being able to monitor group progress in their own time (not just when students were meeting synchronously). Similar findings have been highlighted previously (Marchand & Gutierrez, 2012; Pietarinen et al., 2018). There are, however, a number of constraints to how students regulate emotions in such environments. For example, learning online makes it more difficult to be aware of, and understand, other students’ emotions (e.g., due to reduced emotional cues). This can negatively impact the interpersonal support that both tutors and students can provide during the activities. Furthermore, students may have
greater opportunities to use avoidance type strategies in these settings (e.g., by avoiding asynchronous interaction until others have communicated or by ignoring the collaborative task by distracting oneself). It is important that educators understand the affordances and constraints of regulating emotions in asynchronous online learning settings when designing online group activities, as this may help create flexible solutions to overcome any limitations (e.g., online tools could be used to increase emotional awareness) and ensure that they can explain a range of adaptive strategies that students can use before taking part.

Understanding students’ reasons for selecting the emotion regulation strategies they used is difficult. For instance, previous literature has noted that individuals differ in their use of strategies (Gross, 2015), and that the same strategy can be adaptive or maladaptive dependant on: the emotion being regulated; the specific individual employing the strategy; and the context in which regulation is occurring (Peña-Sarrionandia et al., 2015). One explanation that has been proposed for the selection of emotion regulation strategies is based on whether an emotional encounter is appraised as controllable or uncontrollable (coined the goodness-of-fit hypothesis; Lazarus and Folkman, 1984). According to this hypothesis, emotional situations that are considered controllable tend to lead to the utilisation of problem-focused coping strategies (i.e., active attempts to change or eliminate the stressors via individual behaviour), whilst emotional situations that are perceived to be beyond personal control often led to the use of emotion-focused coping responses (i.e., attempts to adapt the stressors and diminish the consequences of the emotional situation). In relation to this research, issues of control could be viewed as important to the emotion regulation process; however, given that perceived control of emotional encounters was not assessed, firm conclusions cannot be drawn. Further research is needed to gain a more in-depth and nuanced understanding of the factors that determine the selection of emotion regulation strategies in assessed, online, group activities.

In addition to exploring how students regulated their emotions, this research also investigated why they did so. The exploration of students’ emotion regulation goals has received extremely little prior investigation in educational contexts. This, however, is an important area of investigation. For instance, to promote adaptive emotional regulation, and to enhance emotional experiences, it is essential to understand what people want to feel and why they want to feel that way (Tamir, 2016; Tamir & Gutentag, 2017). As
illustrated in Figure 34, emotion regulation goals were grouped into three categories in this research. As shown in this figure, goals were found to be focused on enhancing participation and performance (performance-oriented goals), increasing students’ health and wellbeing (wellbeing-oriented goals), and fostering social relationships (social/relational-oriented goals).

**Figure 34.** Emotion regulation goals pursued by students in assessed, online, group activities.

Students primarily reported regulating emotions to enhance participation and performance (performance-oriented goals). Although these goals often related to achieving successful performance outcomes (e.g., completing activity, achieving a good grade) they also related to improving cognitive, behavioural, and motivational engagement in the task. Interestingly, a few students reported regulating their own emotions to enhance the participation and performance of other group members and the group as a whole (e.g., by providing other students support or increasing their motivation). In accordance with Tamir's (2016) framework of emotion regulation motives, these performance focused goals would be considered instrumental goals (i.e., goals focused
on outcomes other than purely changing one’s emotional state; see Section 2.1.4). Due to the importance of assessed, online, group activities, it is not surprising that such goals are pursued by students.

*Performance-oriented* goals were primarily associated with the desire to feel more pleasant emotions and less unpleasant emotions, however, there were, interestingly, some examples where students focused on reducing the experience and intensity of their pleasant emotions. This view fits theories of emotion that highlight the potential detrimental impacts of experiencing pleasant emotions (see Section 2.1.3). For instance, whilst pleasant emotions have been found to broaden people’s momentary thought-action repertoires (e.g., widening thoughts and increasing creativity and divergent thinking; Fredrickson, 2001), they have also been found to distract attention and thus reduce performance in tasks that require sustained focus (Clore & Huntsinger, 2009). Reducing the experience or intensity of pleasant emotions may, therefore, help narrow focus and allow for quick and decisive action. Ultimately, this may be beneficial for some students during online group activities. Although no evidence was found in this research of students increasing the experience and intensity of unpleasant emotions for performance benefits, it is conceivable that such processes could occur. For instance, if a student experiences beneficial impacts from experiencing unpleasant emotions (such as those found in this research; see Section 4.3.3 and 5.3.4), they may aim to increase these feelings on occasions. Future research could explore this possibility.

In addition to regulating pleasant and unpleasant emotions for performance reasons, this research also found that students pursued goals aimed at improving their wellbeing (*wellbeing-oriented* goals). Primarily, this related to the desire to maintain or feel more pleasant emotions or the desire to reduce unpleasant emotions. In accordance with Tamir’s (2016) framework, these would be classified as pro-hedonic goals (i.e. the motivation to feel more positively). Although emotion regulation is often thought to be driven by such goals (English et al., 2017; Tamir, 2016), the findings that *performance-oriented* goals were reported more frequently when regulating both pleasant and unpleasant emotions in this research may further reflect the context being investigated (i.e., regulating emotions when undertaking an assessed learning activity rather than regulating emotions in everyday life). In addition to regulating emotions to feel more positively, goals in this category also related to regulating emotions to avoid or reduce the impacts of unpleasant
emotions (primarily *anxiety*) on mental and physical health. This is important finding, due to the detrimental impacts unpleasant emotions can have on students’ health.

Regulating pleasant and unpleasant emotions to foster or maintain positive social relationships with other group members (*social/relational-oriented* goals) was another type of emotion regulation goal reported in this research. Although these instrumental type goals were found to be the least reported of all three categories, these findings highlight how the social context can influence the types of regulation goals pursued by students. For instance, such goals would not be sought by students in solo learning settings. In agreement with Eldesouky and English (2019), social emotion regulation goals in this research could further be distinguished as pro-social (e.g., focusing on promoting relationships) or impression management (e.g., controlling how one appears to others). Future inquiry should gain a deeper understanding of the prevalence of such goals (especially when regulating a variety of different emotions, including socially related emotions) and how social regulation goals differ when working with more or less familiar students or groups.

Although this research aimed to investigate *how* and *why* students regulated their own emotions (i.e., intrinsic emotion regulation), there was some evidence of students regulating other students’ emotions (i.e., extrinsic emotion regulation). For instance, in Study 1, two students described using humour to improve the feelings of other students when taking part in a group activity. Although this is only a small finding, it is very interesting, as very little literature has explored the regulation of others’ emotions in collaborative learning settings (both face-to-face and online) (Järvenoja et al., 2019). To gain a more in-depth and complete understanding of the process of emotion regulation in online group activities, strategies students use to regulate other students’ emotions and what their motives are for doing so should be investigated further. Furthermore, it would be intriguing to find out how prevalent this type of regulation is in online settings where there is reduced visibility and awareness of other students’ emotions (an important aspect extrinsic emotion regulation).
7.2 Implications

In addition to contributing to current knowledge about students’ emotional experiences in assessed, online, group activities, this research has numerous theoretical implications, methodological implications, and implications for teaching practice.

7.2.1 Theoretical implications

As discussed in Section 7.1, this research has significantly contributed to the understanding of students’ emotional experiences in these learning settings. Discussion of how this research has advanced a particular theory is, however, challenging. Firstly, as there have been few comprehensive theories of emotions developed for educational contexts (Artino, 2012) and, secondly, because much empirical research undertaken in this area has used differing theoretical approaches (Hascher, 2010). These points were highlighted at the start of this thesis (Section 2.1.6). Of the current theoretical models that do exist, however, Pekrun's (2006) CVT is becoming the predominant theory used to explore emotions in educational contexts. Although this theoretical framework was originally developed to address the origins, functions, and regulation of achievement emotions in traditional, more independent learning situations (e.g., when studying and taking tests in face-to-face environments), over the past decade it has started to be adopted in other learning contexts (e.g., in online learning settings; e.g., Artino and Jones, 2012). Despite this, it does not, in its current form, adequately explain students’ emotional experiences in assessed, online, group activities.

For instance, as found in this research, students experience multiple types of academic emotions whilst undertaking online group activities (e.g., emotions related to the social/relational aspects of working with others, the topics being explored, and unexpected information), not just emotions related to achievement activities and outcomes (the sole focus of the CVT). As such, cognitive appraisals other than control and value (such as cognitive incongruity, novelty, and social relatedness) may be equally, if not more, important for the experience of other types of emotions in these learning activities. The CVT may also not fully explain the impacts and functions of emotions when learning in online group activities. In this research, pleasant deactivating emotions (such as relief and satisfaction) were reported by students as having positive effects on participation and performance. In accordance with the CVT, such emotions are typically
thought to have little, or even detrimental, effects on students’ engagement and achievement (Pekrun et al., 2018). Furthermore, due to the focus on achievement emotions, the CVT does not predict the functions of other types of emotions; for example, this study highlighted the potential important roles of socially related emotions (e.g., admiration, gratitude, and resentment) in online group activities. In relation to emotions regulation, the CVT also takes an individual, or intrinsic, perspective, focussing on ways in which an individual can regulate their own emotions. As highlighted in this study, students in online group learning settings may also attempt to regulate other students’ emotions using extrinsic emotion regulation. It is important that theories of emotion and emotion regulation in educational contexts explain how and when such processes may occur.

The CVT, as with many theories of emotion, solely focuses on emotions experienced as an individual phenomenon and does not attempt to explain how emotions can, on occasions, also be experienced together with other people at a collective level (Goldenberg et al., 2020; Smith et al., 2007). Such collective emotions are obviously more relevant to social learning situations (such as online group activities), where individuals can interact and share their feelings and emotions with one another; in contrast to independent learning situations, where students will primarily work by themselves and have little communication with others. These macro-level emotions may also contribute to the unfolding of various other collective processes (Goldenberg et al., 2020), such as collective engagement (Rogat et al., 2020; Sinha et al., 2015) and collective/shared emotion regulation (Goldenberg et al., 2016; Järvenoja & Järvelä, 2013; Rogat & Linnenbrink-Garcia, 2011). There is, therefore, a need for integrated theories of emotion in educational contexts (such as the CVT) to account for these collective emotions (e.g., their origins and types) as well as how these phenomena influence other collective processes (e.g., collective engagement and regulation).

This research has also highlighted implications at a conceptual level. For instance, it is evident that further clarification needs to be made between the concepts of emotion regulation and student engagement. As evidenced in this research, there is currently clear overlap between these two concepts (also discussed by Boekaerts, 2016). For instance, various emotion regulation strategies identified in this project could also be described as functions of engagement. An example of this is increased effort and work rate. On the one hand, this could be classified as a form of behavioural engagement whilst on the other
it could be classified as a type of behavioural emotion regulation. To avoid such conceptual confusion, it is important that clear distinctions are made between these two concepts. This is important consideration for emotion theorists which incorporate both of these concepts in their theoretical frameworks. For instance, in the CVT, engagement and emotion regulation have both previously been discussed (see Pekrun and Linnenbrink-Garcia, 2012), yet clear distinctions separating these concepts has not been made.

Due to the importance of emotions for learning and achievement, it is peculiar that emotion research and theory is still often siloed from theories and models of online education (Beirne, 2020) (see Section 2.2.3). For instance, although the influence of emotion is starting to be acknowledge in the CoI (Cleveland-Innes & Campbell, 2012; Garrison, 2017), this model provides no explanation of how emotions function when learning in online communities. It is, therefore, imperative that future research aim to either integrate existing theories of emotion with theories and models of online education or develop new emotional theory for social online learning. Such inquiry will significantly enhance our understanding of emotions in these learning contexts and will ultimately lead to more effective learning.

7.2.2 Methodological implications
In addition to theoretical implications, this research has made several noteworthy methodological contributions. First, the use of an online diary proved to be an effective way of gathering self-report data about students’ emotional experiences. Compared to commonly used cross-sectional research approaches (e.g., one-off surveys or interviews), diaries reduced recall periods and allowed measurements to be made at multiple time-points throughout the activity. This method also provided access to populations separated by large geographical distances, which was essential in this investigation. Furthermore, the online diary allowed various aspects of students’ emotional experiences (e.g., emotions, their causes, effects, and regulation) to be measured without being overly demanding. A common concern when using diaries is the potential for large dropout rates or an increased number of incomplete entries. In this research, however, a small dropout rate (two students due to personal reasons) was observed as well as a high diary entry completion rate (98.3%).

263
Second, gaining tutors’ perspectives of students’ emotional experiences provided valuable insights and allowed a more comprehensive portrait of students’ affective lives to be generated than that which could be achieved by investigating students’ perspectives alone. For instance, investigating tutors’ perspectives was extremely useful in gaining a more in-depth understanding of tutors’ own role in helping manage and regulate students’ emotions during the online group activities. Furthermore, the idea that students can experience collective emotions was also highlighted by tutors. To the authors’ knowledge, this is one of the first research studies that has explored students’ emotions in online group learning from a tutor perspective.

Although valuable insights were gained from tutor views, it is important to acknowledge that many tutors found it difficult to judge students’ emotional experiences in assessed, online, group activities. This was primarily due to the to the reduced emotional richness afforded by the online learning context (e.g., lack of facial expressions, body positions, gestures, and voice intonations) as well as regulated emotional expression by students in these learning settings. These findings also have important methodological implications. For instance, exploring students’ emotions through analysing language and discourse features of online interactions during the group activities (e.g., sentiment analysis of online forum discussion data; Harley, 2015), may result in students’ regulated emotions being identified rather than their genuine emotions. These could significantly differ from one another (dependent on how strongly students regulate and control their emotional expression). It is, therefore, strongly advised that if such research approaches are used to gather data about students’ emotions in assessed, online, group activities, additional methods are also used to triangulate research findings. For example, this could include collecting self-report data from surveys or interviews.

Finally, this research project has highlighted the benefits of using a mixed methods approach when investigating students’ emotions in assessed, online, collaborative group activities. Although calls have been made for researchers to adopt such methodologies when exploring emotions in educational settings (e.g., Pekrun, 2016; Schutz et al., 2016; Pekrun and Linnenbrink-Garcia, 2014), to date, few studies have combined qualitative and quantitative approaches in online group learning contexts. In this research, a convergent mixed methods design was adopted, where data (both qualitative and quantitative) from three closely related studies were triangulated, and inferences merged,
so that a more complete understanding of students’ emotional experiences could be gained.

In summary, this research project has highlighted the value of using a mixed methods research design, employing online longitudinal data collection methods, as well as gathering data from multiple perspectives (e.g., student and tutor), when researching students’ emotions in online collaborative group learning contexts.

7.2.3 Implications for teaching practice

The findings of this research project have a number of important implications for teaching practice. Outlined below are recommendations aimed at reducing detrimental emotions and fostering beneficial emotions as well as creating a more emotionally supportive learning environment when undertaking assessed, online, group activities.

Recommendation 1: Educate staff and students about emotions and emotion regulation and how their behaviours can affect these

It is important that the staff involved in the design and delivery of online group activities, and the students themselves, are made more aware of the close links between emotions and learning. Being mindful of the types of emotions that may be experienced during these activities, their causes, and their potential impact on learning, achievement, and wellbeing is an important step in creating a more desirable and enjoyable learning climate. Furthermore, it is important to increase awareness about different emotion regulation strategies and healthier patterns of emotion management. For instance, guidance could be aimed at helping increase students’ knowledge of a broad range of adaptive emotion regulation strategies, as well as providing advice on the differences between regulating emotions in online learning environments and traditional, face-to-face learning settings. Due to the substantial inter-individual and intra-individual variability in the emotion regulation process (Gross, 2015; Lazarus & Folkman, 1984), it is important that learners are provided with knowledge of a wide range of emotion regulation and coping strategies that can be used in various situations during the collaborative tasks. They should also be discouraged from using emotion regulation strategies that are associated with maladaptive outcomes, such as avoidance strategies. Students could also be encouraged to believe that they can modify their emotions, and that this is something that is under their own control (Castella et al., 2017).
Making students and tutors aware of how their behaviours, actions, and emotions can influence others during the activities is also very important. For example, in this research, positive actions, such as providing encouragement, support and reassurance, were found to have beneficial effects (i.e., engendering favourable emotions), whereas negative actions, such as being abrupt, criticising, or not fully engaging in the activity, were found to have harmful consequences (i.e., evoking unfavourable emotions). In particular, students should be made aware (preferably before the activities begin) that a lack of engagement from other students will have no impact on their own achievement (this was found to be the leading cause of unpleasant emotions in this research). Students should be educated about the importance of communicating with other group members when they are not able to participate in the task. For instance, if they know they are unable to participate for aspects of the group task, then it is of great importance that they let the rest of the group know this as soon as they can. Ensuring tutors are provided with clear guidance on how to address issues of non-participation from students is essential.

Students and tutors should be aware of how their own implicit and explicit expression of emotions can influence others’ emotions. As highlighted by tutors in Study 3, emotions expressed by one individual (student or tutor) can also be transmitted to another individual. For instance, the enjoyment and excitement of a student or tutor can be ‘caught’ by other students during the group activities. It is, therefore, important that students and tutors monitor their own behaviour and emotional displays and ensure that they are promoting positive and encouraging messages throughout the activities. It may also be beneficial for students and staff to be educated on how to effectively communicate and express emotions and feelings online (particularly in text-based, asynchronous settings). For instance, this could include providing training to tutors about the type of language and tone of interaction they should use when introducing and discussing assessed, online, group activities with students, as well as providing ‘good practice’ examples (e.g., example emails and forum messages that could be sent to students).

There are various ways in which these recommendations could be implemented. For example, prior to the design (or re-design) of activities, staff could be provided with training and educational material about the importance of students’ emotions and emotion regulation when taking part in group activities. Such information could then be used to ensure that emotions are considered throughout the design process and activities are shaped in emotionally sound ways. Tutors could also ensure that students learn about the
importance of emotions and emotion regulation in the group activities before taking part. This could involve having a discussion in a tutorial session or getting students to complete a short activity about the role of emotions when learning in online groups and the ways in which students can manage and regulate their feelings.

Recommendation 2: Develop social trust and provide opportunities for interpersonal emotion regulation

Developing feelings of social trust and relatedness among students and tutors, as well as providing opportunities for students to regulate their emotions through social processes, are important for fostering a positive and supportive learning environment when undertaking assessed, online, group activities. As such, it is very important to promote a culture where students feel comfortable and safe seeking help from tutors and peers, as well as providing support and encouragement to their fellow learners.

To develop feelings of trust and relatedness, it is important to ensure that there are suitable opportunities for students to interact and get to know one another and their tutors before the group activities begin. For instance, this could include structured ice-breaker activities for students prior to the group activity starting (for each group) as well as the inclusion of non-assessed social and collaborative learning activities throughout the module using various communication methods (e.g., synchronous and asynchronous). Furthermore, it is important that opportunities for less formal interaction are provided to students, such as having ‘off-topic’ conversations or discussing non-course related subjects (Cherney et al., 2018). This could include using social media, such as creating a Facebook group or Instagram page where students can chat and share pictures and videos of their normal day to day lives. Such interaction may help encourage personal acquaintance and develop friendships and a sense of connection with their online classmates; thus, moving beyond the purely academic relationships which are more commonly experienced when learning online. To help foster connections with tutors, students could be asked to complete a ‘getting to know your tutor’ activity at the start of the module. The use of more emotionally rich communication modalities, such as videoconferencing in tutorial sessions and one-to-one phone calls, can also be ways to increase a sense of connection between tutors and students.
Ensuring that suitable opportunities are provided for students to discuss social and emotional issues with individuals in the learning community (e.g., fellow students, tutors, members of the student support team) is also important for supporting emotion regulation. As such it is important that there are a variety of spaces and channels to communicate with others. One approach that could be taken is to provide a specific space to students where they could discuss the emotions they are experiencing in relation to the group activity. Another suggestion would be to have students share and discuss their emotions about the group activity during a tutorial session before the start, or at the beginning, of the task (e.g., this could be achieved using an anonymous online poll so that student do not have to disclose their identities). Discussions could then be directed around how students feel they could manage their emotions and the importance of emotional disclosure and social support throughout the tasks. It is also important that a shared, or communal, regulation or coping orientation is emphasised during the group activities, where students are encouraged to communicate openly about their emotions (i.e., with their peers and tutors) and to develop cooperative strategies to deal with problems and reduce unpleasant emotions. Due to the difficulties for tutors ascertaining students’ emotions in online learning environments, tutors should take a proactive approach to identifying and supporting students who may experience increased unpleasant emotions and/or find it difficult to effectively regulate their feelings in the online group activities.

It is, therefore, crucial that tutors encourage students to disclose their feelings throughout these activities.

Recommendation 3: Enhance students’ confidence, feelings of control, and interest in the activity

Educators should aim to increase students’ self-confidence in relation to online group activities, particularly before they begin. Self-confidence can be augmented by focusing students’ attention on their strengths rather than their weaknesses. For instance, instead of worrying about their ability to complete the activity, students can be encouraged to think about their previous successes in assessments, as well as their high work rate and effort. Furthermore, providing students with clear guidance and instructions about the activity (e.g., details of how it will be assessed and worked examples from previous students) will help increase feelings of confidence and control and may help reduce
worries and anxieties. Such guidance could even be provided to students before the module begins (or at the very start), which would give plenty of time for students to ask any questions about the activity and gain any additional support that they may require. These suggestions may be of great benefit to those students who have mental health conditions, such as social anxiety.

Another suggestion to enhance students’ confidence is to share feedback from students who have previously undertaken the activities, describing their emotional journeys through the tasks (e.g., this could be in the form of short videos, blogs or even word-clouds similar to those reported in this thesis). Gaining such a perspective may help increase confidence and reduce anxieties and worries that students are experiencing in relation to collaborating with others. Students’ self-confidence could further be enhanced by linking group activities to prior tasks or activities that have already been undertaken in the module. For instance, at the start of a group activity, students could be asked to share work, or discuss a topic, that they had previously completed. This may help increase their confidence when interacting with others (e.g., due to increased prior knowledge). If students have little experience of working collaboratively in educational settings, the use of low-stakes group tasks (e.g., those that are not assessed) may help enhance confidence in working with others, increase social presence, and establish trust and a sense of connectedness between students. This could form part of a scaffolding process before students undertake an assessed, online, group activity.

In this research, various sources of unpleasant emotions were related to reduced feelings of control, often caused by limited flexibility and autonomy during the group activities. For instance, as highlighted in this research, students reported experiencing unpleasant emotions due to: working to others’ schedules; the difficulty of finding time to take part in the task (e.g., due to their current job); the activity being undertaken at an unsuitable time in the academic year; and the functionality of certain technologies and communication modalities. Although it is not possible to fully address all issues related to reduced feelings of control when undertaking online group activities, there are a number of steps that can be taken. For instance, students could be given more choice over how they communicate and collaborate with other students. This could include working outside institutional platforms, such as using Facebook or WhatsApp. Another consideration is the timing of the activity. Numerous students highlighted that activities planned over holiday periods or periods of high workload (e.g., when assessments were
due in for other modules) reduced their ability to spend time on the tasks. Ensuring that activities are placed at suitable time points of the module will help increase students’ feelings of control over their learning. The length of the activity should also be appropriate, to ensure that students are given enough time to collaborate with their group. Collaborative activities that are completed over a short period of time (e.g., one or two weeks) may not be suitable for distance learning contexts. The workload of the activity is another consideration. Overly demanding tasks may cause emotions such as confusion and frustration, which could ultimately lead to boredom or anxiety if tasks are too difficult to complete. By contrast, tasks that are too easy, may evoke boredom from the start.

Enhancing students’ interest in the group activities is another important recommendation for educators. For instance, in this research, learning activities perceived as interesting and valuable evoked more pleasant feelings in students, whilst activities perceived as uninteresting and as having no personal value led to more unpleasant emotions. One approach to enhance student interest is to ensure that activities are meaningful, personally relevant, and have clear connections with students’ everyday lives (such activities are often referred to as ‘authentic activities’; Oliver et al., 2007). This can be achieved by ensuring that activities offer useful practice of skills and ways of working that will be relevant for students’ future employment (Evans & Galley, 2016). Ensuring students are provided with detail and explanation about why group activities are an important and mandatory aspect of some modules may also increase their awareness of the value of such tasks (Robinson, 2013).

Overarching recommendation: Ensure activities are well designed and of a high quality

An overarching recommendation is to ensure that assessed, online, group activities are designed to a high standard. As evidenced throughout this thesis, the design of the activities can significantly influence students’ emotional experiences. The importance of good design is also implied in many of the recommendations already provided throughout this section, for instance, ensuring that:

- staff and students are encouraged to behave and communicate in a positive and supportive manner (see Recommendation 1)
- the task topic is meaningful and interesting (see Recommendation 3)
- clear task instruction and guidance is provided (see Recommendation 3)
• the activity is moderately challenging and of a suitable workload (see Recommendation 3)
• the activity is placed at a suitable time point in the module and is of an appropriate length (see Recommendation 3)
• there are opportunities for students to interact with, and get to know, one another and their tutor (see Recommendation 2)
• students have flexibility and choice over how they communicate and collaborate (e.g., using a variety of communication platforms) (see Recommendation 3)

The incorporation of technological tools aimed at helping enhance emotional awareness and regulation in group learning settings may also be beneficial (see Järvelä et al., 2016, for an overview). These technological instruments can increase students’ awareness of their own emotions and prompt different ways in which they can be regulated. They can also help increase tutors’ awareness of students’ emotions, which can help tutors make quick responses and apply timely interventions.

Previous research has also highlighted the importance of having a clear end to activities. A failure to achieve ‘closure’ after completion of collaborative learning activities can lead to extended ‘unsettled feelings’ (Melrose & Bergeron, 2007). Encouraging students to share with others what they have learned, and providing students with the opportunity to reflect on their experiences, may help bring about closure. This in turn may allow students to express pleasant emotions associated with closure.

7.3 Limitations and future directions

This research has provided a wealth of information about students’ emotional experiences when undertaking assessed, online, group activities in naturalistic settings. However, as with any research, there are a number of limitations that should be deliberated when evaluating the findings of this work. Consideration of such limitations will help plan future research in this nascent field of inquiry.

Study design

The specific research designs employed in this research were also a limiting factor. Two of the three empirical studies employed cross-sectional research approaches (Study 1 and
Study 3), gathering data at one point in time. As highlighted previously in this thesis, such designs increase issues of memory decay and retrospective bias (Bartlett & Milligan, 2015; Mann, 2003). It is, therefore, important that future research employ longitudinal research designs where repeated measures can be taken throughout the collaborative tasks. For example, Study 2 used an online diary to capture the dynamic and fluctuating nature of students’ emotions. One concern that researchers may have when using an online diary is the potential for large dropout rates or an increased number of incomplete entries. However, Study 2 had a low dropout rate (two students withdrew from the study due to personal reasons) and a high diary entry completion rate (98.3%). There may be a number of reasons for such a high retention and completion rate. These may include: the rapport built with participants before and in the early stages of the research (built up through email communication); the style of the online diary (there was a mix of closed-ended and short open-ended questions); the relatively short time needed to complete each entry (it was estimated that each entry could be completed in 5-10 minutes); the importance and value of the topic being explored (it appeared that many students were interested in discussing their emotional experiences of the group activity); the pacing of diary entries (each entry was separated by at least one week); and the longer time window available for students to complete each entry (students had 48 hours to complete each entry).

Another longitudinal approach that could be employed is the use of the experience sampling method (Goetz et al., 2016). For instance, Beirne (2020) used this approach to examine the emotions of students’ when undertaking a Mass Open Online Course (MOOC) by embedding surveys into the course platform at multiple time points. Online ethnography (Antoniadou & Dooley, 2017) could also be used to gain an in-depth understanding of students’ emotional experiences over a longer duration of time.

**Sampling considerations**

Each of the three studies included in this project used courses that were purposefully sampled and participants that were self-selected. This led to each study having a greater percentage of female participants in comparison to males and, in general, low response rates. Trying to ensure more representative samples is an important consideration in future research.
Assessment of emotion and emotion regulation

Another limitation of this research was its reliance on self-report data. Although self-report has many advantages, these methods do have a number of major disadvantages (as highlighted in Section 3.5). Due to such limitations, it is important that future research complement self-report with other approaches, such as online ethnography or observation. The use of such methods can, however, be extremely challenging in online learning contexts. Therefore, if this is not possible, it is recommended that multiple self-report methods are employed, and data triangulated to generate more comprehensive findings.

Emotions investigated

In this research project, two types of response formats were used to investigate emotions. In Study’s 1 and 3, a free-response format was adopted. This allowed participants to respond with freely chosen labels or short expressions that they thought best characterised the nature of the emotions they had experienced. Although this approach has a number of advantages, such as being able to provide fine-grained detail and specificity of the emotions experienced (Scherer, 2005), it does have numerous disadvantages. For instance, individuals who rarely label or communicate their emotions may find this process difficult. Furthermore, the vocabulary used to describe emotions may vary significantly between individuals. In this research, for instance, it was found that students used a plethora of words to describe their emotions, including terms that are considered to represent other kinds of psychological conditions. Ultimately, this type of response format often generates a large number of different emotion labels and a low number of responses per label (Scherer, 2005). This makes it difficult to interpret the prevalence and importance of different emotions.

In Study 2, a fixed response format (5-point Likert-type response scale) was employed to investigate a pre-defined set of emotions. One problem with this approach is that the listed emotions may influence participants’ responses (i.e., by suggesting emotions that may not have otherwise been chosen). Alternatively, if a participant wants to respond using an emotion not provided, this may force them to choose the category that most resembles
their feelings, or, if provided, select an ‘other’ response option. The specificity of the data will suffer in both instances. Using a pre-defined list of emotions may also neglect other important emotions. For instance, in Study 2, socially related emotional states (e.g., empathy, sympathy, resentment, and admiration) were not included in the pre-defined list. These types of emotions may have important functions in these learning contexts. It is suggested that future inquiry in this field considers what mental phenomena should be considered an emotion. For instance, in Pekrun's (2006) CVT, boredom and confusion are classified as emotional states. However, whether these psychological conditions meet all of the criteria to be categorised as emotions has been questioned (Eliot & Hirumi, 2019).

Level of analysis

As with most emotion research in educational settings, this research project primarily explored emotion and emotion regulation at an individual level. It is, however, also important to consider that emotions in social contexts may also emerge at collective level (Goldenberg et al., 2020; Järvenoja et al., 2019; Smith et al., 2007). It is also important to consider that students’ emotions may also lead to other collective processes (Goldenberg et al., 2020). For example, emotion regulation at a socially shared level has been shown to occur where group members actively work together in synchrony to regulate their own and each other’s emotions (Goldenberg et al., 2016; Järvenoja & Järvelä, 2013; Rogat & Linnenbrink-Garcia, 2011). Therefore, an important direction for future research, is to begin investigating students’ emotional experiences (as well as other related collective processes) in group learning at a macro-level, moving beyond typical individual level, or micro-level, exploration (Pekrun, 2016).

Research context

All three studies that comprise this research project were undertaken at the OU and used relatively similar types of assessed, online, group activities. It is important that future work explores broader research settings, such as: other academic institutions (e.g., including blended or traditional teaching and learning contexts); different types of online collaborative learning activities (e.g., online problem-based learning or non-assessed collaboration); and in different socio-cultural contexts. The more research that is
undertaken in different learning environments and with different groups, the more it will become possible to discover commonalities or differences in students’ emotional experiences.

**Additional directions for future research**

In addition to the suggestions provided above, future research should aim to specifically investigate extrinsic emotion regulation in these learning settings. This study, like most in educational contexts, explored emotion regulation from an intrinsic perspective (i.e., how a student regulates his or her own emotions). However, in social learning environments, individuals may have the intention of regulating others’ emotions. Understanding *how* and *why* both students and tutors undertake such extrinsic emotion regulation practices will be extremely beneficial.

Another important line of future inquiry is to explore the perspectives of individuals other than the students. For instance, this study gained fascinating insights about students’ emotional experiences by investigating the perspectives of tutors. It is thought that by exploring the views of other individuals important in students’ emotional experiences (e.g., family and friends) further insights can be drawn (e.g., about their role in helping students regulate and manage their emotions).

One further direction for future research is to investigate the change in emotional experiences over time within individual students, rather than grouping all student data together. Emotional experiences are highly individualised and can vary substantially between people. For instance, the emotions experienced by one student in a specific situation may be vastly different to those of another student. As such, in addition to investigating emotional experiences at a whole-group level, it is important that the individual uniqueness of emotions is also explored.

### 7.4 Conclusion

This thesis has explored students’ emotional experiences in assessed, online, group activities. In doing so, it has made an essential and original contribution to the emerging field of emotions in social online learning and substantially advanced current knowledge and understanding in this underexplored research area. From this research, it is evident
that emotions are ubiquitous in these learning activities and these psychological phenomena can have profound impacts on students’ engagement, achievement, and wellbeing. It is hoped that the findings of this research can be used from both an applied perspective, aiding partitioners in the development of more affectively sound and supportive learning environments, as well as serve as a platform to stimulate new and exciting research in this nascent field.
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Appendix A – Study 1 ethical approval

Human Research Ethics Committee (HREC)

From: Dr Duncan Banks
The Open University Human Research Ethics Committee

Email: duncan.banks@open.ac.uk
Ext: (5) 59198

To: Jake Hillard, Institute of Educational Technology

Project title: Students’ emotional experiences in assessed, online, collaborative projects.

HREC ref: HREC/2018/2773/Hillard
Date application submitted: 18/02/18
Date of HREC response: 21/02/18

This memorandum is to confirm that the research protocol for the above-named research project, as submitted for ethics review, has been given a favourable opinion by the Open University Human Research Ethics Committee.

Please note the following:

1. You are responsible for notifying the HREC immediately of any information received by you, or of which you become aware which would cast doubt on, or alter, any information contained in the original application, or a later amendment which would raise questions about the safety and/or continued conduct of the research.

2. It is essential that any proposed amendments to the research are sent to the HREC for review, so they can be recorded and where required, a favourable opinion given prior to any changes being implemented (except only in cases of emergency when the welfare of the participant or researcher is or may be affected).

3. Please include your HREC reference number in any documents or correspondence. It is essential that it is included in any publicity related to your research, e.g. when seeking participants or advertising your research so it is clear that it has been reviewed by HREC and adheres to OU ethics review processes.

4. You are authorised to present this memorandum to outside bodies such as NHS Research Ethics Committees in support of any application for future research clearance. Also, where there is an external ethics review, a copy of the application and outcome should be sent to the HREC.

5. OU research ethics review procedures are fully compliant with the majority of grant awarding bodies and where they exist, their frameworks for research ethics.

6. At the end of your project, you are required to assess your research for ethics related issues and/or major changes. Where these have occurred you will need to provide the Committee with a HREC final report to reflect how these were dealt with using the final report template on the research ethics website - [http://www.open.ac.uk/research/ethics/human-research/full-review-process-and-proforma/final_report](http://www.open.ac.uk/research/ethics/human-research/full-review-process-and-proforma/final_report)

Best regards,

Dr Duncan Banks
The Open University Human Research Ethics Committee

www.open.ac.uk/research/ethics/

November 2017
Appendix B – Study 2 (pilot study) ethical approval

Dear Jake

The HREC Chair has assessed your research proposal as not requiring an ethics review and below is our standard email confirming this. If you have any queries, please get in contact and we hope your research goes very well.

Project title: Student emotion and emotion regulation in an assessed, online, collaborative project: A diary-based study (HREC ref: HREC2018/2806/Hilliard)

Date application submitted: 22/02/2018 HREC response date: 14/03/2018

This message confirms that the research protocol for the above-named research project has been assessed by the Open University Human Research Ethics Committee and does not require an ethics review.

It is important that you note the following:

1. You are responsible for notifying the HREC immediately of any information received by you, or of which you become aware, which would cast doubt on or alter information in your original HREC application - to ensure your continued safety and the good conduct of the research.
2. Researchers should have discussed any project related risks with their Line Manager and/or Supervisor, to ensure that all relevant checks have been made and permissions are in place prior to a project commencing, for example - compliance with IT security and General Data Protection Regulations (GDPR).
3. Researchers need to read and adhere to relevant OU policies and guidance, in particular the Ethics Principles for Research involving Human Participants and the Code of Practice for Research - http://www.open.ac.uk/research/ethics/
4. The Open University’s research ethics review procedures are fully compliant with the majority of research councils, professional organisations and grant awarding bodies research ethics guidelines. Where you have applied for an external ethics review, e.g., Health Research Authority (HRA), you should provide the HREC with a copy of the application and the outcome, to ensure compliance with OU research ethics review - http://www.open.ac.uk/research/ethics/human-research/collaborations.

Sent on behalf of the Human Research Ethics Committee

Professor Louise Westmarland Dr Duncan Banks Dr Claire Hewson
Chair Deputy Chair Deputy Chair
Dear Jake

This message confirms that the research protocol for the following research project, as submitted for ethics review, has been given a favourable opinion on behalf of The Open University Human Research Ethics Committee via Chair’s Action.

Project title: Student emotion and emotion regulation in an assessed, online, collaborative project: A diary-based study (HREC ref: HREC/3144/Hilliard)

HREC approval date: 30/01/2019

As part of your favourable opinion, it is essential that you are aware of and comply with the following:

1. You are responsible for notifying the HREC immediately of any information received by you, or of which you become aware which would cast doubt on, or alter, information in your original application, in order to ensure your continued safety and the good conduct of the research.

2. It is essential that you contact the HREC with any proposed amendments to your research, for example - a change in location or participants. HREC agreement needs to be in place before any changes are implemented, except only in cases of emergency when the welfare of the participant or researcher is or may be affected.

3. Your HREC reference number has to be included in any publicity or correspondence related to your research, e.g., when seeking participants or advertising your research, so it is clear that it has been agreed by the HREC and adheres to OU ethics review processes.

4. Researchers should have discussed any project-related risks with their Line Manager and/or Supervisor, to ensure that all the relevant checks have been made and permissions are in place, prior to a project commencing, for example compliance with IT security and Data protection regulations.

5. Researchers need to have read and adhere to relevant OU policies and guidance, in particular the Ethics Principles for Research with Human Participants and the Code of Practice for Research - [http://www.open.ac.uk/research/ethics/](http://www.open.ac.uk/research/ethics/)

6. The Open University’s research ethics review procedures are fully compliant with the majority of research council, professional organisations and grant awarding bodies research ethics guidelines. Where required, this message is evidence of OU HREC support and can be included in an external research ethics review application. The HREC should be sent a copy of any external applications, and their outcome, so we have a full ethics review record.

7. At the end of your project you are required to assess your research for ethics related issues and/or any major changes. Where these have occurred you will need to provide the Committee with a HREC final report to reflect how these were dealt with using the template on the research ethics website - [http://www.open.ac.uk/research/ethics/human-research/full-review-process](http://www.open.ac.uk/research/ethics/human-research/full-review-process) (HREC Final Report form)

Sent on behalf of the Human Research Ethics Committee

Professor Louise Westmarland  Dr Duncan Banks  Dr Claire Hewson

Chair  Deputy Chair  Deputy Chair
Appendix D – Study 3 ethical approval

Human Research Ethics Committee (HREC)

From: Dr. Duncan Banks
The Open University Human Research Ethics Committee

Email: duncan.banks@open.ac.uk
Extension: (5) 59196
To: Jake Hillard, IET

Project title: Tutor perspectives of students' emotional experiences in assessed, online, collaborative projects.

HREC ref: HREC/2018/2786/Hillard
Date application submitted: 09/02/18
Date of HREC response: 18/02/18

Memorandum

This memorandum is to confirm that the research protocol for the above-named research project, as submitted for ethics review, has been given a favourable opinion by Chair’s action by the Open University Human Research Ethics Committee.

Please note the following:

1. You are responsible for notifying the HREC immediately of any information received by you, or of which you become aware which would cast doubt on, or alter, any information contained in the original application, or a later amendment which would raise questions about the safety and/or continued conduct of the research.

2. It is essential that any proposed amendments to the research are sent to the HREC for review, so they can be recorded and where required, a favourable opinion given prior to any changes being implemented (except only in cases of emergency when the welfare of the participant or researcher is or may be affected).

3. Please include your HREC reference number in any documents or correspondence. It is essential that it is included in any publicity related to your research, e.g. when seeking participants or advertising your research so it is clear that it has been reviewed by HREC and adheres to OU ethics review processes.

4. You are authorised to present this memorandum to outside bodies such as NHS Research Ethics Committees in support of any application for future research clearance. Also, where there is an external ethics review, a copy of the application and outcome should be sent to the HREC.

5. OU research ethics review procedures are fully compliant with the majority of grant awarding bodies and where they exist, their frameworks for research ethics.

6. At the end of your project, you are required to assess your research for ethics related issues and major changes. Where these have occurred you will need to provide the Committee with a HREC final report to reflect how these were dealt with using the final report template on the research ethics website - http://www.open.ac.uk/research/ethics/human-research/full-review-process-and-proforma#final_report

Best regards

Dr. Duncan Banks, The Open University Human Research Ethics Committee

www.open.ac.uk/research/ethics/ November 2017
Appendix E – Details of assessed, online, group activities used in this research project

<table>
<thead>
<tr>
<th>Module</th>
<th>OU level* and credits</th>
<th>Faculty</th>
<th>Number of students registered at the start of module</th>
<th>Description of group task</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computing</td>
<td>Level 2, 60 credits</td>
<td>STEM</td>
<td>453 (2017/18)</td>
<td>Students were required to work in teams of between 6-8 students to undertake an 8-week group project. This primarily involved designing and building a website (using WordPress) for a specific ‘client’ (e.g., a family-friendly hotel or a community theatre) and producing a wiki resource about online communication.</td>
<td>This assignment contributed 20% of the overall module grade. A student’s overall mark for the project was made up of individual and group marks from the creation of the website (50% of overall mark) and wiki resource (40% of overall mark); and there was a further split into marks awarded for the product (wiki and website) and process (e.g., peer feedback on the wiki and collaboration in the forum). Students are also required to write a very short reflective report (10% of overall mark) on the collaboration involved in the project.</td>
</tr>
<tr>
<td>History and Literature</td>
<td>Level 1, 60 credits</td>
<td>WELS</td>
<td>Cohort 1 (September start): 1680 (2017/18) Cohort 2 (January start): 475 (2017/18)</td>
<td>Students worked in groups of up to 10 to undertake a 3-week collaborative activity. This task required students to explore the issue of work in mid-nineteenth-century Britain, using a combination of literary and historical texts, and to create a collaborative piece of work of up to 1000 words (using a wiki).</td>
<td>This assignment contributed 7.5% of the overall module grade. A student’s overall mark for this assignment was made up of a group mark (40% of overall mark), awarded for the group’s finished piece of work. A further 20% of the marks were available for each student’s individual response to the question ‘How well have I worked co-operatively with others?’ The remaining 40% of the assignment comprised of a 500-word individual piece of written work.</td>
</tr>
<tr>
<td>Cell biology</td>
<td>Level 2, 30 credits</td>
<td>STEM</td>
<td>736 (2017/18)</td>
<td>Students were required to work in small groups (typically between 3-6) to undertake a 3-week collaborative activity. The activity involved each group working together to produce a wiki (no more than 1000 words) about a specific neurodegenerative disease (Parkinson’s disease, Huntington’s disease or Alzheimer’s disease).</td>
<td>This assignment contributed 25% of the overall module grade. A student’s overall assessment mark consisted of answering two questions. Question 1 (50% of overall mark) was an individual essay. Question 2 was split into two parts. Part A was the group activity (35% of overall mark). This mark was made up from the final summary wiki, individual contribution to wiki, reflection on contribution, and evidence of collaboration and contribution to the activity. Part B (15% of overall mark) was an individually written description (no more than 300 words) of how protein aggregation is a feature of all three of the neurodegenerative diseases investigated in the group activity.</td>
</tr>
<tr>
<td>Business</td>
<td>Level 2, 60 credits</td>
<td>FBL</td>
<td>346 (2017/18)</td>
<td>Students were required to work in small groups of 4 to 6 students for a 4-week period. Initially, this involved researching what it might be like to work in business organisations and creating a list of criteria that students think are important in a workplace or a career. Students then used the information generated by the group task to research an organisation and write a 2000-word report. Additionally, each student peer reviewed two other students work.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>International development:</td>
<td>Level 2, 60 credits</td>
<td>FASS</td>
<td>279 (2017/18)</td>
<td>Students worked together in small groups (between 4-6) for 4-week period to produce a report in relation to UK government policy on biofuels. The report was generated in one of the following forms: a short-written paper; PowerPoint presentation; audio-visual podcast; or a combined audio-visual podcast and PowerPoint. This assignment contributed 15% of the overall module grade. This was split into two parts. The first was for student participation in the group process (40% of overall marks). This mark was made up from: students’ responses to questions; input into organising the online group work; and contribution to agreeing the group criteria list. The second was for the final report and feedback provided on other students (60% of overall marks). Students were marked on the following: quality and relevance of research and of resources that were used to analyse the organisation in the final report; the use of relevant module concepts in the final report; the quality of feedback to colleagues; and how well feedback from other students was used in the final report.</td>
<td></td>
</tr>
<tr>
<td>Physics and astronomy</td>
<td>Level 2, 30 credits</td>
<td>STEM</td>
<td>164 (2017/18)</td>
<td>Students were required to work in teams of up to 10 for an 8-week period to produce a scientific report based around the modelling processes in the Earth's atmosphere. Each team was sub-divided into three smaller specialist teams - one team carried out experiments, one completing mathematical modelling and one undertook a literature survey. The overall end of module assessment score was based on the production of a scientific report. As a group, students wrote the core/main body (methods, results, discussion) of the report together. This was worth 25% of the overall mark. Individually, students then wrote an abstract and introduction (30% of overall mark), conclusion (30% of overall mark), and a personal reflection of working in a team (15% of overall mark).</td>
<td></td>
</tr>
</tbody>
</table>

*OU level 1 = 1st year of undergraduate degree; OU level 2 = 2nd year of undergraduate degree.*
Appendix F – Online survey

Welcome! Students' emotional experiences in the [module description]

This survey is aimed at exploring the emotions that [module] students may have experienced when undertaking the [module description].

The term 'emotion' will refer to any short-term feelings you may have experienced in relation to the collaborative activity you undertook, such as enjoyment, anxiety, happiness, and frustration. The term 'emotion regulation' refers the ways in you tried to regulate, or manage, your emotions in the collaborative activities. For instance, this could the include the ways in which you tried to decrease, increase, or maintain the frequency, intensity, or duration of your emotions'. Understanding both the pleasant emotions and unpleasant emotions experienced will be extremely beneficial to this study.

Your participation in the survey is voluntary. All of your responses will be kept confidential, and anonymity will be ensured. Your decision on whether to participate will have no effect on any aspect of your module or university study. You are free to withdraw at any time during this study and request the destruction of any data that has been gathered from you, up to the point at which data are aggregated for analysis (approximate date: 03/04/18).

Please click on the 'Next' button below to continue, and where available use the 'Back' button in the questionnaire to navigate back through the questionnaire.

If you have any technical difficulties completing this survey, please email the Survey Team: surveys@open.ac.uk or telephone them on +44 (0)1908 652422/652423.

Please note: this survey has been designed for use on a desktop or laptop computer, therefore we cannot guarantee full accessibility via a handheld device.

Data Protection Information:

Any information you provide us with will be treated in the strictest confidence in accordance with the Data Protection Act and used only by Open University staff as part of this research.

This project is administered under the Open University's general Data Protection policy guidelines.
By taking part in this survey, you are indicating that you give your permission for the data collected to be recorded and used in an anonymous form in any written reports and publications relating to this study.

- I am willing to take part in this research, and I give my permission for the data collected to be used in an anonymous form in any written reports, presentations and published papers relating to this study.

- I am not willing to take part in this research.

---

Examples of different emotions:

Enjoyment, Frustration, Pride, Anger, Excitement, Anxiety, Surprise, Disappointment, Relief, Insecurity, Challenged, Isolation, Gratitude, Alienation, Hope, Inadequacy, Happiness, Guilt, Helplessness, Curiosity, Irritation, Annoyance, Admiration, Overwhelmed, Sympathy Comfort, Engaged, Devalued, Sadness, Valued, Confusion, Supported, Fear, Dissatisfaction, Calmness, Shame, Disgust, Satisfaction, Boredom, Empathy, Belonging, Embarrassment, Unsupported, Regret
Q1 What were the dominant emotions you experienced before, during and after the module description online collaborative activity?
(Please list up to three emotions for each stage and place them in order of their dominance. These can be from the list provided above or other emotions that you have experienced)

<table>
<thead>
<tr>
<th></th>
<th>1st Most dominant (1)</th>
<th>2nd Most dominant (2)</th>
<th>3rd Most dominant (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before the module description</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During the module description</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After the module description?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please add any additional / explanatory comments below:

_________________________________________________________________________________________

_________________________________________________________________________________________

Q2 Can you state the main pleasant emotions that you experienced (if any) and explain their causes...
(These can be from the list provided above or other emotions that you have experienced)

Before the module description?
_________________________________________________________________________________________

_________________________________________________________________________________________

_________________________________________________________________________________________
Q2 Can you state the main pleasant emotions that you experienced (if any) and explain their causes...
(These can be from the list provided above or other emotions that you have experienced)

Before the \{module description}\?


During the \{module description}\?


After the \{module description}\?


Q3 Can you state the main unpleasant emotions that you experienced (if any) and explain their causes...
(These can be from the list provided above or other emotions that you have experienced)

Before the \{module description}\?


During the (module description)?

_________________________________________________________________________________

_________________________________________________________________________________

_________________________________________________________________________________


After the (module description)?

_________________________________________________________________________________

_________________________________________________________________________________

_________________________________________________________________________________

Q4 Do you think that the emotions you experienced in the (module description) had an impact on how you...

<table>
<thead>
<tr>
<th>Yes, definitely (1)</th>
<th>Yes, somewhat (2)</th>
<th>Not sure (3)</th>
<th>No, not really (4)</th>
<th>No, definitely not (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participated (i.e., your engagement with others and your work on the activity)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performed (i.e., your overall achievement)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please add any additional / explanatory comments below:

_________________________________________________________________________________

_________________________________________________________________________________
Q5 Can you state the emotions (if any) that had the biggest impact on how you participated (i.e., your engagement with others and your work on the activity) and how you performed (i.e., your overall achievement in the (module description))? (These can be from the list provided above or other emotions that you have experienced)

Please try and explain how these impacted your participation and/or performance.

Emotions that had a positive/beneficial impact:

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Emotions that had a negative/detrimental impact:

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Q6 Do you feel that you were able to effectively regulate, or manage, the emotions you experienced in the (module description)?

☐ Yes, definitely (1)

☐ Yes, somewhat (2)

☐ Not sure (3)

☐ No, not really (4)

☐ No, definitely not (5)
Please add any additional / explanatory comments below:


Q7 Can you explain what you did to try and regulate, or manage, the emotions you experienced in the {module description}?


Thank you Thank you for your responses.

Please click on the 'Next' button below to ensure all of your responses are recorded.

You will then be redirected to The Open University website where you can either just close the browser window or continue using the website.
Appendix G – Online diary (entry 3)

Stage of the S294 collaborative activity

Please select the statement that best describes where you currently are in the group activity: * Required

- Haven't looked at the group activity yet
- Preparing for the activity (e.g. by reading instructions)
- Interacting with other group members and deciding who does what in the sub-group
- Carrying out individual research, identifying a scientific paper, and posting to the wiki
- Combining information into the final wiki table
- Reading summary wiki tables of each disease and answering TMA 04, Question 2
- Finished all aspects of the group activity

Emotions in relation to the S294 collaborative activity

This part of the survey uses a table of questions, view as separate questions instead?

In relation to the S294 collaborative activity, I am currently experiencing...

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frustration</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Relief</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Disappointment</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Curiosity</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Anxiety</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Excitement</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Hope</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Dissatisfaction</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Anger</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Confusion</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Cause of pleasant emotion

Since your last diary entry, can you think of one occasion when you experienced a pleasant emotion in relation to the S294 collaborative activity and select the emotion you experienced? (This can be from the list provided or another pleasant emotion you have experienced)

If you have not experienced any pleasant emotions in relation to the S294 collaborative activity since your last diary entry, please select 'No pleasant emotions experienced'.

Pleasant emotion experienced:

- Excitement
- Enjoyment
- Satisfaction
- Relief
- Curiosity
- Hope
- Happiness
- Pride
- Surprise
- Other
- No pleasant emotions experienced

Cause of pleasant emotion

Can you describe what caused you to experience this pleasant emotion on this occasion? *

Required
Impact of pleasant emotion on participation

Do you feel this pleasant emotion had an impact on how you participated in the collaborative activity (e.g. how much effort you put into the task or how you communicated with your fellow group members)?  *Required

- Not at all
- Very little
- Somewhat
- Quite a bit
- A great deal

Impact of pleasant emotion on participation

How did this pleasant emotion impact your participation in the collaborative activity? (please select all that apply)  *Required

- I posted more in the forums (or in other communications methods used)
- I didn’t post as much in the forums (or in other communications methods used)
- I tended to initiate discussions
- I mostly responded to messages sent from others but did not initiate discussions
- I felt confident in expressing my thoughts and opinions to the group
- I didn’t feel I could express my thoughts and opinions to the group
- I increased my effort and tried harder in the collaborative activity
- I reduced my effort and didn’t try as hard in the collaborative activity
- I made more effort to support other group members
- I made less effort to support other group members
- I took more of a leadership role
- I left others to take the lead
- I did more of the work by myself
- I didn’t contribute to the tasks as much
- I took on some tasks that were outside of my comfort zone
- I only took on tasks that I was fully confident with
- Other
Regulation of pleasant emotion

Did you try and regulate, or manage, your feelings of this pleasant emotion in any way? For instance, you may have tried to increase, decrease, prolong, or remove these feelings.

- Not at all
- Very little
- Somewhat
- Quite a bit
- A great deal

Regulation of pleasant emotion

How did you attempt to regulate, or manage, this pleasant emotion? Did you use any specific strategies?

Why did you try and regulate, or manage, the feelings of this pleasant emotion? What was the goal of doing this?
Cause of unpleasant emotion

Since your last diary entry, can you think of one occasion when you experienced an unpleasant emotion in relation to the S294 collaborative activity and select the emotion you experienced? (this can be from the list provided or another unpleasant emotion you have experienced)

If you have not experienced any unpleasant emotions in relation to the S294 collaborative activity since you last diary entry, please select 'No unpleasant emotions experienced'.

Unpleasant emotion experienced:

- Anxiety
- Frustration
- Dissatisfaction
- Disappointment
- Confusion
- Anger
- Insecurity
- Boredom
- Guilt
- Other
- No unpleasant emotions experienced


Cause of unpleasant emotion

Can you describe what caused you to experience this unpleasant emotion on this occasion?


Impact of unpleasant emotion on participation

Do you feel this unpleasant emotion had an impact on how you participated in the collaborative activity (e.g., how much effort you put into the task or how you communicated with your fellow group members)? * Required

- Not at all
- Very little
- Somewhat
- Quite a bit
- A great deal

---

Impact of unpleasant emotion on participation

How did this unpleasant emotion impact your participation in the collaborative activity? (please select all that apply) * Required

- I didn’t post as much in the forums (or in other communications methods used)
- I posted more in the forums (or in other communications methods used)
- I mostly responded to messages sent from others but did not initiate discussions
- I tended to initiate discussions
- I didn’t feel I could express my thoughts and opinions to the group
- I felt confident in expressing my thoughts and opinions to the group
- I reduced my effort and didn’t try as hard in the collaborative activity
- I increased my effort and tried harder in the collaborative activity
- I made less effort to support other group members
- I made more effort to support other group members
- I left others to take the lead
- I took more of a leadership role
- I didn’t contribute to the tasks as much
- I did more of the work by myself
- I only took on tasks that I was fully confident with
- I took on some tasks that were outside of my comfort zone
- Other
Regulation of unpleasant emotion

Did you try and regulate, or manage, your feelings of this unpleasant emotion in any way? For instance, you may have tried to increase, decrease, prolong, or remove these feelings.

- Not at all
- Very little
- Somewhat
- Quite a bit
- A great deal

Regulation of unpleasant emotion

How did you attempt to regulate, or manage, this unpleasant emotion? Did you use any specific strategies?


Why did you try and regulate, or manage, the feelings of this unpleasant emotion? What was the goal of doing this?


Appendix H – Online diary (entry 5)

Page 1: Stage of the S294 collaborative activity

Please select the statement that best describes where you currently are in the group activity:  ★

Required

- Haven't looked at the group activity yet
- Preparing for the activity (e.g. by reading instructions)
- Interacting with other group members and deciding who does what in the sub-group
- Carrying out individual research, identifying a scientific paper, and posting to the wiki
- Combining information into the final wiki table
- Reading summary wiki tables of each disease and answering TMA 04, Question 2
- Finished all aspects of the group activity

Page 2: Diary entry 5 information

This diary entry will focus on your overall emotional experiences in the S294 collaborative activity. Questions will, therefore, relate to the emotions you may have experienced before, during and after the collaborative task.

Please press 'Next' to continue.
Page 3: Overall emotions in relation to the S294 collaborative activity

This part of the survey uses a table of questions. view as separate questions instead?

Overall, in relation to the S294 collaborative activity, I experienced...

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disappointment</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Curiosity</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Frustration</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Hope</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Anxiety</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Dissatisfaction</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Excitement</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Confusion</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Relief</td>
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<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Anger</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Page 4: Cause of pleasant and unpleasant emotions

Overall, what were the main causes of pleasant emotions in the S294 collaborative activity? Please explain your answer in the space below. * Required

Overall, what were the main causes of unpleasant emotions in the S294 collaborative activity? Please explain your answer in the space below. * Required
Page 5: Impact of pleasant and unpleasant emotions on participation

This part of the survey uses a table of questions, view as separate questions instead?

Overall, in relation to the S294 collaborative activity, to what extent did **pleasant emotions** (e.g. enjoyment, curiosity, relief, excitement, hope) have a...

<table>
<thead>
<tr>
<th></th>
<th>None at all</th>
<th>To a small extent</th>
<th>To a moderate extent</th>
<th>To a great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive impact on your participation in the activity</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Negative impact on your participation in the activity</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

This part of the survey uses a table of questions, view as separate questions instead?

Overall, in relation to the S294 collaborative activity, to what extent did **unpleasant emotions** (e.g. anxiety, frustration, disappointment, confusion, anger) have a...

<table>
<thead>
<tr>
<th></th>
<th>None at all</th>
<th>To a small extent</th>
<th>To a moderate extent</th>
<th>To a great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive impact on your participation in the activity</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Negative impact on your participation in the activity</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Page 6: Impact of pleasant and unpleasant emotions on participation

This part of the survey uses a table of questions. [view as separate questions instead]

What impact did the following emotions have on your participation in the S294 collaborative activity? If an emotion had both a positive and negative impact, select both ‘Positive impact’ and ‘Negative impact’ options.

<table>
<thead>
<tr>
<th>emotion</th>
<th>Positive impact</th>
<th>Negative impact</th>
<th>No impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hope</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Disappointment</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Anxiety</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Dissatisfaction</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Excitement</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Anger</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Frustration</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Curiosity</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Confusion</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Relief</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

If you have any other comments about how pleasant and/or unpleasant emotions impacted your participation in the S294 collaborative activity, please use the space below.
Page 7: Regulation of pleasant and unpleasant emotions

Overall, do you feel that you were able to effectively regulate, or manage, pleasant emotions experienced in relation to the S294 collaborative activity? * Required

- Yes, definitely
- Yes, somewhat
- Not sure
- No, not really
- No, definitely not

Overall, do you feel that you were able to effectively regulate, or manage, unpleasant emotions experienced in relation to the S294 collaborative activity? * Required

- Yes, definitely
- Yes, somewhat
- Not sure
- No, not really
- No, definitely not

If you have any other comments about how you regulated, or managed, pleasant and unpleasant emotions in the S294 collaborative activity and how effective this was, please use the space below.
Appendix I – Selected pleasant and unpleasant emotions in diary entries 1-4

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Diary entry 1</th>
<th>Diary entry 2</th>
<th>Diary entry 3</th>
<th>Diary entry 4</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Pleasant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relief</td>
<td>9</td>
<td>13.2</td>
<td>14</td>
<td>20.9</td>
<td>22</td>
</tr>
<tr>
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<td>19.1</td>
<td>3</td>
<td>4.5</td>
<td>1</td>
</tr>
<tr>
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<td>1.5</td>
<td>5</td>
<td>7.5</td>
<td>11</td>
</tr>
<tr>
<td>Hope</td>
<td>5</td>
<td>7.4</td>
<td>2</td>
<td>3.0</td>
<td>4</td>
</tr>
<tr>
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<td>1.5</td>
<td>2</td>
<td>3.0</td>
<td>1</td>
</tr>
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<td>Enjoyment</td>
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<td>3</td>
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<tr>
<td>Curiosity</td>
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<td>1</td>
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<td>1</td>
<td>1.5</td>
<td>0</td>
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<tr>
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<td>0.0</td>
<td>1</td>
<td>1.5</td>
<td>0</td>
</tr>
<tr>
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<td>0.0</td>
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</tbody>
</table>

*No pleasant emotions experienced#* 13 14 7 14 48

<table>
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<tr>
<th>Unpleasant</th>
<th>Diary entry 1</th>
<th>Diary entry 2</th>
<th>Diary entry 3</th>
<th>Diary entry 4</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Anxiety</td>
<td>20</td>
<td>29.4</td>
<td>13</td>
<td>19.4</td>
<td>11</td>
</tr>
<tr>
<td>Frustration</td>
<td>11</td>
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<td>11</td>
<td>16.4</td>
<td>8</td>
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<td>Disappointment</td>
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<td>7.5</td>
<td>4</td>
</tr>
<tr>
<td>Confusion</td>
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<td>5.9</td>
<td>0</td>
<td>0.0</td>
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</tr>
<tr>
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<td>0</td>
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</tr>
<tr>
<td>Dissatisfaction</td>
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<td>0.0</td>
<td>2</td>
<td>3.0</td>
<td>0</td>
</tr>
<tr>
<td>Guilt</td>
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<td>2</td>
<td>3.0</td>
<td>0</td>
</tr>
<tr>
<td>Boredom</td>
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<td>1</td>
<td>1.5</td>
<td>0</td>
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<tr>
<td>Other</td>
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<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
</tbody>
</table>

*No unpleasant emotion experienced* 9 11 14 22 56

<table>
<thead>
<tr>
<th>Total</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td>71</td>
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<td>100.0</td>
<td>260</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Emotions are listed in descending order based of total frequencies.
*#Percentage of column total. *Not included in total and overall values.*
Appendix J – Online forum threads

Thread 1: Students’ emotions in the {module description}

Hi everyone,

My name is Jake Hilliard and I’m a PhD student at the Open University. I’m currently doing some research about the emotions students experience when they undertake assessed group activities/projects. This will hopefully help inform the design and development of future modules. As well as collecting the opinions of the students themselves, I’m hoping to gain the perspectives of tutors.

I’ve set up two threads for tutors to comment on. This thread focusses on the emotions you feel students experience when they carry out the {module description} and what impact these emotions have on how they participate and perform in the activity. The other thread is about your experiences of monitoring and managing student emotions in the {module description}.

I’ve provided some bullet points below that might guide the sort of thing you could comment on in this thread but please feel free to say as much or as a little as you would like. If you have views that you would like to share on these topics but don’t want to write them on the forum, you can alternatively send me your views by email to jake.hilliard@open.ac.uk. When writing up my project, I will ensure that all responses are kept confidential and anonymity will be ensured.

• What are the main positive/ pleasant emotions students experience before, during and/or after the {module description}? What causes these?

• What are the main negative/ unpleasant emotions students experience before, during and/or after {module description}? What causes these?

• What positive/ pleasant and negative/ unpleasant emotions do you feel have the biggest impact (i.e., beneficial or detrimental) on how students participate (i.e., engagement with others and their work on the activity) and perform (i.e., overall achievement) in the {module description}?
Thread 2: Monitoring and managing student emotions in the module description

Hi everyone,

My name is Jake Hilliard and I’m a PhD student at the Open University. I’m currently doing some research about the emotions students experience when they undertake assessed group activities/projects. This will hopefully help inform the design and development of future modules. As well as collecting the opinions of the students themselves, I’m hoping to gain the perspectives of tutors.

I’ve set up two threads for tutors to comment on. This thread has a focus on tutor experiences of monitoring and managing student emotion in the module description. The other thread is about the emotions you feel students experience when they carry out the module description and what impact they have on participation and performance.

I’ve provided some bullet points below that might guide the sort of thing you could comment on in this thread but please feel free to say as much or as little as you would like. If you have views that you would like to share on these topics but don’t want to write them on the forum, you can alternatively send me your views by email to jake.hilliard@open.ac.uk. When writing up my project, I will ensure that all responses are kept confidential and anonymity will be ensured.

• To what extent do you feel that you monitor student emotions in the module description? If you feel that you have done this, could you provide examples? Do you think it is difficult to monitor emotions in an online group work environment?

• Have you had experiences where you have had to help students manage their emotions in the module description? If so, could you provide examples? Do you think it is difficult to help manage student emotion in an online group work environment?
Appendix K – The interview guide

Interview Guide

**Purpose:** The purpose of this interview is to gather data from tutors for a research project exploring students’ emotional experiences in assessed, online, group learning, such as the \{module description\} assessed collaborative activity.

**Recording:** The interview will be recorded to make sure all information is collected accurately so that a transcript can be produced. You may be sent a copy of the transcript to ensure it is accurate.

**Confidentiality:** Your anonymity will be ensured throughout the research study; quotes from the interview transcript may be used but all identifiable factors will be removed or changed. You will have the right to withdraw from the interview at any time, and not answer any particular questions. The last section of the interview will allow you the opportunity to comment on the interview and interview process.

**Orienting instructions:** Questions will be based on your experiences of tutoring students undertaking assessed, online, group activities and students’ emotional experiences in these learning settings.

**Do you have any questions at this point in time? Are you happy to start?**

1. Could you provide a brief overview of the assessed, online, group activities that you have tutored on at The Open University?
2. What has your role been in these activities? How is it different to teaching more traditional types of activities?

3. What emotions do you feel students experience before, during, and after undertaking assessed, online, group activities?
4. What do you think causes these emotions?
5. As a tutor, how can you tell if students are experience different pleasant and unpleasant emotions when undertaking assessed, online, group activities?
6. Do you feel that a student’s emotions can impact their participation and performance in assessed, online, group activities?
   a. If so, how do think emotions impact student participation and performance?
   b. If not, why do you believe that emotions do not impact participation and performance?
7. Do you feel that the emotions of a tutor can influence the likelihood that an individual student or a whole group can experience similar emotions?
   a. If so, why do you feel this? Could you provide examples?
   b. Do you feel that this can influence the engagement or disengagement of students?
8. Do you feel that emotions may have also been experienced at a group level?
   a. If so, could you explain why?
9. What do you think causes group-level emotion?
10. Do you feel group level emotions can lead to group level engagement or disengagement?

11. Do you feel that one individual experiencing and expressing unpleasant or pleasant emotions can influence the feelings of other group members or the whole group?
   a. If so, why do you think this happens?
   b. How much of an impact do you feel the feelings and emotions of one individual can have on other students?
   c. Do you feel that this can influence the engagement or disengagement of other students?

12. How do you feel students regulate, or manage, their emotions in assessed, online, group activities?

13. Have you had experiences where you have had to help students manage their emotions in the assessed, online, group activities?
   a. If so, how have you done this?

14. Do you think it is difficult to help manage student emotion in an online group work environment?
   a. If so, could you explain why?

15. Do you feel that social interaction and support from tutors can influence the emotions students experience and how they regulate their feelings?
   a. If so, why do you feel this?

16. Have you as a tutor used emotive language to impact student emotions?
   a. If so, how and why have you done this?

17. Do you feel that students/groups experiencing more extreme unpleasant emotions (e.g., such as high levels of frustration or anger) need more tutor support?
   a. If so, can you explain why?

18. Have you tried and monitor student emotion during assessed, online, group activities?
   a. If so, how do you do this?
   b. Is it difficult to monitor students’ emotions?

19. Have you observed students helping each other regulate, or manage, their emotions in assessed, online, group activities?
   a. If so, how have they done this?

20. Is there anything else you would like to add?

Section 6: Conclusion

Thank you for your time and efforts in participating in this interview.
Appendix L – Initial thematic map (themes and sub-themes)