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THE IMPACT OF EMOTIONS ON STUDENT PARTICIPATION IN AN ASSESSED, ONLINE, COLLABORATIVE ACTIVITY

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Summary

There is growing recognition of the importance of emotions in academic online learning contexts. However, there is still little known about the role of emotions in social and collaborative online learning settings, especially the relationship between emotions and student participation. To explore this relationship, this study used a prospective longitudinal research design to follow 46 distance learning students throughout a 3-week assessed, online, collaborative activity. This approach allowed the fluctuating and dynamic aspects of emotions to be explored as well as the relationship between emotions and student participation in the collaborative activity. Self-report data were gathered using a semi-structured online diary at five time points throughout the task (once at the start of the collaborative activity, three times during the activity, and the final entry after the activity had finished). Findings revealed that learners generally perceived pleasant emotions (such as *relief*, *satisfaction* and *enjoyment*) to have positive impacts, or no impact, on participation, whereas unpleasant emotions (such as *anxiety*, *frustration*, and *disappointment*) were generally perceived to have negative impacts, or no impact, on participation. Interestingly, however, *anxiety*, and to a smaller extent *frustration*, were perceived by a number of students to have positive impacts during the activity. To conclude this paper, implications for educators are highlighted.

Introduction

Research is increasingly highlighting the profound effects that emotions have in academic contexts (Pekrun et al., 2018; Pekrun & Linnenbrink-Garcia, 2012). It has been found that there are inextricable links between a learners' emotions and their cognitive processes (such as memory, attention and perception) (Tyng et al., 2017). Although support is growing for acknowledging the importance of emotions in online learning settings (e.g. Graesser, 2019; Artino, 2012), there is currently scarce research regarding the role of emotions in social and collaborative online learning environments, with a particular lack of research exploring the impact of emotions on student participation.

Providing a clear definition for the terms *emotion* and *student participation* is a not an easy task. Previous research has noted that both concepts are loosely defined and difficult to operationalise (Azevedo, 2015; Mulligan & Scherer, 2012). In this study, emotion will be viewed as a relatively short-lived intense reaction in response to a particular object or event (Artino et al., 2012). Emotions are thought to be multifaceted, consisting of affective, cognitive, physiological, motivational, and expressive components (Pekrun et al., 2018). The term *student participation* can be viewed as describing active engagement in academic tasks (Rocca, 2010). In the online collaborative activity, participation was defined to students as their: contribution to discussions; effort levels to complete the task and work with others; and overall involvement in the activity. Student participation is very much related to the concept of *student engagement*. There have been many conceptualisations of this concept; one commonality is that this it is viewed as being a multidimensional meta-construct consisting of several components (such as cognitive, behavioural, and emotional dimensions; Fredricks et al., 2004). In this study, we considered emotional engagement as an antecedent to the other dimensions of this construct (such as behavioural and cognitive engagement). This is a view that has been advocated previously. For instance, Pekrun and Linnenbrink-Garcia (2012) suggest that student engagement acts as a mediator between emotions and their academic learning and achievement. Whilst Boekaerts (2016) believes that discovering the effect of different types of emotions on other aspects of engagement (e.g. the quality of students' attention, participation, strategy use, interaction with peers, compliance, effort, and persistence) could be missed without separating emotional engagement from the overall conceptualisation of student engagement.

Although not specifically examining collaborative online learning, when exploring the links between emotions and student engagement in a distance learning environment, Kahu et al. (2015) found emotions to have differing effects on engagement. More specifically, pleasant emotions of *enjoyment* and *interest* were viewed as central to student engagement whilst *anxiety* and *frustration* were often found to inhibit engagement. 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. Work by Linnenbrink-Garcia et al. (2011) provides support for the notion that pleasant emotions lead to positive impacts and unpleasant emotions lead to negative impacts on student engagement. In a face-to-face group work environment, these researchers found that increased levels of negative emotions were associated with social loafing whilst higher levels of positive affect were related to positive group interactions. Viewing the relationship between emotions and student engagement in this way may, however, be over simplistic. In accordance with Barrett and Russell's (1998) conceptualisation of emotion, not only are emotions distinguished by their valence

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(i.e. pleasant or unpleasant) but also their activation (i.e. physiologically activating or deactivating). The activation of an emotion may dramatically impact its effects on student engagement (Linnenbrink, 2007). For instance, an unpleasant activating emotion such as *anxiety* can energise and motivate a student whereas an unpleasant deactivating emotion such as *hopelessness* may reduce and undermine engagement (Pekrun & Linnenbrink-Garcia, 2012). We have also observed the facilitative effects of unpleasant emotions in our own research (Hilliard et al., 2020). When exploring students' experiences of anxiety in an assessed, online, collaborative project, we found that more learners perceived anxiety to have had a facilitative effect on their individual participation and performance than a debilitating one. Such findings highlight the importance of gaining a greater understanding of the role of emotions in social and collaborative online learning.

Purpose and Research Questions

The main purpose of the study was to explore the impact of emotions on undergraduate distance students' participation in an assessed, online, collaborative activity. The following research questions were addressed:

- To what extent do students perceive pleasant and unpleasant emotions to impact participation in an assessed, online, collaborative activity?
- How do students perceive pleasant and unpleasant emotions to impact participation in an assessed, online, collaborative activity?

Study Context

The study was undertaken with UK Open University students who were studying a second-year undergraduate module in cell biology. As part of the module, students were required to work in small groups (between 3-6) to undertake a 3-week assessed, online, collaborative activity. This predominantly involved students working together to explore a neurodegenerative disease (Parkinson's, Huntington's or Alzheimer's). Each group was required to research their chosen disease and contribute information to a wiki. After this research had been carried out, each group had to collectively generate a summary of information about the disease (no more than 1000 words). To carry out the activity, groups were provided with a forum to discuss and interact with other group members. A student's overall grade for the activity was made up of both individual and group marks.

Research Methods

Sample and Procedures

After gaining ethical approval from the Open University's Human Research Ethics Committee (HREC) and the Student Research Project Panel (SRPP), invitation emails stating the purpose of the study were sent to 245 out of the 729 students that studied the

module that year (some could not be included because of rules observed by SRPP). Students who agreed to take part in the study filled out a short online consent form. A total of 48 students volunteered to take part in this study (19.6% response rate). Two students withdrew one week into the collaborative activity and their data has not been included in this paper. The remaining 46 students were aged between 21 years and 56 years ($M = 32.72$ years; $SD = 8.78$ years) and the majority were female (82.6%; 38 females and 8 males). When compared to the student cohort, women were slightly over-represented as the proportion studying the module was 72%. This study adopted a prospective longitudinal research design (Menard, 2008) and students were sent links to five online diary entries (created using JISC Online Surveys) over a 6-week period. The first diary entry planned to be completed before the start of the collaborative activity, the next three during the activity and the final entry after the activity had been completed. Students were briefly instructed on how to fill out the diary entries after agreeing to take part in the study. Students had 48 hours to complete each diary entry; after this time, they were unable to access the online form. In total, 227 diary entries were completed out of a possible 230 (98.7% completion rate). For participating in the study, participants received a financial incentive (£20 Amazon voucher).

Measures

The online diaries were semi-structured and included a mix of closed-ended and short open-ended questions. In this paper, a specific sub-set of the data were reported which related to the impact of emotions on student participation in the assessed, online, collaborative activity. Diary entry 1 is not discussed as it did not ask students about how emotions impacted their participation (this entry was intended to be completed before the collaborative activity began).

Diary entries 2-4

These entries were aimed at exploring emotional experiences throughout the activity and asked students to self-report how specific emotions impacted their participation. Students were asked to select one pleasant and one unpleasant emotion they had experienced in relation to the collaborative activity for the specific time period stated in each diary entry (e.g. the time since the previous diary entry). Students could select from nine pleasant emotions (*hope, curiosity, enjoyment, relief, satisfaction, excitement, happiness, pride, surprise*) and nine unpleasant emotions (*anger, disappointment, confusion, frustration, anxiety, dissatisfaction, insecurity, guilt, boredom*). These emotions were chosen based on previous research which has investigated emotions in online collaborative activities (e.g. Hilliard et al., 2019; Webster, 2019). Students also had the option to select *other* if they felt that the predefined lists 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”. For instances when students selected a pleasant and/ or unpleasant emotion, they were asked to report the extent to which they felt the emotion had impacted their participation (1 – *Not at all* to 5 – *A great deal*). 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. This consisted of 17 statements which aimed to reflect how emotions could impact participation in both positive and negative ways and was based on previous literature and research undertaken by the authors of this paper (e.g. Hilliard et al., 2020; Linnenbrink-Garcia et al., 2011). For example: “I increased my effort and tried harder in the collaborative activity” and “I didn’t contribute to the tasks as much”. An “other” was also available for students to describe any other ways emotions had impacted their participation.

Diary entry 5

This entry was intended to be completed after the activity had been completed and aimed to gain a reflective assessment of how emotions impacted participation throughout the whole activity. Students were asked to respond to four statements about whether they thought pleasant and unpleasant emotions had positively or negatively affected their participation (using a 4 point-scale from 1 – *None at all* to 4 – *To a great extent*). For instance, students were asked: “Overall, in relation to the S294 collaborative activity, to what extent did pleasant emotions (e.g. enjoyment, curiosity, relief, excitement, hope) have a positive impact on your participation in the activity?”. They were also asked to indicate how six pleasant emotions (*hope, curiosity, enjoyment, relief, satisfaction, excitement*) and six unpleasant emotions (*anger, disappointment, confusion, frustration, anxiety, dissatisfaction*) 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*.

Analysis

Quantitative data were analysed using descriptive statistics. Frequencies (n) and percentages (%) were calculated and transformed into tables in Microsoft Excel 2013.

Results

Findings from diary entry 5 are presented first, as they provide an overall assessment of how students perceived emotions to impact their participation throughout the activity. In total, 45 students responded to this diary entry. Findings are presented in Table 1 and Table 2. When asked if pleasant emotions positively impacted their participation (Table 1), a large majority of respondents (84%) said that they did. When asked if pleasant emotions negatively impacted their participation, the majority of students (71%) said they did not.

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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.

Table 1: Students perceptions of the extent to which pleasant and unpleasant emotions impacted participation.

	None at all	To a small extent	To a moderate extent	To a great extent
Did pleasant emotions positively impact participation?	7 (16%)	11 (24%)	13 (29%)	14 (31%)
Did pleasant emotions negatively impact participation?	32 (71%)	7 (16%)	5 (11%)	1 (2%)
Did unpleasant emotions positively impact participation?	20 (44%)	10 (22%)	12 (27%)	3 (7%)
Did unpleasant emotions negatively impact participation?	15 (33%)	19 (42%)	5 (11%)	6 (13%)

In diary entry 5, students were also asked how specific pleasant and unpleasant emotions had impacted on their participation in the collaborative activity (see Table 2). Overall, substantially more students reported pleasant emotions to have a positive impact on participation than a negative impact. A large proportion of students also reported pleasant emotions to have no impact on their participation in the collaborative activity. For the specific pleasant emotions, the three most reported to have a positive impact were: *relief* (reported by 69% of students), *satisfaction* (reported by 58% of students), and *enjoyment* (reported by 56% of students). Although *curiosity*, *hope* and *excitement* were reported by many students to have a positive impact (reported by 49%, 44% and 44% of students, respectively), the same number of students, or more, reported these emotions to have no impact on their participation in the collaborative activity (reported by 49%, 56% and 53% of students, respectively).

Overall, substantially more students reported unpleasant emotions to have a negative impact on participation than a positive impact. A large proportion of students also reported unpleasant emotions to have no impact on their participation in the collaborative activity. This was higher than that reported for pleasant emotions. The most reported emotion to have a negative impact on participation was *anxiety* (reported by 64% of students). This emotion, however, was also the most reported unpleasant emotion to have a positive impact of participation (reported by 29% of students). The second most reported unpleasant emotion to have a negative impact was *frustration* (reported by 42% of students) and this was also selected by a few students to have a positive impact on participation (reported by 13% of students). Although *dissatisfaction*, *disappointment*, *confusion* and *anger* were reported by a number of students to have a negative impact (reported by 31%, 26%, 33%

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and 24% of students, respectively), considerably more students reported these emotions to have no impact on their participation in the collaborative activity (reported by 67%, 69%, 62% and 76% of students, respectively).

Table 2: Students' perceptions of the general impact of pleasant and unpleasant emotions on student participation (Darker red = higher frequency; White = lower frequency).

	Positive impact	Negative impact	No impact	Overall
Pleasant	144	9	122	275
Relief	31	1	15	47
Satisfaction	26	2	17	45
Enjoyment	25	2	19	46
Curiosity	22	2	22	46
Hope	20	1	25	46
Excitement	20	1	24	45
Unpleasant	27	100	155	282
Anxiety	13	29	9	51
Frustration	6	19	23	48
Disappointment	2	14	30	46
Dissatisfaction	3	12	31	46
Confusion	3	15	28	46
Anger	0	11	34	45
Total	171	109	277	557

Table 3: Students' perceptions of the specific impact of pleasant and unpleasant emotions on student participation.

Emotion	I posted more in the forums	I didn't post as much in the forums	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 member	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	Overall
Pleasant	34	2	18	6	32	0	32	0	26	0	11	6	9	3	15	2	5	201
Relief	11	0	8	2	12	0	11	0	13	0	5	2	4	1	6	0	2	77
Satisfaction	9	0	6	1	10	0	8	0	6	0	5	2	3	0	4	0	1	55
Curiosity	3	1	0	1	2	0	3	0	1	0	0	2	0	1	1	1	1	17
Pride	2	1	1	0	4	0	3	0	1	0	1	0	0	0	1	0	0	14
Enjoyment	3	0	1	1	3	0	2	0	2	0	0	0	1	0	1	0	0	14
Surprise	2	0	1	0	1	0	3	0	1	0	0	0	0	2	0	0	0	10
Hope	2	0	1	1	0	0	1	0	0	0	0	0	1	1	0	1	1	9
Happiness	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	3
Excitement	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Unpleasant	18	18	12	8	5	7	19	6	15	5	11	9	12	3	4	5	6	163
Anxiety	7	4	4	4	2	0	7	0	4	1	4	3	4	1	1	2	3	51
Frustration	4	4	4	0	1	2	4	2	2	1	2	3	3	2	1	1	1	37
Disappointment	3	2	3	0	1	2	3	2	3	1	2	0	4	0	1	0	1	28
Insecurity	3	1	1	2	1	1	3	1	4	0	1	2	1	0	1	0	0	22
Anger	1	2	0	0	0	1	1	1	1	1	1	0	0	0	0	1	1	11
Dissatisfaction	0	2	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	5
Confusion	0	1	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	5
Boredom	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	3
Guilt	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	52	20	30	14	37	7	51	6	41	5	22	15	21	6	19	7	11	364

In diary entries 2-4, students were asked to select one pleasant and one unpleasant emotion they had experienced in relation to the collaborative activity and indicate whether this had impacted their participation. In total, 101 pleasant emotions were selected by students and from these 70 were reported to impact participation in the activity. From the 89 unpleasant

emotions selected by students, 68 were reported to impact participation. Frequencies of specific ways emotions affected participation are reported in Table 3. 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”. For the specific pleasant emotions, students reported *relief* and *satisfaction* to have the most impact on participation overall. Students 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”. For the specific unpleasant emotions, students reported *anxiety* and *frustration* to have the most impact on participation overall.

Conclusion

This study aimed to explore the impact of emotions on undergraduate distance students’ participation in an assessed, online, collaborative activity. Findings highlighted that students perceived emotions to have varying effects on participation, with pleasant emotions largely having positive impacts, or no impact, and unpleasant emotions generally having negative impacts, or no impact. The pleasant emotions of *relief* and *satisfaction* were found to be of particular importance in relation to student participation in this study. Both of these retrospective outcome emotions have been found to be prevalent in similar learning activities in previous research (Hilliard et al., 2019). In accordance to Barrett and Russell’s (1998) taxonomy of emotions, both *relief* and *satisfaction* would be classified as pleasant deactivating emotions. These are thought to have potentially debilitating effects on student engagement, such as reduced attention and motivation. However, both emotions were found to be central to engagement in this collaborative activity. These findings highlight the need to explore the relationships between specific discrete emotions and student engagement further in this learning context, as emotions may act differently than in other academic learning environments. The unpleasant emotions of *anxiety* and *frustration* were also found to be of significance in relation to student participation. These emotions have also been found to be frequently reported by students in previous research in similar settings (Hilliard et al., 2019). Findings revealed *anxiety*, and to a lesser extent *frustration*, were perceived by students to have both negative and positive impacts on student participation. Both emotions would be classified as unpleasant activating emotions, which are thought to be able to facilitate engagement (e.g. by enhancing motivation to avoid failure). The dual effect of such unpleasant emotions in online collaborative activities is an interesting area of study, which needs to be explored further

to fully understand the role and function of these emotions when learning in social online learning contexts.

This study has contributed towards understanding how emotions impact student participation in an assessed, online, collaborative activity and there are a number of important implications for educators and learning designers from these findings. Firstly, we believe that a greater focus should be placed on student emotions when designing and teaching online collaborative activities. Research has highlighted that emotions can have profound effects in academic contexts and placing a strong emphasis on students' emotions in online collaborative activities may not only have a substantial impact on student experience but also on learning and achievement. Secondly, it is important to understand that unpleasant emotions do not have negative effects for all students. As highlighted in this study, numerous students reported beneficial impacts from *anxiety* and *frustration* on their participation. Further research is, however, needed to understand the functions of different emotions in this learning context. Third, support should always be provided to students when unpleasant emotions are strong and persistent. These experiences can lead to reduced student satisfaction, academic achievement, and student retention. Exploring ways to best support students in distance learning environments is essential and more research needs to be undertaken in this area. For instance, we are currently exploring incorporating an emotion awareness and regulation tool throughout an online collaborative project at the UK Open University.

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