# An Empirically-grounded Study on the Effective use of Social Software in Education

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**Abstract: Purpose** – The purpose of this paper is to discuss the results of our empirical investigations on the effective use of social software in further and higher education. The aims of our research were to: identify situations where social software tools had been employed in learning and teaching; elicit the experiences of the staff and students; and to draw out the benefits, challenges and issues (and their resolutions) associated with the use of social software.

**Design/methodology/approach** - In our empirical study, data from 26 initiatives, where social software tools have been employed, was collected, analysed and synthesised. A case study methodology was followed and both educators and students were interviewed to find out what they had done, how well it had worked, and what they had learned from the experiences.

**Findings** – This study provides insights about the benefits to the students, educators and institutions; challenges that may influence a social software initiative; and issues that need to be considered in a social software initiative.

**Research limitations/implications** – The data analysis in this project has been qualitative. In future research, it would be useful to obtain quantitative evidence relating to the effectiveness of the use of social software. Such evidence would be of considerable assistance to institutional policy makers. The case studies in our project are snapshots of the current situation. It would be useful to carry out longitudinal studies over a period of time to investigate the sustainability of the individual initiatives.

**Practical implications** – We hope that the lessons captured in this paper will inform the learning and teaching strategies in higher and further education – specifically, assisting the institutions and educators who are considering the use of social software, or more generally, people or organisations undertaking technology-enabled learning and teaching initiatives.

**Originality/value** – The published research so far has tended to focus on the use of forums, blogs and wikis, rather than extending to encompass other social software. Furthermore, the literature discusses experiences of individual educators and with a small set of students. The project, reported in this paper, examined data from 26 initiatives from a varierty of institutions, involving a wide range of social software tools, and in diverse contexts.

**Keywords:** Web 2.0, social software, social networking, peer-learning, collaborative learning, case study methodology

**Article Type:** Research paper

## Introduction

Social software is a class of networked tools that support and encourage individuals to learn together while retaining individual control over their time, space, presence, activity, identity and relationship (Anderson, 2005). Social networking websites such as MySpace, Facebook, Flickr, and YouTube are examples of some of the tools that are being used to share and collaborate in educational, social, and business contexts. The key aspect of a social software tool is that it involves wider participation in the creation of information which is shared (Franklin and van Harmelen, 2007; Leslie and Landon, 2008).

Social software enables communication and networking between groups where the members are made aware of what other groups are doing, and where each member of the group benefits. Further, social software allows gathering and sharing resources to inform others and receive feedback.

For example, consider the social bookmarking site Delicious (http://delicious.com/ ). For my research on social software tools, I can save bookmarks in my Delicious account, and through the tags or keywords that I assign to individual resources, users with similar research interests can access my bookmarks and perhaps find them useful; I can create networks within Delicious where I can link up with users who are also conducting research in social software. So in addition, to my own library of bookmarks, I also have access to a network of colleagues and their bookmarks who are also interested in social software tools.

Educational institutions are increasingly making use of (see Leslie and Landon (2007); Amstrong and Franklin (2008):

- Tools that facilitate collaborative authoring, such as blogs and wikis

- Websites that enable sharing of bookmarks, photographs, and videos, such as Delicious, Flickr and YouTube

- Social networking platforms such as Elgg and Ning

- 3-D virtual worlds, such as Second Life that facilitate synchronous group discussions and meetings (see Eschenbrenner, et al, 2008)

These, and other social software tools, are of increasing interest in education, but need to be well grounded within the pedagogical activities of courses. The published research so far has tended to focus on the use of forums, blogs and wikis (eg Minocha and Roberts, 2008; and Williams and Jacob, 2004), rather than extending to encompass other social software. Furthermore, there are few guidelines for good pedagogical practice or assessments of the effectiveness of the different social software tools. Thus, it appeared that studies were needed which determined:

- How activities can be designed to include social software tools

- The benefits and problems associated with their use

- The role of these tools in enhancing the learning and teaching experience

Therefore, in our JISC[1]-funded project (http://tinyurl.com/5a8zu3), we set out to: identify situations (as case studies) where social software tools had been employed in further and higher education; collect information about the experiences of the staff and students involved; and analyse that information to discover the benefits, problems and issues (and their resolutions) associated with the use of social software.

In this paper, we discuss the methodology we employed, the key findings from our project, and some recommendations for educators who are planning to adopt social software in learning and teaching. We conclude this paper by discussing the implications of our project and how the research discussed in this paper and related to investigating the effectiveness of social software in education can be taken forward.

## Methodology

We employed a case study methodology to collect data from 26 case studies or initiatives in further and higher education, where social software tools have been employed.

*Case study methodology*

A case study is an empirical enquiry that investigates a phenomenon within its real-life context using multiple sources of evidence. It is especially useful when the boundaries between the phenomenon and context are not clearly evident (Yin, 2009). A case study methodology helps to answer the 'how' and 'why' questions about a contemporary set of events over which the investigator has little or no control. Applying case study methodology involves development of detailed, intensive knowledge about a single 'case', or of a small number of detailed 'cases' (Robson, 2002).

The important aspects of case study enquiry (Robson, 2002), which we considered, were:

- having a *strategy*, that is, a stance or approach, rather than a method, such as observations or interview
- being concerned with *research*, taken in a broad sense and including, for example, evaluation
- collecting *empirical* data in the sense of relying on the collection of evidence about what is going on
- focussed about the *particular*, a study of that specific case
- focussed on *phenomenon in context*, typically in situations where the boundary between the phenomenon and its context is not clear; and
- using *multiple methods* of evidence or data collection such as interviews, focus groups, analysis of documents (eg course outlines, papers or publications that captured the educators' perceptions on and experiences with social software), and analysis of artefacts related to

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[1] The Joint Information Systems Committee (JISC), http://www.jisc.ac.uk, receives funds from the UK Higher and Further Education funding bodies to provide world-class leadership in the innovative use of ICT to support education and research.

social software tools: such as content in blogs, wikis, and discussions of students on forums.

We chose cases which gave us a wide spread of tools to examine, from a variety of subject areas, from different contexts (part-time, full-time or distance learning) and levels of study, and institutions (higher and further education). The criteria were as follows:

- The social software used, or equivalent software tools, should be available in the public domain

- The usage of social software should be situated in the pedagogy of the course or a programme; or the social software should be used to support and engage learners and to enhance their online participation

- Within the activity or activities where a social software tool is employed, if other e-learning tools are also employed, the social software should be the primary tool

- Studies selected should demonstrate evidence of effective practice (or evidence to the contrary). In order to fulfil this criterion we chose studies that had been running for some time (more than one semester), and that included a reasonable number of students/modules

- Case studies should be drawn from a variety of disciplines; our case studies cover diverse disciplines: for example, hair salon management, dentistry, computing, education, photography, and physiotherapy

- The portfolio of case studies should encompass a broad range of tools and skills: for example, group reflection (eg blogs); collaborative authoring (eg wikis), collaborative digital photography (eg Flickr); social bookmarking (eg Delicious); social networking (Facebook); collaborative 3-D modelling (eg Second Life)

- The portfolio of case studies should include a lifelong learning element. At least one case study should look at the more mature student and/or work-based learning. We do have case studies which meet these criteria

- At least one of the case studies should be from further education

- The relationship between the use of publicly available social software tools and Virtual Learning Environments (VLE) or Personal Learning Environments within institutions should be considered

- The results should be transferable to a range of contexts.

Through interviews, focus groups, by reviewing any internal reports or publications, course descriptions, and in some cases students' activities helped us to find out from both educators and students and in some cases from the policy makers or VLE managers, what they had done, how well it had worked, and what they had learned from the experiences.

If you would like to know about our case study methodology, the ethical approval process, and the research materials we used (eg interview

templates, consent forms), please refer our report of this project and the set of twenty six case studies which we investigated on: http://tinyurl.com/5a8zu3

In our empirical research, we captured the following:

- benefits that the learners and educators perceive with the pedagogical usage of these tools

- the design of activities and the challenges involved in using the tool(s), relating these to their context (including the expected learning outcomes of the course and/or programme)

- learning experiences of the educators: what worked and what did not work so well; whether or not the social software tool or the associated pedagogical activity is transferable to another context

- obstacles faced by students and educators, whether they are technological, usability-related, skills or training issues, or social issues

- accessibility issues regarding support to users with special needs, and how they are being (or have been) addressed

Through the case studies (examples) and their analysis by applying inductive or thematic analysis (Braun and Clark, 2006), our goal was to come up with some recommendations or some guiding principles for educators and policy makers, for social software initiatives – the pedagogical roles of social software: communication, nurturing creativity and innovation, and collaborative learning; but also the influencing factors that can enhance student learning and engagement.

## Key findings

We have drawn out some key findings from our case study investigations. In this section, we discuss these findings, which relate to the benefits and challenges that organisations (policy makers), educators, and students will experience in a social software initiative.

*Benefits to the organisations*

Student retention: There are several instances which we came across in our investigations where early signs of a student struggling were picked up in formal and informal contributions on social tools and early interventions meant that students were provided with support and help before it was too late.

A number of the case studies provided firm evidence of the positive impact of social tools on student retention, as students who were struggling were picked up in formal and informal contributions on social tools and offered support. Several cases studies identified the development of communities of learners who, in some instances, stayed in touch after completing the course.

Image-building: To be at the forefront of adopting digital technologies in courses and programmes not only attracts students but also is perceived by external bodies as being forward looking.

Alumni community building: In two of the case studies that we investigated we found that students, who had worked collaboratively using social software on

courses, went on to form alumni groups at the end of the course to keep the conversation and dialogue flowing.

*Challenges to the organisations*

The tension between social software tools in the pubic domain and the VLE: If the tools used by educators are not within the institution's VLE, then continuity of the service, its reliability and maintenance, and whether it should be employed in assessment are just some of the concerns that policy makers within an organisation have. The lack of control of an external service is of concern, as the service to the students cannot be guaranteed unless formal agreements are set up with external providers.

There was more general concern that educational organisations had no control over public sites, eg the software providing the service could change or the site could be become unavailable. This could become a serious issue if assessment were involved. In reality, the popularity of the sites usually meant that they were well maintained and backed up so the probability of loss of service or data was low; none the less, the worry remained.

Policies about the usage of social software tools for both educators and students: We did not come across any formal policies that an organisation had set up about how these tools should be used and what were the expected norms – even when the students' contributions were being made in public groups (for example, on Flickr or on Facebook).

The success of the projects is very much dependent on the enthusiasm and drive of committed tutors, with none of the case studies reporting coherent institutional policies about the usage of social software tools for either educators or students.

Firewalls and access to tools in the public domain: Access to some social software tools, such as Skype or Second Life, may require altering the firewall mechanisms. The security risks to the institution's network systems are of concern to the organisations.

Benefits to the educators

Being able to track student's process and intervene early: Educators are now able to keep a track of the group's or an individual student's progress and intervene before the formal assessment.

Being able to review students' contributions: Educators are able to see the questions that students want to find an answer to prior to a tutorial which enables the educator to make a more effective plan for a tutorial.

Being able to teach interactively rather than broadcast: Some courses and activities require students to have a conversation and dialogue, and now there are tools such as a wiki to discuss collaboratively and create resources. Students can create podcasts themselves to learn communication skills and receive feedback from peers and the educator.

*Challenges to the educators*

Changing the way they teach: Students who belong to the digital generation expect to talk back, and have a conversation. They want their education to be relevant to the real world; they want it to be interesting, even fun. Therefore, educators face the challenge of continuing to 'broadcast' lectures as well as

using 'conversational' social software supported methods to motivate, empower and enthuse the students.

Diverse needs of students: While supporting students who have grown digitally and who prefer a more participatory approach to education, the education system still has to cater for the needs of those students who may not have had the resources (availability of computers, broadband) to be able to grow as 'Net Geners' (from the net generation) (Tapscott, 2009). Some of these students may still prefer a 'broadcast approach' of teaching and may be unfamiliar with the social networking phenomenon.

Designing and assessing learning activities: Even though the case studies investigated in this project provide several examples of effective use of social software tools for different purposes, there is currently little (formal) guidance for educators to assist them with the design and assessment of learning activities for the social software toolkit. So unless there are personal initiatives (as the majority of our case studies are), educators may find it difficult to determine the role the tools can play and how they can be effectively employed. Further, designing assessment can be extremely challenging; counting the number of comments on a blog post may not be an effective indicator of a student's contribution if the comments are not insightful enough.

The literature that we reviewed also concluded that there could be a problem with assessment in that teachers are expected to mark the work of an individual student but this may prove to be very difficult for collaborative work.

Workload issues: Some of the case studies suggested that the planning, launch and maintenance of a social software initiative can be very time consuming. Further, some educators suggested that it was difficult to keep a track of everyone's progress (30 blogs on a course is not unusual) if there is formal assessment along with using social software tools. However, other case studies are exactly the opposite (the initiative did not take much time to organise or has saved time overall and assessment is practical and not unreasonably time consuming. Tools such as RSS (Really Simple Syndication) feeds can help in tracking the updates but better reporting tools (for example, who has contributed on the wiki, what and when, instead of scanning the history on the wiki) and integration of support for assessment into social software tools would help to reduce the burden on the educator.

Perceived role of the educator: The role of an educator becomes facilitative, (ie more like a mentor) when social software tools are employed. This perception might be in conflict with that of the educator's who may still see his (or her) role as 'delivering' education and instruction.

*Benefits to the students*

Collaborative and peer-to-peer learning: Students learn by looking at the contributions of other students in the collaborative working space such as wiki or a group blog, by seeing the different approaches that others take, and by reflecting on their own contributions. Through conversations and dialogue (Cross, 2007), they are better able to internalise their learning (Nonaka and Takeuchi, 1995). Students also tend to comment on other contributions and provide support and critical feedback.

Gaining transferable skills for work environments: Social software tools are increasingly being used in the workplace, for example, wikis as intranets, blogs for marketing, podcasts for customer education, web conferencing for meetings, and social networking groups for campaigns, and for conducting surveys. If students learn to use these tools and are aware of their potential, then they will not only be able to use and adopt new technologies with ease but will also feel confident when taking decisions about which tools should be used for what purpose. In addition, using social software tools assists students develop team-working skills and online collaboration and communication skills, which will help them to fit easily into work settings.

Developing an e-portfolio for future employment: The outputs of their studies, eg essays, poems, records of their skills audits and skill development, are portable if they are in tools such as wikis and blogs, and can be shown to prospective employers.

Collation of resources: Social bookmarking facilities can enable the students to collate their resources over a period of time and across courses and institutions.

*Challenges to the students*

Group working in collaborative authoring spaces: When students work in groups and contribute collaboratively in a space such as a wiki or a group blog, there are concerns about everybody not contributing equally and, therefore, there are questions or concerns about the ownership of the resulting product. However, the same problem is reported in all group-working situations whether or not they are technologically mediated. Further, the students may not benefit from the collaborative activity if most students do not contribute. Mechanisms such as the history in a wiki can track individual contributions but it requires monitoring by the educator. A more general solution is to design the assessment in a way that rewards group and individual contributions.

Most organisations require their employees to work in groups and there will always be people who do not make as great a contribution to the group as others, so learning how to recognise and manage this situation is arguably a useful life lesson.

Deriving value from the tools: The value from social software tools comes only if there is participation by the group. If a student does not receive comments from his peers on his blog, or on his photographs on Flickr, then he may not derive the intended value from contributing on these tools.

Learning new tools: Unlike an institutional VLE, as new tools evolve and educators experiment with them, students might be using different tools on different courses, and this would require them to learn to use these tools, taking up time and effort, and perhaps diverting them from the actual learning activities that they are supposed to conduct using these tools. On the other hand, learning the tools helps to equip them with knowledge which can be used later.

Pedagogy vs. technology: If students are not able to understand the role the technology plays in their learning or if there is a steep learning curve for the

technology or the usability of the tool is poor, they will have an unsatisfying experience and may feel that the technology is 'getting in their way'.

Concerns about their materials in the public domain: Some students have concerns about their contributions on these tools being in the public domain (eg a public-facing blog). Some students even have concerns about sharing their reflections and ideas even with peers (eg being worried that somebody else would take their ideas). Even when the ethos of the social software tools is to be collaborative, the individual assessment is still seen as competitive by some students.

Some students had concerns about their contributions being in the public domain but on the other hand, exposure to a public site allowed learners to showcase a portfolio of their work to potential future employers.

Invasion of students' social spaces: Students are not always willing for institutions to enter their social spaces such as Facebook, or being asked to make a tutor their 'friend' on a social networking site. Some students are keen to keep the personal (social) and academic spaces apart. However, most case studies concluded that there were few, if any, problems of this sort.

Preference for individualistic learning rather than collaborative learning: Adult learners or part-time learners who are handling work and studies at the same time generally prefer learning at their own pace and in their own time. They can be resistant to collaborative work as it means that they may have to work at a time that suits others, a commitment which they may find hard to meet.

## Recommendations for educators

There are wide-ranging factors that influence the success of a social software initiative. Therefore, there are no set procedures or guidelines that, if followed, will guarantee the success of a social software initiative. In this section, we outline principles, which we believe will apply to an initiative and will guide educators.

*Be learner-centred*

The initiative should be learner-centred: meeting learners' requirements and providing them with a positive and empowering experience. The technology should support the learning activities and outcomes of the course or programme.

*Consider the impact on staff*

It is important to consider how all staff will be affected by any initiative. For example, a technical support team may have to support another tool; or a helpdesk may receive queries from students and others involved and the associated staff will need the requisite training and resources to support the students. What is important is that policy decisions about the expected involvement of all staff are taken.

*Identify your key stakeholders*

The key stakeholders will include students, technical support teams, departmental heads, and colleagues who are involved with the learning and teaching strategy of the organisation. It will be useful to communicate with them regularly as they may not only offer support to the initiative but also give

ideas. They will help you to understand the requirements from multiple perspectives.

*Be convinced yourself*

In almost all the initiatives that we investigated in this project, the educators were passionate about the tool and were convinced of its significance in learning, teaching, and student engagement. Therefore, only if you are yourself convinced that the initiative is worthwhile, should you proceed with it.

*Be prepared to spend time*

The introduction of any initiative requires the allocation of time and resources for: planning for designing, conducting and evaluating the initiative, communicating with a variety of stakeholders, choosing a particular tool; designing the educational activities. It is necessary to ensure that sufficient resources are allocated to an initiative.

*Do not hesitate to learn from others*

There may be colleagues within your institution who have already used the same tool or have faced similar challenges. There will almost certainly be colleagues in other institutions who have relevant experience.

The case studies of the project, being reported here, are intended to provide useful insights into a variety of initiatives and should be a very useful resource for learning from experiences of others.

*Keep a log of the experiences*

Keeping a regular log of the activities and your experiences with the initiative will be useful for self-reflection and for sharing experiences with others during and after the project. This regular log could be maintained in a tool, such as wiki or blog, which could be made accessible to all or to selected group of stakeholders.

*Be willing to disseminate*

Do not wait to write a journal paper! It would be good to share your experiences and efforts from early on – whether they are internal seminars, departmental meetings, and lunchtime talks in your institutions. The more you discuss and share your experiences with others, the more support and ideas will flow your way.

*Be prepared to monitor and intervene*

Our investigations have shown that constant monitoring of students' experiences and timely interventions play a significant role in the success of the initiative. This, of course, has resource implications and you would have to be prepared to spend time to 'be there'.

*Evaluate the initiative*

All the successful case studies indicate that it is important to elicit students' and educator' perceptions and experiences and to evaluate them. The evaluations can help to iteratively improve the initiative in terms of activities, choice of the tool, training and support, and so on. Further, evaluations and iterative improvement of the initiative will enhance its potential for sustainability and transferability. Depending on the context of an individual

initiative, a variety of techniques may be applied to collect feedback: reflective journals or diaries, surveys, interviews, questionnaires, and focus groups.

To draw out both analytical and statistical generalisations, collect both qualitative and quantitative evidence, over a period of time. Thorough evaluations will be helpful in convincing the institution. They would also facilitate transferability of the initiative, and will be useful for the community.

*Be prepared to adapt and change*

The landscape of social software tools is emerging and changing, and so are students' choices of tools and their expectations of the tools. However, the experiences with a set of tools can be carried over to other initiatives with a different set of 'new' tools, if there has been a thorough process of evaluation and learning from the evaluations (as suggested in strategy 9.10 above).

## Implications

Our research and set of case studies (available at http://tinyurl.com/5a8zu3) have helped to bring together experiences with social software of several colleagues in the higher and further education institutions in the UK. We are hopeful that their stories, experiences and inputs will guide and inspire colleagues within the educational community who are interested in adopting social software in learning and teaching.

A comparison of the literature review and findings of the study is presented in this section. Then, we discuss the limitations of the study and propose solutions for overcoming those limitations to take this work forward. We also propose some ideas for using social software tools for involving the community in sharing experiences and case studies.

*Comparison of the literature review with the findings of this study*

The findings of the case studies seem to be largely, although not entirely, in agreement with research as discussed in the literature review (include reference to other paper here); what follows are some observations on the similarities.

Public domain versus Virtual Learning Environments (VLEs): The literature review discussed the potential conflict between the opportunities provided by exposing learners to public internet content and the comparative safety of the 'walled garden' VLE of the institution. This potential conflict was also borne out in the case studies. For example in one of the case studies, the course team developed and used the OpenStudio tool to upload and share photographs rather than use Flickr so that the site would be available only to students registered on the course and to authorised staff members. The main reasons given for the rejection of Flickr were that the university could not control the use of the public facility and that it could not be integrated sufficiently into the assessment system.

There was more general concern that educational organisations had no control over public sites, eg the software providing the service could change or the site could be become unavailable. This could become a serious issue if assessment were involved. In reality, the popularity of the sites usually meant that they were well maintained and backed up so the probability of loss of service or data was low; none the less, the worry remained. Some students

had concerns about their contributions being in the public domain but on the other hand, exposure to a public site allowed learners to showcase a portfolio of their work to potential future employers.

Student retention: The literature review comments on the motivation for distance learners in particular to move from the lonely isolation of self-paced learning into a learning community of inquiry providing mutual support (Anderson, 2005; also see Shirky (2008); Lave and Wenger, 1991 and Wenger (1998)). A number of the case studies provided firm evidence of the positive impact of social tools on student retention, as students who were struggling were picked up in formal and informal contributions on social tools and offered support. Several case studies identified the development of communities of learners who, in some instances, stayed in touch after completing the course.

Assessment: The literature reviewed concluded that there could be a problem with assessment in that teachers are expected to mark the work of an individual student but this may prove to be very difficult for collaborative work. The lack of assessment proved to be an issue in a number of the case studies showing that this area is perhaps still somewhat immature in its development.

Policies about the usage of social software tools: Both the literature reviewed and the case studies identify the advantages of 'learner-centredness' and how collaborative and peer-to-peer learning allow learners to internalise their learning. This approach results in the tutor being a facilitator for learning, rather than a provider of information. However as the case studies illustrate, the success of the projects is very much dependent on the enthusiasm and drive of committed tutors, with none of the case studies reporting coherent institutional policies about the usage of social software tools for either educators or students.

Team working and online collaboration skills: In two case studies which employed wikis, blogs and podcasts, the respective course teams postulated that developing team-working skills will help the students practise 'real life' skills and become familiar with the online collaboration and communication tools that are significant for a career in industry. This is wholly in line with the observation in the literature review: 'In addition to higher quality learning outcomes, participants in the process benefit from both peer recognition and peer review, both excellent preparation for more modern collaborative teamwork' (Crook et al, 2008).

*Limitations of our research*

The limitations relate to the methodology, the extent of investigations that we carried out, and the data, which we have collected.

Case study methodology: A common concern about case studies is that they provide little basis for scientific generalisation (Yin, 2009). In project study also, we have not been able to enumerate frequencies and draw out statistical generalisations, although we have made an attempt to draw out analytical generalisations as discussed in the section on key findings.

One of the features of case study methodology is that there should be multiple sources of evidence, with data derived by different techniques and related to a variety of stakeholders (Robson, 2002). In this study, the data collection has

been primarily through interviews and visits to the participating institutions though we have made every effort to talk to both educators and students. In some of the case studies, we had access to papers presented in conferences or workshops, internal reports, and brief access to students' materials. Therefore, not every case study is based on multiple sources of evidence.

In some of the smaller initiatives, we were only able to meet one or two educators and a group of students. We were not able to speak to the policy makers or stakeholders at decision-making levels, who would otherwise have a strong influence for the sustainability of smaller initiatives and for adopting them at the institutional level.

Case studies are 'snapshots': The investigations have been conducted on the 'current' situation and the data that we have elicited is not through longitudinal studies, ie making observations over a long period of time. As a result, even though we have drawn out generalisations, the case studies should be considered 'snapshots' which are reporting the situation when the data was collected.

Qualitative data analysis: The data analysis in this study has been qualitative and has been driven by the primary objective of the study: whether and how the social software initiatives enabled student learning and engagement. We have identified the themes and sub-themes in the data related to the factors which have influenced the initiatives. The case studies were quite different from one another in terms of the nature and extent of the initiatives. In addition, since the data collection was over a short period of time, the interview data was not amenable for drawing out quantitative conclusions (for example, statements such as 10 students from the 15 on the module rated their satisfaction as 4 on a Likert scale (http://en.wikipedia.org/wiki/Likert_scale ) from 1 to 5).

Bias of the investigators: In this research, one consultant investigated a case study rather than two or three consultants working together. Although each participating institution validated its case study twice, there is a possibility that an investigator's biases such as attitude towards social software and personal experiences or background may have influenced data collection.

*Taking the research further*

Case study methodology: To address the limitations of the methodology outlined earlier in this section, it would be useful to carry out investigations using multiple techniques for data collection and analysis during the development of a case study. Also, it would be useful to carry out longitudinal studies over a period of time involving two or more consultants with the aim of: avoiding individual consultant's biases; capturing the changes in experiences and perceptions of the initiative over time; observing how the initiative evolved, and if the initiative was able to sustain itself.

A significant requirement for any future research is the need to obtain quantitative evidence relating to the effectiveness of the use of social software. Such evidence would be of considerable assistance to institutional policy makers and to individual educators considering the introduction of social software.

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