

Collaborative Working: Wiki and the Creation of a Sense of Community

MARTINA A. DOOLAN University of Hertfordshire

Abstract This paper reports on the effectiveness of Wiki technology for creating a sense of community amongst 96 second year computing undergraduates engaged in group based assessment activities. This paper reports on the student experience, their attitudes and feedback relating to the use of a Wiki over a one year period at the University of Hertfordshire, through the use of pre- and post-test questionnaires. In addition to the questionnaires, student reflections were captured using a Blog, with entries about their understanding of the purpose of the community, rationale, and how the Wiki influenced and supported their undertaking of the group based assessment activities in a social constructivist blended learning environment.

Results from the pre- and post-test questionnaires shows a significant difference $t(64) = 2.527$; $p < 0.05$ in learner confidence in using the technology to support group work, $t(70) = 3.436$; $p < 0.05$ shows that Wiki technology can support group work and $t(64) = -4.451$; $p < 0.05$, that learners equally participate to the group work whilst using the technology.

Results from the reflective blogs show that learners valued the Wiki in undertaking the group based assessment and fostering a learning community. This demonstrates that both people and task aspects are important when considering the design of a blended face-to-face and online learning experience. People oriented learners cited being comforted by each other and that being online saves face. Task oriented learners value the opportunity to manage their own learning and learning environment.

Introduction

There are a number of driving forces in Higher Education (HE) to use online technology to support teaching and learning: for example, the Department for Education and Skills e-learning strategy (DfES 2005) and the Higher Education Funding Council e-learning strategy (HEFCE 2005) focus in particular on 'personalised' learning through the 'harnessing' of new technologies. With the availability of the infrastructure, and emerging technologies such as Wiki, online social software can be used as a resource to shift the emphasis from the tutor to the student and as a tool for collaborative learning enabling students to personalise their own learning.

Socio-constructivism postulates that knowledge construction is a social process that occurs through collaboration with others. Collaborative learning has been shown to engage learners in knowledge sharing, to provide support, where learners can depend upon another, negotiate and manage their own learning needs (Tu 2004). A key concept of integrating collaborative learning into online learning is providing a sense of community. This has been defined by Tu & Corry (2002) as "...a common place where people learn through group activity to define problems affecting them, to decide upon a solution and to act to achieve the solution". There is considerable research to characterise communities (McConnell 2006; Paloff & Pratt 1999; Wenger 1998). However, there is limited research into what actually happens in online communities (McConnell 2006). Moreover, there is limited research into the use of collaborative learning in a blended learning environment (Baskin *et al* 2005). In this blended learning environment, technologies are integrated with conventional class based activities.

Therefore, this study investigates the integration of collaborative learning using a Wiki in a blended learning environment to help understand a sense of community. The intention of the study is to gain an understanding of the learner experience, their attitude and feedback relating to the use of a Wiki to support group based assessment in an attempt to understand the effects of such systems in the development of a sense community. These issues are explored by using qualitative and quantitative methods as described in this paper.

The Online Learning Environment - Wiki

Wiki is steadily gaining a place in the Higher Education e-learning environments. A Wiki is a collaborative authoring tool which can be used to build a community of learning and a shared learner knowledge base. It is essentially a shared "white board" and any text entered by any author can be added to and edited by any person (with permission, in this example, through a login procedure) just by using a web browser; hence a Wiki looks and feels like a normal Intranet or Internet website. Hyperlinks to other pages are created easily thus providing the opportunity for learners to construct their own learning environment and pathways through to other resources and take control of their own learning. In addition to co-authoring text, Wiki supports images, sound and video.

In this study, a 'Jotspot' Wiki was used. This Wiki is freely available and provides the Wiki functionality and the server space for storing the pages. Learners gained access to the Wiki via the University's Managed Learning Environment, StudyNet. Using the web link <http://uh-isd1.jot.com> the learner is presented with the login screen. In this example, the learner's email address was their username and they chose a password on first login.

The Wiki was integrated with conventional teaching practices and was intended to provide more opportunities for learners to interact with each other outside the classroom in order to undertake the group based assessment. These interactions were intended to provide learners with a stronger sense of being connected to one another, and increased construction of knowledge through co-creation of content and discourse, thus providing stronger feelings that educational goals were being satisfied by the learners and indeed a sense of belonging to a 'community of learning'.

Methodology

The Study

This study was carried out over a one-year period with ninety six second year learners studying an Information Systems Development course. The study was exploratory and was intended to gain an understanding of learner experiences of using a Wiki to support the group based assessed activities, their attitude to using the Wiki and to gain an understanding of a sense of community. Doolan (2006) describes effective strategies for building a learning community online including the importance of preparatory work by the academic, involving their role as tutor to create an engaging online learning environment to encourage collaborative task driven student-student interactions. Therefore, learners were divided into groups of six which were randomly selected. There were a total of sixteen groups numbered from one to sixteen. The group number related to their group space in the Wiki. These learners had never undertaken a group assessment in this course of study and were generally not familiar with the members in their group prior to undertaking this study. Therefore, a group list was attached to their group space on Wiki and learners were required to complete an introductory assessed task as described below. The learners' personal group space on Wiki was to enable learners to work securely to complete the five set tasks for the assessment as summarised below. Active learner engagement requires the chosen activities to be shared equally within and across the group, (Doolan *et al* 2006) enabling personalised learning and autonomy (DfES 2005). Therefore, learners also had access to a shared communal Wiki space and through the set activities were actively encouraged to share resources, news and problems in the communal space accessible by the whole cohort of ninety six learners once they had entered the homepage of the Wiki. Each of the sixteen learner groups were required to complete a report as part of their assessment, which consisted of five set activities, summarised as follows:

- Task 1: Group Commitment where learners had to provide group information, an object or photo, which represented them and basic planning for the problem.
- Task 2: Eliciting and documenting requirements related to gathering the requirements for a software development task.

- Task 3: Support for project stakeholders reporting on issues of design of an appropriate computer system.
- Task 4: Evaluation of the design of the new computer system.
- Task 5: Production of a group reflective log using a Blog.

In performing the tasks, a range of communication, information gathering and role play activities were employed. Using a case study learners were required to carry out a thorough analysis and design of a computer system using the Wiki, to complete individual and group work activities according to the needs of the group. The overall learning objective is to apply the principles and techniques of system development in a team environment, thus fostering and developing collaborative working skills. This requires learners to move from problem identification through to implementation and evaluation.

Full assignment specification including activities, assessment criteria and templates were made available to learners in the communal space on Wiki and a summary was presented in a lecture. Learners were made aware that all activities were to be assessed after the final submission deadline and were provided with two lectures on group work. An introduction to the Wiki took place through a live demonstration in a lecture when distributing the summary assignment specification. It was not felt necessary to train learners to use the system as these learners were introduced to the university MLE in their first year of study and were already familiar with using MS Word and MSN.

Data Gathering

Data collection included both quantitative and qualitative methods. Quantitative data came from a pre- and post-test questionnaire, which was undertaken one week prior to the start of the study and one week after completion of the study. The questionnaire was distributed during a taught lecture using an EDPAC answer sheet and results were fed through an optical mark reader. The questionnaire was designed using a Likert type response 'A' to 'E'. Where 'A' indicates 'Strongly Agree', 'B' indicates 'Agree', 'C' indicates 'No View', 'D' indicates 'Disagree' and 'E' indicates 'Strongly Disagree'. Data was coded into SPSS and a paired samples T test was performed to test the significance of the difference in the results of the pre- and post-test questionnaires.

Qualitative data analysis was in the form of learner reflective group blogs which the sixteen groups were required to complete as an assessed task. The blogs were analysed and coded based on specific topics raised in the blogs and open in their nature. These were guided by questions specifically designed to encourage learners to reflect upon and evaluate their own experiences in terms of community and technology use, as an attempt to understand the effects of such systems in the development of a community and in the context of supporting group based assessment. Quantitative data came from these coded responses.

Results

Pre- and Post-test Questionnaire

Of the ninety six students who undertook this study, 77 (80%) responded to the pre-test questionnaire and 76 (79%) to the post-test questionnaire.

The results are shown in figures 1 - 6 below. 'SA' indicates 'Strongly Agree', 'A' indicates 'Agree': classed as 'Positive Responses'. 'SD' indicates 'Strongly Disagree' and 'D' indicates 'Disagree': classed as 'Negative Responses'.

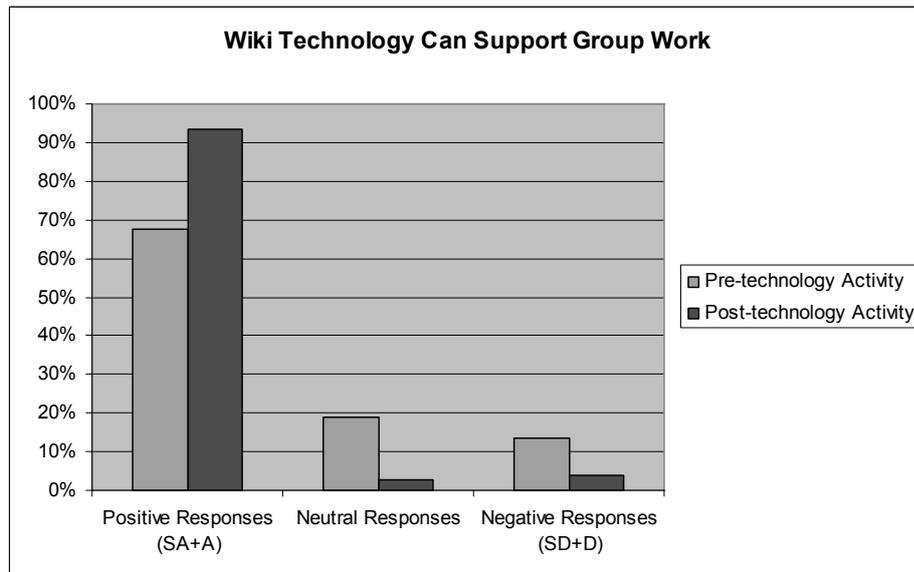


Figure 1 Wiki technology and support for group work

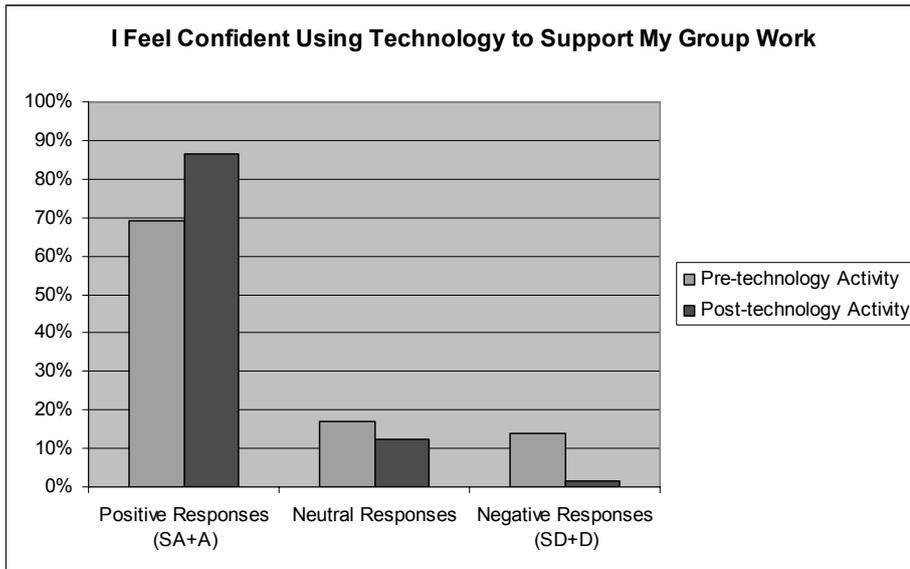


Figure 2 Learner confidence in using the technology to support group work

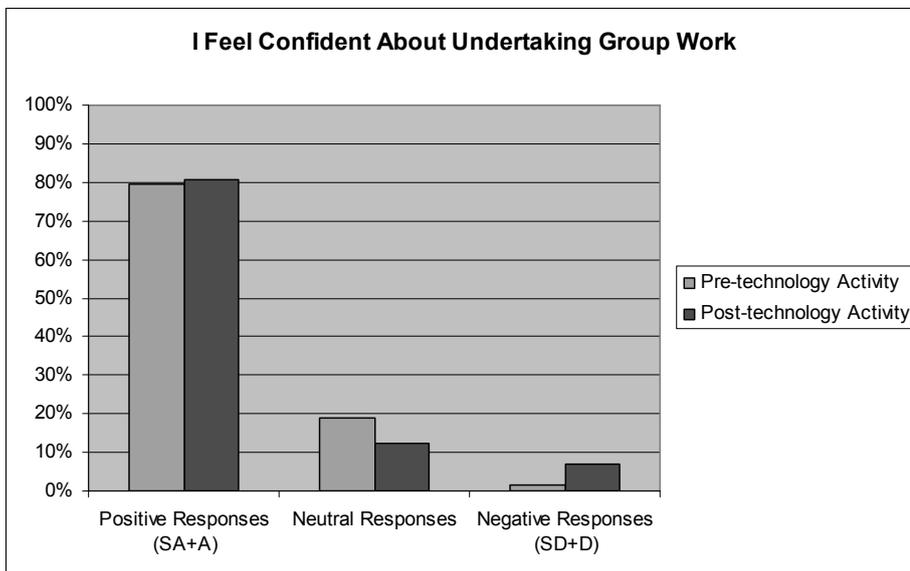


Figure 3 Learner confidence levels in undertaking the group based assessment

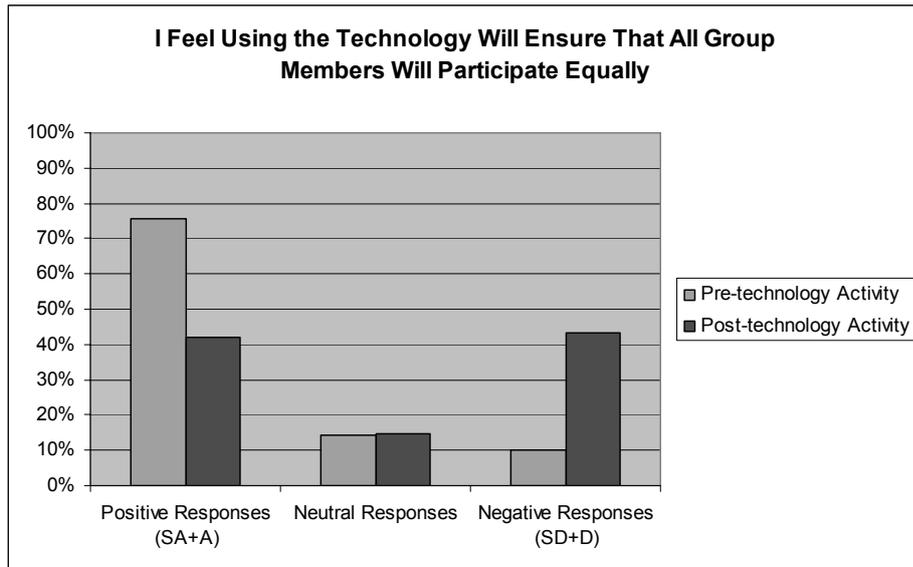


Figure 4 Learner participation and equality in group work

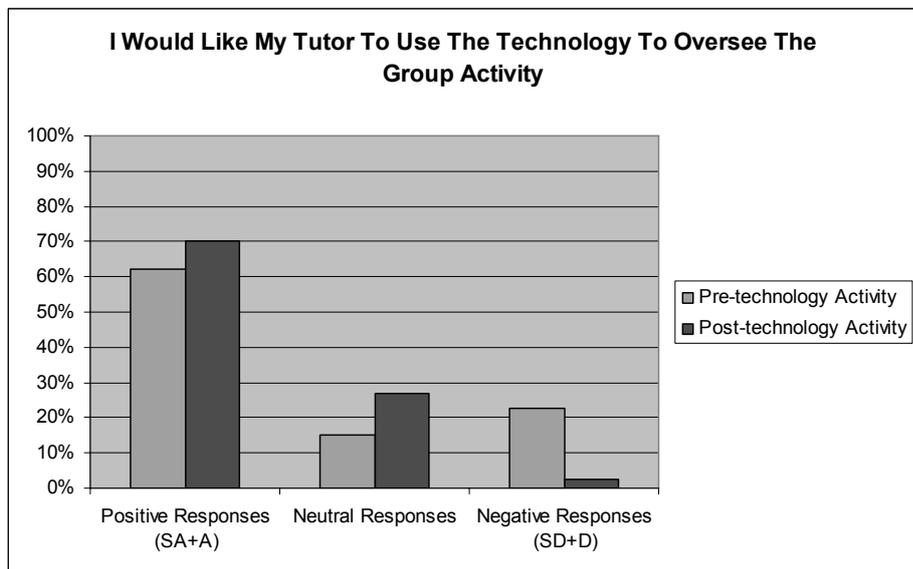


Figure 5 Tutor Role and Group Work

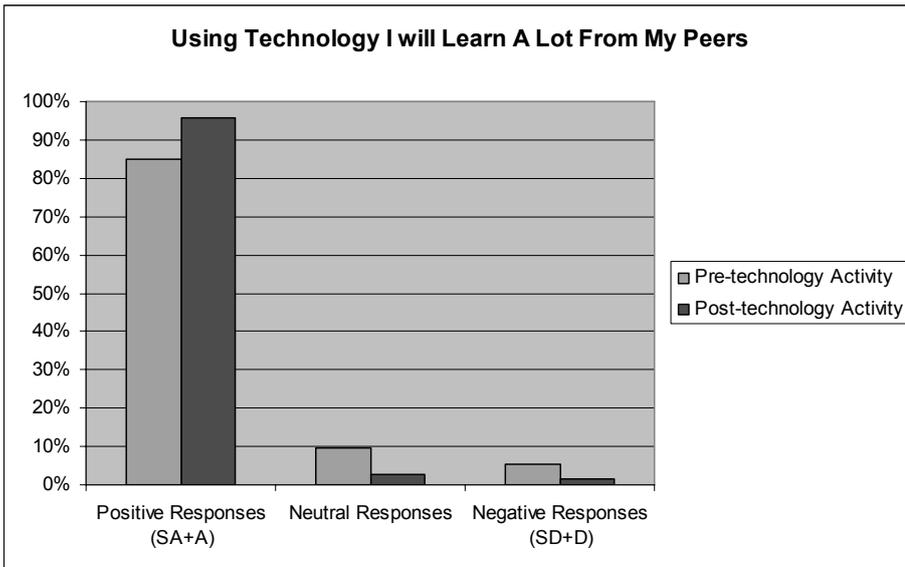


Figure 6 Learning from others in the community

Results from Reflective Group Blogs are presented below:

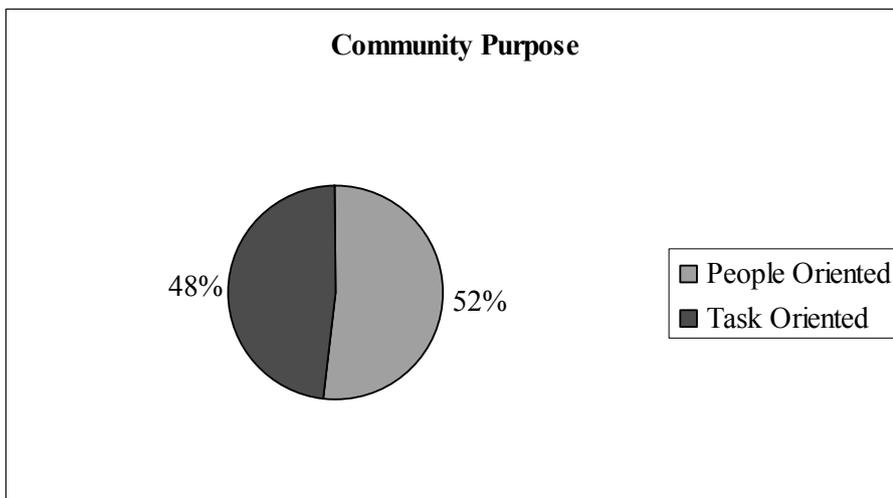


Figure 7 Learner perception of community

Out of a total of 88 comments provided by all 16 groups, 45 comments (52%) related to 'People Oriented' reasons as to what learners cite as the purpose of community.

Table 1 provides examples of student comments in relation to the 'People Oriented' aspects.

Table 1 Learner rationale for community - PEOPLE

" to contribute various ideas and opinions"
"to communicate regularly"
"to find someone who knows the answer to your question and is willing to help you"
"to share their views and ideas"
"to interact"
"we could communicate together as a team"
"to have connections"
"to work together to collectively complete an assignment"

42 out of 88 comments (48%) related to 'Task Oriented' as the purpose for their community. Table 2 provides examples of student comments in relation to the 'Task Oriented' aspects.

Table 2 Learner rationale for community - TASK

"to achieve the objectives and the tasks set"
"to complete the group assignment"
"to produce effective results"
"to complete each task within the required time"
"to ensure the successful completion of all tasks"
"to pass ISD2"
"to do the assignment"

Tables 3 and 4 provide examples of learner positive and negative comments relating to using the Wiki. Overall, learner attitude and feedback relating to the use of a Wiki to support group based assessment was positive with few students expressing negative comments.

Table 3 Examples of Learners' Positive Comments

"face to face could lead to members going off topic compared to online is very unlikely to happen"
"everyone contributes and there is a record for reflection after the event"
"the communication was less personal which could make the individual feel comfortable"
"provide confidence to the individual to effectively contribute their ideas"
"feel free to say what they are really thinking online so better expression online"
"access from almost anywhere, using mobile phones, laptops"
"you can reply at your own time when it suits you"
"we all have a username and password to see our assignment online securely at any time"
"so if I put my idea forward either in text, images or diagram and am not correct someone else in our group can edit it".

Table 4 Examples of Learners' Negative Comments

"it is hard to judge someone without even meeting them"
"fellow group members may rely on other group members to do their work group"
"no visual audio feedback people may take things the wrong way"
"lack of true response, facial expression"

Discussion of Findings

This study sought to investigate integrating collaborative learning using a Wiki in a blended learning environment to help understand a sense of community. The results from the group reflections demonstrate that learners perceived that the community had a purpose: to support them in undertaking their learning together both to support them as people and support the tasks set for the group based assessment. Indeed a learner cited *"to find someone who knows the answer and is willing to help you"*. Learners equally valued the opportunity to work collaboratively whilst carrying out set tasks for the assessment. They valued the opportunity to learn together, work together, share and discuss ideas, to support and help each other. According to Wenger (1998) a sense of community is about belonging, learning from one another, having an objective, a goal, a reason for joining the community and to revisit the community. In this study, learners demonstrate this sense of belonging *"so if I put my idea forward either in text, images or diagram and am not correct someone else in our group can edit it"*.

What was also evident from the group reflections is that learners valued the Wiki in undertaking the group based assessed activities and fostering a learning community, demonstrating that both people and task aspects are important when considering the design and implementation of a blended face-to-face and online learning experience. The results also show that the group process was supported by the Wiki. Learners were able to share their views and ideas, to connect and contribute to the group process. They were able to collaborate and edit other members work; the opportunity to use a jointly collaborative authoring tool helped with this.

The results highlight the importance for 'task oriented' learners of having the opportunity to manage their own learning and learning environment as learners cited the importance of achieving the objectives and set task in order to successfully complete the assignment within the required time, to produce effective results and pass the course. This was particularly evident in the students whose rationale for community was task orientated "*to achieve the objectives and the tasks set*".

An interesting finding is that students were 'comforted' by each other in the community as some of them stated being online saves face. "*the communication was less personal which could make the individual feel comfortable*" and "*feel free to say what they are really thinking online so better expression online*". The students also reported an added sense of confidence and felt encouraged by their group members to participate. Also they were not overly concerned about making mistakes indeed they reported they felt that other group members would be willing to correct their mistakes.

It is evident from the pre- and post-test results that once learners completed the group assessed tasks that their perception of Wiki and group work had changed. There was a 17% increase in learner confidence in using the technology to support group work as illustrated in figure 2 and the result of a paired samples test $t(64) = 2.527$; $p < 0.05$ shows a significant difference in the results. This supports the hypothesis that confidence was improved for learners in using the technology to support group work. There was a 26% increase in learner perceptions that Wiki technology can support group work as illustrated in figure 1 and the result of a paired samples test $t(70) = 3.436$; $p < 0.05$ shows a significant difference in the results. This supports the hypothesis that the technology can support learners whilst undertaking group work.

Similar problems as in conventional group based assessment (such as face-to-face), arose when using the Wiki; when learners were presented with the statement "I feel using the technology will ensure that all group members will equally participate" figure 4 shows a 34% decrease in positive responses in the post-test result. The result of a paired samples test $t(64) = -4.451$; $p < 0.05$ shows a significant difference in the results which rejects the hypotheses

that learners equally participate to the group work whilst using the technology. This may have resulted in the 10% increase in learners wanting the tutor to oversee the group work process as illustrated in figure 5.

Despite some negative comments learners overall had a positive attitude to using the Wiki for undertaking the group based assessed tasks. The data derived from the reflective blogs provided evidence of the kinds of learner engagement with the Wiki and the learning process. This is an important measure of learner use of the Wiki to support collaborative working and learning and a sense of community. Learners valued the Wiki in particular the opportunity to work on tasks any time, any place and at their own pace. They valued the opportunity for reflection before responding to others and liked that Wiki kept a record of these reflections as important in their learning. They valued the communicative aspects that Wiki affords *“so if I put my idea forward in text, images or diagram and am not correct someone else in our group can edit it”*.

There was evidence that some learners were concerned that not all group members equally participated to the group work. This was an important finding in this study and highlights the need to investigate further to put in place mechanisms to ensure that learners are encouraged to equally participate in the group work process. In addition, it is important to ensure that learners are not disadvantaged by using technology.

Some learners showed concern about the lack of ‘true’ responses, facial expressions, and that others may misinterpret edits to Wiki. These online communication difficulties and the need to physically be in contact with other group members have been widely reported by (Guernsey 1998, Larson 1999 and Hiltz 1998; as cited in Valenta 2001). Doolan & Barker (2005) similarly found that students preferred face-to-face contact in many online group situations.

An interesting finding from this study was that some learners valued the restricted access to the Wiki via password given the nature of Wiki is generally ‘open’ citing that they found the restricted access particularly useful in creating a safe and sheltered environment, which is important in nurturing a sense of community.

Conclusion

Using Wiki technology offers a major opportunity to personalise the student learning experience, enabling learners to co-create their own learning content, knowledge, and environment social constructivism. However, the uses of these technologies are in their infancy. Therefore, it is important to ensure that learners are not disadvantaged by using these technologies. On a personal note, this study has provided valuable insights into the individual learner

experiences and group processes in a system of mass higher education helping me to reflect and review my teaching, learning and assessment practices whilst helping learners develop a sense of community. Technologies such as Wiki, in addition to providing new learning opportunities, are relatively easy to set up and use. A critical success factor is the learning design, much of which is the transfer and adaptation of existing good conventional teaching, learning and assessment practices.

References

Baskin, C., Barker, M. and Woods, P. (2005) 'When group work leaves the classroom does group skills development also go out the window?' *British Journal of Educational Technology* 36 (1) pp 19-31.

DfES, (2005) The Department for Education and Skills e-Strategy, 'Harnessing Technology: Transforming learning and children's services', 15 March 2005. Available: <http://www.dfes.gov.uk/publications/e-strategy/> [Accessed 22 February 2007]

Doolan, M.A. and Barker, T. (2005) Evaluation of Computing Students Performance using Group Based Learning Online and Offline. In *Proceedings of the 9th CAA International Computer Assisted Assessment Conference 2005, July 5-6*, Loughborough University, Leicestershire.

Doolan, M.A. (2006) Effective Strategies for Building a Learning Community Online using Wiki. In *Proceedings of the 1st Annual Blended Learning Conference 2006, 15 June, University of Hertfordshire*

Doolan, M.A., Thornton, H.A. and Hilliard, A. (2006) Collaborative Learning: Using technology for fostering those valued practices inherent in constructive environments in traditional education. *Journal for the Enhancement of Learning and Teaching* 3, (2), pp 7-17

HEFCE's e-learning strategy (2005) Higher Education Funding Council for England, Joint Information Systems Committee and Higher Education Academy, March 2005

McConnell, D. (2006) *E-Learning Groups and Communities*. SRHE & Open University Press

Paloff, R. and Pratt, K. (1999) *Building Learning Communities in Cyberspace: Effective Strategies for the Online Classroom*. San Francisco: Jossey-Bass.

Richardson, W. (2006) *Blogs, Wikis, Podcasts and other powerful web tools for the classroom*. Corwin Press.

Tu, C.H. (2004) Electronic community of practice. In Silberman, M. (Ed.), *the 2004 training and performance sourcebook and the 2004 team and organization development sourcebook*. Wappingers Falls, NY: Inkwell Publishing

Tu, C.H., & Corry, M. (2002) Research in online learning community. Available: <http://www.usq.edu.au/electpub/e-jist/docs/html2002/pdf/chtu.pdf> [Accessed 19 February 2007]

Valenta, A. (2001) Identifying students attitudes and learning styles in distance learning. *Journal of Asynchronous Learning Networks* 5, (2) pp 111-127

Wenger, E. (1998) *Communities of practice: learning, meaning and identity*. New York: Cambridge University Press.

Biography

Martina A. Doolan is a National Teaching Fellow (2007), a blended learning teacher in the Blended Learning Unit and a principal lecturer in the School of Computer Science at the University of Hertfordshire. Her current interests include and are not limited to: Web 2.0 Social Software, Group Work, and Social Constructivist approaches to education. Contact by email m.a.doolan@herts.ac.uk