

Blended learning: Evaluation of the WebCT Blackboard Virtual Learning Environment in relation to asynchronous discussion and student assignments

Anthony Barnett
University of Worcester
(a.barnett@worc.ac.uk)

Keywords: blended learning, e-learning, virtual learning environment, asynchronous discussion

Abstract

This paper is a review of the potential value of the blended learning approach utilised in a level 6 module for final year undergraduate students entitled 'Issues in ICT and Education'. It includes a focus on the nature of blended learning approaches. There is an emphasis on the analysis of asynchronous discussion board posts and illustrative examples of reference to the on-line discussion within student assignments. The paper evaluates the impact of ways identified within the module to improve the quality of asynchronous discussion and concludes with a discussion of identified issues.

Main body of contribution

Introduction

The intention in this paper is to review the potential value of the blended learning approach utilised in a level 6 module for final year undergraduate students entitled Issues in ICT and Education. The 17 students taking the module were unaccustomed to the blended learning approach which involved alternating lectures and online asynchronous discussion. The students were all undergraduates but from different backgrounds: some were fulltime students and some were doing a top up degree. Several of the group were teaching assistants in primary and secondary schools, one was a lecturer in FE, and the full time students were following a range of different pathways.

Individual end of module feedback, talking to students and emails from students revealed a range of responses. 48% of the students valued the module and the blended approach either positively or very highly; 34% would have preferred the more conventional lecture format and 18% responded in the range favourable to being strongly dismissive of the value of the module. This mixed response is consistent with the view of Dziuban et al (2004) that,

“Students must come to terms, however, with the fact that previously successful learning approaches may not be nearly as effective in the blended environment. In a sense, they must relearn how to learn. The rhythms of blended courses differ from those in face-to-face classes, forcing students to stay actively engaged and connected. For students, the landscape of learning is drastically altered, although they are still able to anchor their learning experience on the familiar face-to-face class meetings.” (p.9)

Methodology

The research design included both an action research model and content analysis as part of a constructivist paradigm (Denzin & Lincoln, 2005). The methodology included an analysis of the content of the discussion board threads utilising the Bloom's Digital Taxonomy rubric for asynchronous discussion. However, the operationalising tradition in social research (Blaikie, 2008) was resisted as this would have required clear and precise working definitions in the manner of the concept-indicator model

(Dey, 1999). This approach would require ways of measuring, for example, “Replies show *insight, depth and understanding*” and “The reply or post shows a *high level of understanding*”, as well as other criteria within the rubric such as “The post *enhances the discussion...*” [Emphasis added](fig. 1). Nuances of meaning and variety of responses make such a thorough going and fine grained analysis a difficult challenge even were it to be part of a post-positivist approach. A more manageable methodology rooted within a postmodernist paradigm is to regard the asynchronous discussion data more subjectively. From this point of view the analysis is supported by the rubric in a way more closely related to the sensitizing tradition, and also informed by the experience of participating in the discussion. This is also consistent with a participatory action research approach aiming to improve the quality of the asynchronous discussion and thereby contributing to also improving the quality of the module. The cyclical process involved discussion of strategies in the lecture, participation in asynchronous discussion, evaluation of quality of discussion and potential for trying out further strategies. The evaluation of the blended learning approach adopted by the module is also able to provide a source for discussion by students in the following year’s module. As Eisner (2005) suggested,

“our propensity to change practice is a function of the attractiveness of a set of ideas, rather than the rigour of a body of data-based conclusions” (p.89)

Outline of the module

The content of the module covered a range of issues including Government policy, aspects of Web 2.0, ICT in the home, gender issues, ICT thinkers, digital games, technology and inclusion, Internet safety and schools of the future. These topics were introduced in the face to face sessions and followed up as discussion threads on the Blackboard discussion area. The technology and inclusion topic was approached as a directed study involving small group collaborative online discussion to support preparation of a short presentation. The resultant presentations were uploaded to the Blackboard and students posted peer assessment evaluative comments on each presentation. The three assignments for the module focused on evaluating a recent ICT research paper, critically analysing some perspectives on educational ICT and evaluating the effectiveness of the virtual learning environment (VLE). This third part of the assignment provided an ongoing focus throughout the module.

As the third part of the assignment required students to evaluate the effectiveness of the VLE, the value of contributing to the online discussion was discussed and emphasised at the start of the module. Furthermore, as this assignment expected students to include an evaluation of their own contribution to the Blackboard discussion motivation to participate was an inherent part of the module. Ongoing consciousness-raising about what was possible with Blackboard was included during the face to face sessions e.g. students were shown use of the ‘Tracking’ tool which records participation statistics; referring back to statistics from the previous year showed the average number of posts to have been 27 with a range from 15 – 56; the first two face-to-face lectures also included a specific focus on VLEs and improving the quality of online discussion.

Asynchronous discussion in the context of the Module

Chan et al (2009) identify the potential value of asynchronous discussion, a major component of this module, as being underpinned by the social constructivist perspective on learning. This model suggests that the value of the learning that occurs will be related to the extent of the discussion. In the review of literature on this topic Chan et al note average discussion thread sizes of 2.2 and 2.69 messages, suggesting students lack motivation to post messages. During the ‘Issues and ICT’ module, where participation in the online discussion was a formal requirement of the module, the average thread size was considerably higher at 21 messages per thread. The extent of the discussion is also reflected in the number of messages posted by individual students, an average of 22.5 messages per student with a range of 13-51, with most in the range 19-26, (excluding two students who made minimal

contributions). Table 1 provides a more detailed view of the lengths of discussion threads in the 'Issues in ICT and Education' module.

Government Policy		Web 2.0 applications	
Rose Review	1	Facebook, YouTube, Twitter and short term working memory	7
ICT & Education	18	How can blogs, podcasts and wikis enhance higher order thinking skills?	14
Directions in Government Policy	5	Using Blackboard for asynchronous discussion	27
Directions in Government Policy (1)	28	YouTube	16
Emphasis on ICT in schools	17	Is there any educational value in Facebook, MySpace or BeBo?	53
Reading the literature		Other Web2.0 topics	17
Summaries of documents	14		
Perspectives on educational ICT		Uncategorised topics	
	0	General queries	22
Inclusion directed studies – peer assessment posts	26	Home use of ICT	26
Group 1	31	Average thread size = 21 Range: 0-52	
Group 2	52		
Group 3	30		
Group 4	19		

Table 1

It was a formal requirement of the module for the students to make a significant contribution to an online discussion equivalent to two hours study each week. The meaning of 'significant contribution' was not stated on the module outline but was discussed with the students from the outset of the module. As the module progressed it seemed expedient to set a minimum number of posts in order to increase motivation and provide input about expectations. This minimum number was set at 15 though students were reminded that this would need to represent the equivalent of two hours study each week, and needed to be posted throughout the module i.e. not tacked on at the end.

Literature review

Singh (2003) contrasted first generation e-learning, which duplicated face-to-face approaches using electronic means such as 'page turners', with second generation e-learning which takes the form of blended learning approaches. Singh (2003) also extended the more limited original use of the blended learning concept as the mix of asynchronous discussion with traditional classroom teaching by referring to several overlapping dimensions. Attention was drawn, for example, to the blending of live with 'self-paced and collaborative learning', inclusion of support for unstructured learning, development of custom content and performance support.

Various concepts and models of blended learning have been considered. Dziuban et al, 2004, referred to blended learning

“as a pedagogical approach that combines the effectiveness and socialization opportunities of the classroom with the technologically enhanced active learning possibilities of the online environment, rather than a ratio of delivery modalities” (p.3)

and identified key aspects of the teaching model as student centred teaching and active learning, increased interaction and a more integrated approach to assessment. Driscoll, 2003, referred to blended learning as having one of four forms: combination of web-based technologies; combination of pedagogical approaches e.g. as implied by different learning theories; combination of web-based and face-to-face teaching and; combination of instructional technology with work based learning. Khan's Octagonal Framework (Singh, 2003) provides a more structured approach to making decisions about the specific form of blended learning appropriate for particular circumstances. Pedagogical, interface design, resource support, evaluation and

ethical dimensions are relevant for the implementation of the module as well as at the module planning stage and more broadly. Institutional, management and technological dimensions form part of the broader context.

The blended learning approach

The 'Issues in ICT and Education' module approached the face-to-face lectures through use of a variety of teaching methods in each session. Lectures typically included a combination of reviewing progress with the online discussion, specific support directed at writing one of the assignments, discussion of an article/article extract students were expected to have read prior to the session, input relating to new subject content for the session typically using PowerPoint, focus on resources located on Blackboard, orientation for the non-contact week. The emphasis varied depending on particular circumstances and in some lectures some of the above structure was abbreviated or omitted e.g. on one occasion adverse weather led to a reduced lecture time. The face-face lectures also included one session where, as part of the session, students read their first assignment to other group members. Outside of the lectures email support was available and provided to all students that initiated contact. Approximately a quarter of the group made use of this opportunity to support assignment writing. The online component of the module involved mainly the posting of individual contributions to the asynchronous discussion; there was also a collaborative directed study involving asynchronous discussion leading to a PowerPoint presentation and peer review using the discussion board.

It is evident from the above description of the module that the blended learning included web-based and face-face teaching, a range of pedagogical approaches including an active role for students within lectures and enhanced contact outside of lectures in the form of email correspondence support related to the assignments.

Results

This section begins with a focus on the discussion of virtual learning environments and identification of criteria for improving the quality of the online discussion. This is followed by content analysis of the data collected utilising the students' strategy criteria and Bloom's Digital Taxonomy rubric. This tabulated data is then illustrated by anonymized examples from the discussion board and from an assignment.

Virtual learning environments

The first lecture of the module focused on the potential of virtual learning environments to support learning and on the implications of Bloom's digital taxonomy for asynchronous discussion.

The initial discussion identified that students were mainly familiar with the use of Blackboard as a storage space for tutor notes. The discussion of an article by Konrad, 2003, highlighted potential advantages and drawbacks of using a VLE in a more active way and the students reflected on the possibilities e.g. the potential for supporting a more informed type of reflection when expressing ideas contrasted with the demands of learning in a more independent way.

In relation to Bloom's digital taxonomy (Churches, 2009) particular emphasis was given to the 'threaded discussion rubric' focusing on Understanding and Evaluating. Attention was drawn to the value of communicating personal opinions that relate to and build on previous posted messages and that express insight and understanding in a supportive way. Fig. 1 is an extract from the rubric showing expectations at the fourth level and insofar as this was a group of final year undergraduate students they were encouraged to work towards these expectations while contributing to the online discussion.

Construction and understanding component					
4	Reply construction			Understanding	
	Spelling and grammatical errors are rare. The reply has structure and is formatted to enhance readability. Contains a appropriate links, uploaded files or images. Sources are acknowledged. Images and links are referred to within the text. Refers to other posts and builds on these.			Replies show insight, depth and understanding. They are connected with thread, topic or post. Entries are relevant with links to supporting material. Personal opinion is expressed in an appropriate style and is clearly related to the thread or post. The reply or post shows a high level of understanding, it shows a depth of understanding in matters relating to and surrounding the original post.	
Evaluation component					
	Reference	Clarity	Argument	Critique	Questioning
4	Student refers to other posts. The reply post is related to the thread.	The post enhances the discussion and is expressed in clear and concise opinion.	The student has developed the argument using appropriate language. This is clearly and appropriately supported by facts, opinions and related materials including links.	The student is judging other posts on their merits. The student provides a detailed critique of posts in an appropriate manner.	The student structures appropriate focusing or challenging questions related to the topic and previous posts. The student answers the questions posted by their peers with depth and shows a high degree of understanding. Can defend his or her position of stance on a topic.
Fig. 1 from Churches, 2009, pp59-60					

Improving the quality of online discussion

The second face-to-face lecture included discussion related to the Golanics & Nussbaum's (2007) research paper, focusing on how to improve the quality of the online discussion. This discussion combined well with the previous focus on Konrad's article and Bloom's revised digital taxonomy and led the students to identify a range of strategies to improve the quality of the online discussion. Table 2 represents the students' agreed strategy for improving the quality of the online discussion and comparative analysis of the early and later part of the module. During this period there was discussion during two face-to-face lectures of the progress of the Blackboard discussion.

Strategy	October posts	Nov-Jan5th posts
Ask questions either during or at the end of a post	21%	30%
Relate the content of the post to one or more posts in the thread	100% of posts were related to the thread i.e. they were focused on the topic	
Incorporate evidence of reading relevant literature	24%	28%
Include hyperlinks (live or address included)	7%	22%
Include reference to sources (inline – author + date only)	21%	10%
Direct critical responses at the post and in a supportive manner	<5% focused specifically on critiquing views expressed by students	
Table 2		

The analysis of the content comparing posts for October and Nov-Jan 5th indicates an increased number of posts where students posed questions and increased evidence of reading. The data also shows that more students were including useable links i.e. live or including the address and less non-usable links i.e. inline quoting of authors and date of publication.

Tables 3 and 4 (based on the Bloom's Digital Taxonomy rubric) represent the impression gained from analysing a total of 204 posts in the Blackboard discussion. The approach adopted for this analysis was influenced by the suggestions of Miles & Huberman (1994) for representing qualitative data and is consistent with the more subjective impressionistic approach to data analysis referred to in the Methodology section of this paper.

Reply construction	Comments
Spelling and grammatical errors are rare	Almost all posts were written in standard English
The reply has structure and the formatted to enhance readability	Paragraph structure was the common format
Contains appropriate links, uploaded files or images	No posts included uploaded files
Sources are acknowledged	
Images and links are referred to within the text	Sources/hyperlinks were referred to within the posts as integral to the view being expressed. <8% of posts included a reference as an adjunct.
Refers to other posts and builds on these	Most replies could be interpreted as responses to other posts but only a few replies identified the author of the original post.
Understanding	
Replies show insight, depth and understanding	Almost all posts and replies were well focused and demonstrated understanding of the topic within the context of an ongoing discussion.
They are connected with thread, topic or post	All replies were related to the thread and all threads started by students were relevant to the topic.
Entries are relevant with links to supporting material	Supporting material was not included in any of the posts apart from hyperlinks which enabled access to source documents.
Personal opinion is expressed in an appropriate style and is clearly related to the thread or post	Almost all posts expressed relevant personal opinions
The reply or post shoes a high level of understanding	The meaning of 'high level' and 'depth' within the context of the ongoing discussion were not clearly determined. However, approx. 10% of replies included a very clear extension or critical response to ideas in a particular post. These replies argued for a particular viewpoint and included reference to more than one source.
It shows a depth of understanding in matters relating to an surrounding the original post	

Reference	Clarity	Argument	Critique	Questioning
Student refers to other posts	The post enhances the discussion and is expressed in clear and concise opinion	The student has developed the argument using appropriate language	The student is judging other posts on their merits	The student structures appropriate focusing of challenging questions related to the topic and previous posts
<i>Most replies could be interpreted as responses to other posts but only a few replies identified the author of the original post.</i>	<i>The general impression was that some replies reinforced previously stated viewpoints. However, replies typically added new material e.g. an idea not previously expressed and/or a reference not previously cited</i>	<i>The general impression was that of students being engaged by the discussion. The posts and replies reflected the interest and involvement of the students. The style of writing was generally informal but well focused</i>	<i>Rare</i>	<i>Questions varied from specific tightly focused questions to vary general open questions e.g. what do you think? Some questions were quite inventive e.g. "instead of thinking "we must ban this website", why not consider "what makes this game more engaging than the research activity?"</i>
The reply post is related to the thread		This is clearly and appropriately supported by facts, opinions and related materials including links	The student provides a detailed critique of posts in an appropriate manner	The student answers the questions posted by their peers with depth and shows a high degree of understanding
<i>All replies were related to the thread and all threads started by students were relevant to the topic.</i>		<i>This was less evident in posts directly related to assignments</i>	<i>No posts of this type</i>	<i>When questions were asked they always elicited answers. The linked post was more usually part of the discursive flow than a demonstration of depth of understanding.</i>
				Can defend his or her position or stance on a topic
				<i><5% fitted into this category</i>

The general impression of the quality of the asynchronous discussion gained from using the Bloom's Digital Taxonomy rubric was that students engaged with the discussion thread topics informed by relevant background reading that had involved independent research for appropriate sources. They remained focused on the developing topic thread, responding to and building on previous posts. The character of the discussion thread labelled "Using the Blackboard for asynchronous discussion" included 27 quite brief messages with no links or references to sources but very clearly focused on evaluating the discussion. As the third part of the individual assignment was an evaluation of the VLE it's possible that the students wanted to keep references for their assignments private! Similarly the discussion threads labelled "ICT Thinkers" and "Reading the Literature", relating to the first and second parts of the assignment had only 3 posts and 14 posts respectively.

Illustrative example

The following example of a student's posted message illustrates the identified characteristics of the students' agreed strategy and criteria drawn from the Bloom's Digital Taxonomy rubric,

"Most of the discussion so far seems to suggest that there is no educational value in social networking sites. However, there has been some research by the [University of Minnesota](#) which claims that there is. Christine Greenhow, who led the study, says:

"What we found was that students using social networking sites are actually practicing the kinds of 21st century skills we want them to develop to be successful today. Students are developing a positive attitude towards using technology systems, editing and customizing content and thinking about online design and layout. They're also sharing creative original work like poetry and film and practicing safe and responsible use of information and technology. The Web sites offer tremendous educational potential."

This is supported by an article in the [Guardian \(2008\)](#), which says that social networking sites can be used to collaborate on homework activities and construct "e-portfolios". The "7 Things You Should Know About Facebook" report by [EDUCAUSE \(2007\)](#) says that Facebook is "here to stay" – so how long can we keep ignoring it in terms of education? I don't necessarily agree with this research, but it does offer an alternative viewpoint. Do you think that the points raised here are valid?"

Using the discussion threads within assignments

The following example of use of the asynchronous discussion when writing the first assignment (evaluation of a research paper related to home or school use of ICT) enabled the student to demonstrate engagement with issues related to the evaluation of their chosen research report. It also illustrates transfer and application of learning, which was one of the themes discussed by the students in relation to Bloom's revised digital taxonomy.

This assignment included a focus on the 'digital disconnect' (Levin & Arafeh, 2002) which refers to the different use of ICT within school and outside school. The student referred to evidence that primary school pupils typically play non-educational games when at home (Kerawalla & Crook, 2002, and Selwyn et al, 2009) and noted the views of Solomon & Schrum (2007) that Web 2.0 applications are commonly utilised outside school. This evidence, linked to the findings of Barker & Gardener (2007) that primary school teachers are confident with ICT and enthusiastic to use ICT within lessons, was then used to suggest Web2.0 and digital games as a means of beginning to reduce the digital disconnect. However, the student was also aware of the contrary results of the Selwyn et al research regarding out of school use and supplemented this with reference to the Blackboard online discussion to support a personal viewpoint,

“It is more likely that these Web 2.0 applications are not used as much at home or at school because of growing Internet safety concerns. This is supported by contributor A (Posted on Blackboard On: 28th October 2010 at 6:38pm), who discusses closely monitoring her son’s Internet use”.

Although there was no specific resolution to this theme of the digital disconnect, the issue was returned to in a general way as part of a concluding paragraph within the assignment by drawing attention to the recommendation of Selwyn et al (2009) that ICT within primary schools should emphasise ‘exploration’ rather than ‘restriction’.

Discussion

The number of messages posted and length of discussion threads is likely to have been directly related to the formal requirement to make a substantial contribution to the discussion. However, the average number of posts (22.5) was significantly higher than the stated minimum of 15. This may suggest that students wanted to do more than the minimum in order to improve assignment grades. However, there was no requirement to include examples from the discussion in the first two assignments. In the third assignment students were only required to focus on one of the threads they had made a significant contribution to. The well above minimum number of posts may also suggest therefore that students became engaged by the evolving discussions, which is consistent with the review of Chan et al (2009) which noted,

“...students must find the topic worthy of discussion and can relate the topic to the class learning goals. The perceived worth of the topic becomes the anchor for promoting a sustained discussion.” (p. 440)

My impression of the interest and engagement of the students was reinforced by my own experience of participating in the online discussion. The flow of messages being posted also helped to maintain interest in the discussion. The independent study which involved students drawing on texts to support views expressed definitely helped to set expectations when posting messages.

There was quite a lively face-to-face discussion during one of the lectures where progress with the online discussion was reviewed. It was interesting that some of the students had clearly read what others had posted and had valued their contributions. Topics covered included the question of anonymity but quickly progressed onto contrasting opportunities for self-expression in the face to face environment and the difficulty of tracking specific discussion points in asynchronous discussion. As noted by Chan et al (2009) the group agreed that the Blackboard interface may have contributed to this problem of responding to messages posted near the start of themes being developed in the discussion. However some of the group pointed out that it is possible to enter the discussion at any point by expanding the particular thread in focus. The resolution of this perceived difficulty would seem to be developing greater familiarity with how the Discussions area in Blackboard works.

In the role of teacher for this module I endeavoured to tread a balanced line between facilitator and observer of the discussion. My contributions were more frequent at the start but became less frequent as the students became more involved in the discussion. Utilizing PQRS framework referred to by Chan et al (2009) my initial posts typically **P**ointed students in the direction of adding references to literature and web sources; this became more focused when I urged students to include live web links. I also joined in with the **Q**uestioning strategy agreed by the group by concluding my posts with open ended questions aimed at sustaining the discussion. Later on in the module, once threads were well developed, I used the **S**ummarising technique and incorporated discussion based on the summary into the face-to-face lectures. One of the themes identified by some of the students was that of agreeing with each other rather than expressing conflicting opinions. Although this did not occur very noticeably or frequently, neither was there any clearly conflicting views expressed. Consequently the **R**esolving strategy was not evident in any of the discussion threads.

With regard to the action research aspect of the methodology discussion with the Course Leader following completion of the module identified the following specific changes to the next module with regard to the asynchronous discussion using Blackboard:

- The first two lectures will be face-face. This will provide opportunity for the students to become familiar with use of the Blackboard for online discussion
 - There will be specific attention to the structure of the discussion i.e. how to expand threads to follow and contribute more easily to the discussion
 - How to format messages to include live hyperlinks
 - Examples of well formatted messages
- The first two lectures will also pave the way for the more independent study character of the module
 - Approaches to the use of literature to support message writing will be considered
 - Attention will be given to managing time when working on the module in the non-contact time
- It was decided to develop the Resolving strategy, within the PQRS framework, as this was thought valuable. The asynchronous discussion will therefore also include a debate format where students are assigned to either side of the debate within one of the discussion threads.

References

Barker, R. & Gardiner, J. (2007) Focus on the digital age: e-learning and e-skills. London, National Statistics. (Accessed 6/1/11)

http://www.statistics.gov.uk/downloads/theme_compendia/foda2007/Chapter3.pdf

Blaikie, N (2008) Designing Social Research, Polity Press, Cambridge

Chan, J. Hew, K and Cheung, W (2009) Asynchronous online discussion thread development: examining growth patterns and peer-facilitation techniques, Journal of Computer Assisted Learning, 25, pp. 438-452

Churches (2009) Bloom's Digital Taxonomy,

<http://edorigami.wikispaces.com/file/view/bloom%27s+Digital+taxonomy+v3.01.pdf>

(Accessed 09/09/10)

Denzin, N & Lincoln, Y (2005) The Sage Handbook of Qualitative Research, 3rd Ed, London, Sage

Dey, I (1999) Grounding Grounded Theory: guidelines for qualitative enquiry, London, Academic Press

Driscoll (2003) Blended Learning: Let's Get Beyond the Hype,

http://www-07.ibm.com/services/pdf/blended_learning.pdf (Accessed 12/12/10)

Dziuban, C. Hartman, J and Patsy, M (2004) Blended Learning, Educause Centre for Applied Research, Research Bulletin, Vol 2004, Issue 7, March 30, pp. 1-12

EDUCAUSE (2007) <http://net.educause.edu/ir/library/pdf/ELI7025.pdf> (Accessed 20/10/10)

Eisner, E (2005) Reimagining Schools: the selected works of Elliot Eisner, London, Routledge

Golanics & Nussbaum's (2007) Enhancing online collaborative argumentation through question elaboration and goal instructions, *Journal of Computer Assisted Learning*, Vol 24, Issue 3, pp. 167-180

Guardian (2008) <http://www.guardian.co.uk/education/2008/jun/25/schools.uk2>
(Accessed 20/10/10)

Kerawalla, L. & Crook, C. (2002) Children's Computer Use at Home and at School: context and continuity, *British Educational Research Journal*, 28(6), pp. 751-771

Konrad, J (2003) Review of educational research on virtual learning environments [VLE] - implications for the improvement of teaching and learning and access to formal learning in Europe, <http://www.leeds.ac.uk/educol/documents/00003192.htm>
(Accessed 21/09/2010)

Levin & Arafeh(2002)
http://www.pewinternet.org/~media/Files/Reports/2002/PIP_Schools_Internet_Report.pdf.pdf (Accessed 5/1/11)

Miles, M & Huberman, A (1994) *Qualitative Data Analysis*, London, Sage

Science daily (2008)
<http://www.sciencedaily.com/releases/2008/06/080620133907.htm> (Accessed 20/10/10)

Selwyn, N., Potter, J. & Cranme, S (2009) Primary pupils' use of information and communication technologies at school and home, *British Journal of Educational Technology* Vol. 40 (5) pp. 919–932

Singh (2003) Building Effective Blended Learning Programs, *Educational Technology*, Vol 43, No. 6 pp. 51-54

Solomon, G & Schrum, L (2007) *Web 2.0 New Tools, New Schools*, Eugene, Or. ISTE

University of Minnesota
<http://www.sciencedaily.com/releases/2008/06/080620133907.htm>
(Accessed 20/10/10)