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1. Are Virtual Learning Environments used to facilitate collaborative student learning activity? Findings of an institutional evaluation.

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Summary

Virtual Learning Environments (VLEs) are used extensively within higher education, primarily as an educational tool, but can also have additional functionality. There has been considerable debate, both internal to the university and in the external academic community, about the value of a VLE, e.g. MacLaren (2004), Sharp et al. (2005) and Conole and de Laat (2006). The focus of this debate is whether or not a VLE is primarily used as a transmissive tool, in which the teacher determines VLE content and communication and which tends to be teacher initiated while the student adopts a passive role (Jonassen & Land, 2000). Whilst a transmissive approach may be an important element in students' learning experiences, there is little evidence to suggest such usage facilitates deep learning.

Keywords

Virtual learning environments / collaborative learning / transmissive learning / student evaluation.

Introduction

Many authors have identified how additional VLE functionality offers potential use of non-transmissive approaches to education in which there is a belief that deep student learning will occur, e.g. constructivist and collaborative learning methodologies. Whilst the authors were aware of some internal use of non-transmissive approaches to VLE use, there was little evidence to support any anecdotally based conclusions about the extent to which such activity occurred. Therefore, the purpose of this study was to obtain information from students about their use of the university's VLE, enabling the authors to evaluate the extent to which the VLE was used as both a transmissive and non-transmissive tool.

The study's aims were:
- To find out what students used on the VLE
- To determine what students used the VLE for
- To investigate student perceptions of the VLE
- To find out what additional information and features students would like on the VLE
- To identify factors influencing student usage of the VLE

Methodology

The methodology employed in this study followed principles for examining students' experiences of technology recommended for the JISC e-learning programme and which have formed the basis of a number of recent major studies of students' views on the use of technology in Higher Education, such as the JISC LEX (Mayes, 2006) and LXP (Conole & de Laat, 2006) projects. The study used a naturalistic approach, recruiting student volunteers to use various tools that would provide a triangulated, essentially open-ended approach to obtaining students' perspectives on how they used the VLE. To obtain both breadth and depth in data collected about students' use of the VLE, three methods of data collection were used: questionnaire, diary and focus group.

The questionnaire was selected to provide a broad student perspective on their VLE activity and was completed on-line via the Student Union web site. Design of the questionnaire structure enabled the authors to collect information about how students used the VLE from both a transmissive and non-transmissive perspective, ease of use, support provided in VLE use, personal feelings about using the VLE, evaluating impact of VLE use on their learning and demographic data.[*]

The second data collection tool to be used was a diary that was used after the questionnaire completion period had expired. The diary provided an opportunity, through adoption of an open ended structure, for students' accounts of their VLE use, for example how they used the VLE and the relationship between VLE use and their overall learning, to obtain detailed insights into student activity. The students completed the diary for one VLE session each week over an eight week period.[*]

The focus group was the final data collection tool used to enable the authors to acquire clarification about student diary data as well as explore further the themes emerging from diary and questionnaire data. Discussion within the two focus groups covered aspects of inconsistencies in the VLE, relationship between the VLE functionality and their learning style as well as the actual and potential of the VLE for student communication and collaboration.[*]

407 students (1.67% of the university's student body) responded to university wide publicity and volunteered to complete the on-line questionnaire. A purposive sample of 14 students was selected to complete the diary with the same 14 students participating in one of two focus groups. These 14 students were chosen so that all nine of the university school's were represented and that a cross-section of undergraduate and postgraduate programme years were

included as well as international students. Quantitative data resulting from the completed questionnaires and diaries were subjected to descriptive statistical analysis (Patton 2002). Qualitative data obtained from all three data collection methods were analysed following the principles of thematic coding (Boyatzis 1998). One member of the research team read through the transcribed interview transcripts and generated some categories descriptive of the interview contents. After discussion with colleagues in the team, the categories derived were grouped and refined into a thematic coding scheme. Inevitably, in this process, data reduction occurs as the research team took decisions about concepts and, in summarising, coding, eliciting themes and clustering responses. Such a data reduction/transforming process is referred to by Strauss (1987) as the conceptualisation of data. By collaborating as a team, the researchers hoped to reduce the intrusiveness of the researchers by working towards a mutual interpretation of the data. Interview transcripts were revisited by the team members and passages allocated particular codes across the transcripts were extracted, matched and commented upon by each team member. The results section represents the outcome of this process.

Results
The study found that a majority of students (66%) logged into the VLE on a daily basis. The predominant ways in which the VLE was used concerned students either downloading and then annotating learning materials, or using the VLE for assignment preparation.

Table 1 indicates the time in minutes spent in the VLE by students on one day in each of the eight week period of diary completion.

The data provided insight into the students' views of the contribution that the VLE made to their learning, both in a positive and occasionally, a negative way. This paper utilises participants' comments to illustrate

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[*] Copies of all instruments are available from the authors on request.

the authors' interpretation of the data, which identified the different ways that the VLE enhanced student learning as well as considering factors impeding their learning and how the VLE might be more effectively used.

The data provided an overview of student activity within the VLE. Table 2 illustrates what students did in terms of downloading, note taking, printing and reading notes via the VLE:

Student activity data suggests that the VLE is primarily used as a content repository, with little indication of non-transmissive approaches to learning being used. Themes generated from the qualitative data were as follows:

Extension of subject knowledge
Some students discussed how extension of their subject knowledge was made possible by the provision of supplementary information on the VLE:

The VLE gives you the opportunity to explore subjects in more detail… The VLE …has helped on essay writing and all other aspects of university project life…it contains useful information on subjects which help you learn but also on subjects which you would be interested in, allowing you to extend your knowledge. (2nd year female UK student)

Modernity and motivation.
Students welcomed the modernity of the VLE and found it motivated them in their learning:

The information was clear and concise and helped me understand the work which I was trying to do. Therefore I felt more motivated to complete it to a higher level…, it was a very contemporary way to receive information…(1st year female international student)

Other students liked the flexibility of the VLE, the "any time, any place" aspect of usage and the ability to communicate with their lecturers via the VLE:

*The VLE is an interesting addition to teaching because it means that you have access to everything you need to know for the module and course at any time day or night. (*3rd year female UK student)

The VLE as a source of support & interactivity
Almost half of the survey respondents (42%) agreed that the VLE fostered interaction with staff. When their lecturers were unavailable or time was short, students recognised that they could get support from the VLE:

The VLE is a good way to learn …especially at times when I may find something difficult on my course and do not have the time to speak to a lecturer, I can log on to VLE and get information. (2nd year female UK student)

Support could be forthcoming not only from lecturers but from other students in modules where interactivity was encouraged:

I could not successfully complete a module without the VLE site. I use VLE to allow me to interact with other students and lecturers via the discussion boards and it often helps when I am struggling with work, especially when I know others are also finding it difficult. (2nd year female UK student)

The interactivity and communications aspect of the VLE were described as being beneficial to shy students and to international students who might be inhibited about speaking up in class but felt more confident engaging in on-line discussion. This could help increase such students' confidence.

Independent study and personalisation.
The VLE afforded students the opportunity to pace themselves and engage in independent study:

The VLE …allows the individual to be more in control of their own learning and go at their own pace… (2nd year female UK student)

Students were aware of how the VLE could cater for different learning styles:

Students each learn differently so by having a mixture of learning options it will allow all students to be able to use the VLE to help themselves. (1st year female UK student)

The reflective student
Furthermore, students described how they used the VLE to reflect on sessions, particularly by downloading and annotating on-line learning materials provided by the lecturer, e.g. lecture notes and further reading links. However, some students believed the VLE was not being used for maximum benefit and as such limited opportunities for students to adopt a student-centred approach to learning:

I have not greatly benefited from the VLE in a sense regarding teaching; it is more an information point for me. It mainly saves me time if I can print off lectures rather than taking a lot of notes…The VLE is not as yet an aid to learning nor a way of learning. There has been nothing more than lectures put on the VLE. (2nd year female UK student)

Certainly students were aware of how the effectiveness of the VLE was dependent on usage by staff and students:

The VLE is certainly an effective addition to teaching in terms of the facility to post learning information and material.

Sometimes it is an interesting addition to teaching. It depends on the lecturer and how they use it. (postgraduate female UK student)

On the other hand there were instances when lecturers used the VLE but the students on the module did not avail themselves of the options made available to them:

It also depends on the student cohort. For example, one of my lecturers started a discussion board this semester which I thought was a really good idea and a good way to stimulate interest but no one bothered to post anything there! (postgraduate female UK student)

This is a common experience with face-to-face courses since students may feel there is no real need to use virtual discussion when they have direct access to their peers. Use of techniques to encourage participation, particularly through staff development activity, might increase discussion board activity:

Students use the VLE just because their tutors ask them to do it. They do not use it on their own initiative. That may be one of the reasons why on-line discussion is not used widely…The function of interactivity is available on VLE, but students are not interested in it. I think one of the main reasons is that the "authors" of VLE are not responsible… too busy to make their module information attractive. (postgraduate female international student)

However, it would be inappropriate to blame students for failing to use the VLE if staff lack the time, experience and training to make on-line material more attractive. Lecturers may not be afforded the time to develop expertise or attend training sessions to enable this.

Students appeared to adopt a student-centred approach to their learning when using a teacher-controlled facility since they were able to identify ways they met their individual learning needs, as in the following example:

I normally do a lot of research to understand the problem very clear before solving it. I need a clear structure or strategy to learn and establishing them take me a lot of time. I think VLE is suitable for me because the amount of material and how it is organised help me to reduce my time searching for materials and focussing more on the actual problem. (postgraduate male international student)

Impediments to student engagement with the VLE

Students identified a number of impediments to their use of the VLE, including nature of content; lack of effective induction; consistency in navigation functionality; and, access problems.

Text-based content

Some e-Learning systems contain predominantly text-based content which may make users less engaged during on-line learning. Users dislike reading large volumes of text on screen (Carswell, 1998). As Carswell points out, students are used to the 'web culture's colourful punchy documents which display their information quickly and easily' (Carswell, 1998: 47). The VLE was criticised by a number of students for its limited functionality and over-reliance on text, which may partially explain low take-up in some modules:

As I study Law I often have to read long passages of text which can be quite boring but if there were images and interactive questions and answers to test yourself on what you have just read, it would make it more interesting. (1st year female UK student)

Induction

Only 13% of the questionnaire respondents felt that they needed more guidance in using the VLE and, overall, 85% agreed that they were confident using the VLE. However, a number of student focus group participants identified problems in their preparation:

I didn't receive much support at the beginning of my course on how to use the VLE so found that I have taught myself. (1st year female UK student)

It would appear that some students would have preferred greater information about the VLE plus more preparation for using the VLE:

I wish I had understood the significance of it……I really wish that we had the opportunity to use VLE and navigate our way around the site as if we were downloading lecture notes before a lecture etc as that would have made it stick in my mind so much more. Also if someone had actually said the words "This is the most significant thing you will do today and it will have great significance to the way you will study all year" I would have paid more attention. (postgraduate female UK student)

This comment would seem to indicate a need for a more effective induction programme, including emphasising the importance of the VLE.

Access and navigation

In the case of these two impediments, Britain and Liber (1999) discuss the 'micro-world' of the VLE and the potential impact of how the course structure is set up with linkage of tools to course homepages etc. While 78.5% of questionnaire respondents felt the VLE was easy to navigate, an issue of inconsistent appearance emerged in the study:

Different layouts for different modules can cause confusion…should be a standard layout for each module. Although 'module content', 'learning material' and 'learning resources' might all be the same thing, it can cause confusion…(2nd year male UK student)

These comments provide guidance to staff about the need to consistently design VLE sites, assess ease of navigation through a VLE site and prepare students for using the VLE.

Concluding remarks
Most student activity in the VLE appears to be associated with a transmissive approach to learning. Whilst there is some evidence of non-transmissive approaches being used, particularly student collaboration and constructivist learning activity, it seems to be limited usage. Student data provides little indication that academic facilitation of collaborative and/or constructivist learning occurs, predominant academic use of the VLE being as a repository of teacher produced learning materials.

The VLE offers pedagogic benefits to staff and students. For example it has the potential to help students explore subjects further and in more depth, it can motivate students, it affords students the opportunity to pace themselves and engage in independent study; and it can aid reflective thought.

Students identified other aspects of their VLE use that have implications for development and use of the VLE by staff. Some students believed they needed more preparation in using the VLE. Inconsistencies in site structures hindered students' ability to navigate module sites. A number of students believed that the VLE's communication tools had, if used effectively, the potential to enhance student learning.

The study highlights several areas in which staff may want to consider developing initial student preparation for using the VLE, ensuring students are not only able to use the VLE, but understand its importance in their learning. Furthermore, staff should consider how to best make use of the VLE's potential to support collaborative and/or constructivist learning activity to facilitate deep learning.

Many of these recommendations have implications for staff. However, the authors acknowledge that the study did not obtain staff perspectives on how a VLE can enhance student learning. Another group not included in the study was students on programmes making no use of the VLE. Whilst the authors attempted to obtain the views of such students, none volunteered to complete the online questionnaire specifically designed for them. Both staff VLE users and non VLE student users would form groups worthy of study, though the resources available to the authors meant that the study focussed upon student users.

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Table 1: Minutes spent by diarists on VLE

Teaching Activity	Week Number	Date	Mean	Mode	Median
Semester one teaching	1	Nov 13	67	120	35
	2	Nov 20	78	120	60
	3	Nov 27	54	60	60
	4	Dec 4	78	60	60
Semester 1	5	Dec 11	62.5	60	60
exam period	6	Jan 8	72	60	60
Independent study week	7	Jan 15	52	180	5
Semester 2 teaching	8	Jan 22	53	120	20

Table 2: Downloading, note taking, printing and reading and the VLE

Action	Number using
Downloads	23
Note-taking from screen	4
Printing	24
On-line reading	20