

UTILIZING A LEARNING MANAGEMENT SYSTEM IN A BLENDED LEARNING DESIGN TO ENHANCE SELF-REGULATED LEARNING STRATEGIES IN A BACCALAUREATE NURSING FUNDAMENTALS COURSE

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Abstract

Learning management systems which facilitate online learning have transformed higher education. Blended learning, the combination of traditional face-to-face and web-based delivery has proliferated across institutions of higher education at all levels (Newby et al., 2006). These technologies present new opportunities to extend traditional course evaluation to include the efficacy of technology integration as a dimension of instructional quality. Results using the LESSON questionnaire suggest discrepancy between actual capabilities and learners' perceptions of the capabilities of such systems to support self-regulated learning strategies. Recommendations for engaging learners in more self-regulatory behaviours are presented.

Introduction

This descriptive case study is part of a larger research project involving the development and validation of the LESSON, a multidimensional questionnaire designed to assess pedagogical utility in learning management systems (LMSs) and similar e-learning technologies (Bratt, 2007; Bratt & McCracken, 2008). Learning management systems (LMSs), the enterprise systems which support online learning have emerged as core technologies crucial to the successful delivery of online learning environments (Syllabus, 2004). The LESSON is a recently developed questionnaire designed to measure the capability of LMSs to support self-regulatory behaviours from the learner's perspective. Its use in course evaluations could provide instructors, course designers, and LMS administrators with insights as to whether students are using the pedagogical affordances of these systems to support their learning goals.

This paper presents the results of a study assessing the use of Blackboard to support selected learning strategies within a blended learning environment in a first year undergraduate nursing practice foundations course in a Canadian baccalaureate nursing program. Two primary research questions guided this study:

- What types of learning strategies do learners perceive are supported by their course LMS?
- Is there a discrepancy between learner's perceived support and the actual capabilities of the LMS?

The most common delivery mode for Foundational nursing courses is face to face. The course under investigation extends this mode by integrating Blackboard with face-to-face strategies used in the classroom, nursing laboratories and clinical practice. The traditional course evaluation criteria were extended to include the role of the learning management system as a factor in course efficacy. Traditional evaluation criteria include communication skills, organizational skills, etc. However, course instructors were interested in evaluating students' perceptions using non-traditional criteria. As such, a questionnaire designed to evaluate the perceived capability of a LMS to support self-regulated learning (SRL) strategies from the learner's perspective was used to evaluate the course. The following section identifies and describes the learning strategies considered in the evaluation.

Literature Review

A course evaluation can provide feedback to teachers as part of a critical evaluative process to improve the quality of teaching and learning. The evaluation is usually in the form of a questionnaire and may consider factors such: communication skills, organizational skills, enthusiasm, flexibility, attitude toward the student, teacher — student interaction, encouragement of the student, knowledge of the subject, clarity of presentation, course difficulty, fairness of grading and exams, and global student rating (Kim & Hodge, 2000). This present study considers two factors: (a) learners' perceptions of the course learning management system capability to support their learning strategies; and (b) indirectly, if the LMS supports self-regulated learning strategies. Results from the questionnaire will inform revisions to the use of LMS to support the course design.

Learning Strategies: Definitions and Categories

Learning strategies are described as mental activities and behaviours that are engaged by the learner to facilitate encoding during knowledge acquisition which, according to cognitive theory, is central to the learning process (Ertmer & Newby, 1993). Learning strategies are believed to influence the acquisition, organization and integration and later recall of new knowledge (Weinstein & Mayer, 1986). There has been some debate over whether the definition of strategy must include intentionality as a criterion or if strategy selection may reach a level of automaticity as much less conscious attention and reflection is required by the learner. This present research adopts the definition of strategy proposed by

Pressley et al.: “A strategy is composed of cognitive operations over and above the processes that are natural consequences of carrying out the task, ranging from one such operation to a sequence of interdependent operations. Strategies achieve cognitive purposes (e.g., comprehending, memorizing) and are potentially conscious and controllable activities” (1985, p. 4). More simply put, they are specific, goal-oriented methods of attaining a performance standard. An example of a strategy might be rehearsal (repeating items from a list) in order to memorize information. Educational research associated with self-regulated learning typically distinguishes between the three major types: cognitive, metacognitive, and affective (Winne, 1996) which are further subdivided into: (1) rehearsal (2) elaboration (3) organizational (4) comprehension and (5) affective strategies (Weinstein & Mayer, 1986). As this current research is founded on Zimmerman’s (1986) framework, it will exclusively examine cognitive and metacognitive learning. The fourteen SRL strategies contained within the framework are explained in the following section and summarized in Table 1.

Method

Descriptive case study research is used to obtain information concerning the current status of the phenomena to describe “what exists” with respect to variables or conditions in a situation. This case study assessed student’s perceptions of the ability of Blackboard to support specific learning strategies within a Nursing Practice Foundations course.

Nursing Practice Foundations: Description of Course and Structure

The course is described as a blended learning course design in which foundational nursing practice knowledge and skills are attained and integrated within classroom, laboratory, simulation, and practice settings. The course is a complex orchestration of three core course components that include face-to-face instructor led lectures, face-to-face instructor led lab and simulation activities and instructor supervised clinical practice. Since this was a first year undergraduate nursing course, content was pre-structured and required a guided instructor environment. Instructional learning strategies used in the classroom included direct teaching, lecture, lecture with discussion, brainstorming, concept mapping, case studies, worksheets, and guest speakers.

Participants

Participants were drawn from a Baccalaureate Nursing program in western Canada where access to a convenience sample of students enrolled in a first year Nursing Practice Fundamentals course which used Blackboard to support the delivery of the course using blended learning. The sample was selected based on sample size, homogeneity of the sample, consistency of the course web site design and

instructional design and complexity of user-system interactions. Three hundred and twenty-seven participated in the survey over 3 academic terms. Mean results show that 1.93 had post secondary education and the majority of students had experience with learning management systems.

Ethical approval was obtained and confidentiality of names and information was maintained. Participants were instructed that they may withdraw at any time and may register a complaint to the Director of the Office of Research Ethics without penalty. Any uniquely identifiable data would not be included in the aggregate data. Participant's data was maintained in a secure location on a password protected computer system.

Data Collection and Instrumentation

This present research describes the role of a course learning management system in supporting the pedagogical goals of students in a first year Nursing Practice Foundations course. The study was introduced to the Nursing Practice Foundations students in their classroom one week prior to the data collection sessions. Participation in the study was voluntary. Class time was provided for participants to assemble in a computer lab in order to complete the web-based questionnaire. Data was collected over 3 semesters using 3 different cohorts.

The data collection in this study had been extended from a prior study to include log data and qualitative data. Log data is a type of archival record of user generated interactions with a computer system. This study used Blackboard's students tracking utility to analyze their interactions with the system. A content analysis of these records enabled us to characterize their activities in the form of strategies (such as seeking information, seeking help, etc.). Data was also collected using the Learning Strategies Support Online (LESSON) questionnaire (Bratt & McCracken, 2008). The LESSON is a 101-item Likert-type rating scale using a 5 point response format with anchor points of *strongly disagree* and *strongly agree*. The questionnaire was developed by one of the researchers as part of a larger study to assess the capability of LMS (and similar e-Learning systems) to support the pedagogical goals of end-users. The instrument had previously undergone an expert review, pre-pilot and pilot testing as part of the validation process. The dimensions measured by the LESSON are derived from the literature on learning strategies — in particular those identified by Zimmerman and Martinez-Pons (1988) as associated with self-regulated learning. Participants were also invited to provide comments about their interactions with Blackboard in a comment box at the end of the questionnaire. Data from all three sources were reviewed and analyzed together to provide a triangulation of results based on both quantitative and qualitative data.

Analysis and Results

Two methods of analysis were used in this study based on the type of data collected: basic descriptive statistics (questionnaire items and log data), and content analysis (qualitative data). Descriptive statistics were used to calculate the mean scores for each of the factors. Results showed that perceptions of learning strategy support were generally positive but varied across factors. Some strategies, such as *Environmental Structuring* and *Self-evaluation* were perceived as strongly supported, while others, such as *Elaboration* and *Transforming*, were viewed as less supported. Mean scores ranged from 3.18 to 4.33 suggesting neutral to strong perceptions of support for learning strategies. Mean scores above 3.7 were identified as significant. Scores < 3.0 indicated neutrality and not indicative of learning strategy support. Mean scores ≥ 3.7 or higher were considered indicative of perceptions of learning strategies support. Table 1 shows the mean scores for each learning strategy.

Table 1: Mean Scores for Each Learning Strategy Factor

Categories of Learning Strategies	\bar{x}
Environmental structuring	4.30
Self-evaluation	4.28
Reviewing records	3.96
Seeking information	3.89
Goal-setting	3.82
Seeking help from others	3.80
Monitoring comprehension	3.78
Planning	3.78
Organizing	3.54
Keeping records	3.52
Rehearsing and memorizing	3.47
Collaborating	3.38
Self-consequencing	3.28
Elaboration	3.26
Transforming	3.15

Results

Environmental Structuring

Results indicate that students perceived that Blackboard provided them with the flexibility to access the course resources and information at their convenience. This evidence is corroborated with both Blackboard log data which show that students accessed nursing skill videos on multiple occasions and participants' comments that the ease and utility of Blackboard enabled them to use the site's

resources at their convenience enabling them to customize their learning environment to suit their learning preferences.

In a traditional classroom environment access to course materials such as instructional videos would only be available on campus. This restriction limits students' flexibility to review course material at a time and location of their choice. Blackboard tracking statistics recorded 98,887 sessions across three academic terms.

Self-evaluation

Results showed that students believed Blackboard provided them with the ability to judge their learning outcomes. For example, five quizzes provided feedback enabling students to judge their understanding of course content prior to midterm and final exams and potentially adjust their behaviours in order to optimize their learning outcomes. Evidence of self-evaluative behaviours is suggested through Blackboard tracking statistics which show access to My Grades, quizzes and clinical reflective practice journal across all three semesters. Further evidence of Blackboard's capability to support self-evaluation is demonstrated in participants' comments that having access to their grades helped them to evaluate and monitor their progress.

Reviewing Records

Results showed that students believed Blackboard supported their own efforts to review quizzes and videos in order to prepare for labs, class and tests.

Seeking Information

Students felt that Blackboard enabled them to seek for assignments and/or course related work. Blackboard log data show significant use of video, e-mail access, frequently asked questions and rubrics across all terms.

Goal Setting

Mean scores confirm that students knew they had the ability to use Blackboard features to facilitate setting learning goals. Tools such as assignment rubrics provide learners with clear evaluation criteria and performance indicators.

Seeking Help from Others

Mean scores showed that students felt that Blackboard afforded them the ability to interact with each other and their instructors. Tools such as a discussion board and e-mail enable learners to ask for assistance from others. Blackboard tracking statistics show substantial use of the discussion board and e-mail program across three academic terms.

Monitoring Comprehension

Mean scores showed that students knew that Blackboard allowed them to monitor their understanding of course content. Tools such as weekly quizzes enable learners to observe their performance. Blackboard tracking statistics show that students completed 6091 across all three academic terms.

Planning

Results suggest that students believed that Blackboard allowed them to plan the sequencing and timing for completion of educational activities. Tools such as the Course Calendar, Announcements, and Assignment Reminders assist with planning and time management skills. Blackboard tracking statistics confirmed that within a fourth month semester term results show that students accessed the calendar 943 times across three academic terms.

Analysis of the log files was based on frequency of user-generated activity such as accessing the Discussion Board or viewing video files, as shown in Table 2.

Table 2: Blackboard Data Log for Nursing 175

Activity	Frequency			Total Frequency	Total Enrollment
	Winter 2008 (<i>n</i> = 143)	Fall 2008 (<i>n</i> = 157)	Winter 2009 (<i>n</i> = 185)		
Announcements	2781	4015	3096	9892	485
Assessments	2522	5015	3809	11346	
Calendar	353	332	258	943	
Discussions	4028	7363	3905	15296	
Mail	1534	2415	1903	5852	
My Grades	5615	6191	2650	14456	
Files	20054	11537	9511	41102	
Videos	508	783	718	2009	
Quizzes	2941	1611	1539	6091	
FAQs	2086	1279	1904	5269	

Participant comments indicated generally favourable learner interactions with Blackboard. However there were issues regarding instructors' skill level with the system and with navigation and the organization of the course content. Some comments include:

“These online resources work great when the instructors understand how to use them. I believe proper training is essential if the tool is to be used for the benefit of the students/instructors”

“Black board is a tool, and much of the issues with it are due to the use of this tool by the users . . . Education needs to be to instructors as well, not just students.”

This feedback suggests issues with how the system is being used — not with the system itself. Additional themes which arise from the qualitative data include a) I can study anywhere, anytime; b) I can monitor progress; c) Everything I need to know is on Blackboard; and d) Blackboard is great for communication.

Discussion

Results suggest that learners perceived that Blackboard is capable of supporting *some* of the learning strategies identified in the Zimmerman and Martinez-Pons model. These strategies are: environmental structuring, self-evaluation, and reviewing records. These results suggest minor discrepancies between learner's perception of system capabilities and the actual capabilities of the system. For example, a mean score of 3.96 for Seeking Information indicates students do not use the abundant course resources available in Blackboard to support this strategy. Similarly, a mean score of 3.80 for the factor Seeking Help from Others suggest that students are not aware of the communication tools that enable them to seek assistance. More significant discrepancies appear with Goal setting, Monitoring Comprehension, Planning and Collaboration. The discrepancy may be attributed to three causes: a) students do not engage in self-regulatory behaviours in an online environment; b) students are unaware of many of Blackboard's features; or c) the course design does not require students to use these strategies. The latter reason may explain low ratings for *Collaboration*. Blackboard was not expected to support collaboration as a learning strategy in this course. The importance of understanding and learning about collaboration in registered nursing is vitally important. Collaboration, in this course, was learned during face-to-face lectures, case studies, labs and in clinical practice.

Further investigation into the relationship between learners' self-regulatory behaviour both on and offline may be informative. Insufficient training with LMSs may also be associated with low ratings for strategy support. Many higher education institutions provide information literacy workshops, writing skills and study skills programs to develop these core skills associated with academic success. One participant commented, *“Didn't know black board had all these applications . . . I wish I would have had an orientation”*. Research on the effects of similar learning management systems training on strategy use is recommended.

Low ratings on factors such as *Organizing* and *Transforming*, *Elaboration*, and *Self-consequencing* reflect that fact the Blackboard currently lacks the capability to support these strategies. The system does not provide authoring tools which allow learners to create, customize, and organize notes to suit their learning preferences. Nor does the system enable learners to change the appearance of course content or link to related content presented elsewhere in the course.

The blended learning design of this course created the opportunity for students to adjust their environmental conditions for learning to take place. Whether students are in class, lab or in clinical practice, they can access, review or monitor their outcomes or make changes to their learning goals. More importantly, course content accessed and studied online provided for richer face-to-face interaction with instructors. This flexibility and self-reflection afforded by LMSs such as Blackboard is more difficult in traditional face-to-face classroom interaction.

Limitations of the Study

Two factors present limitations to the study. The first is the single case study methodology which inherently limits generalizability to the local issue. The second factor relates to the validation of the LESSON. While the questionnaire has undergone expert review, construct validation and content validation, pre-pilot, and pilot studies, it is important to note that the questionnaire is still in the validation process. The results of this study will determine the factor structure in order to further validate the dimensions that it measures.

Future Recommendations

The extension of traditional course evaluation criteria to include the efficacy of technology integration as a dimension of instructional quality has proved informative. Log data analysis and participant comments indicate significant and generally favourable learner interactions with Blackboard. However, it is clear from participants' comments that instructors need to be trained on how to use Blackboard effectively — both from a technical and an information design perspective. It is recommended that all instructors involved in the course complete a training session provided by the institution because instructors require face-to-face, hands on instruction, not just the self-help Blackboard provides. Results using the LESSON questionnaire suggest discrepancy between actual capabilities and learners' perceptions of the capabilities of such systems to support self-regulated learning strategies. Recommendations include a training session for students and transforming the instructional design of the course to explicitly require students to engage in self-regulatory behaviours such as organizing and

transforming their notes, linking new content to prior knowledge (elaboration), setting learning goals, and collaborating with others.

Finally, the results of the study suggest that a more learner-centered design of the system is required in order to support the self-regulatory behaviours which are associated with academic success. Software applications such as graphical organizers, academic planners, annotation tools and knowledge management tools could be integrated into LMSs. The ability to customize course content; create one's own content and organize information to suit the learner's preference are strongly recommended in future designs of this system and similar e-learning systems.

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