Challenges in evaluating Hong Kong students' perceptions of Moodle

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Abstract

The open source learning management system (LMS), Moodle, has been adopted by many people and organisations around the world because it offers a tightly integrated set of tools said to be designed from a social constructivist perspective. However, what advantages does Moodle really offer over other commercially available LMSs such as Blackboard, from the perspective of the lecturer or the student? In this study, Moodle was used in five teacher education classes in Hong Kong in a variety of ways. The experience of these classes was evaluated by institutional evaluations of teaching and a questionnaire specific to the use of Moodle. The results indicated only a partial preference for Moodle over Blackboard. Implications for pre-service teachers are discussed.

Philosophy of the free software (open source) movement

The terms 'free software' and 'open-source software' are sometimes used interchangeably in the discussions of software that may be distributed and downloaded from the Internet without charge. However, the free software movement has a specific definition of 'free'. Free software is not 'free' as 'free' in the monetary sense, but users of the software should have the *freedom* to run, modify, adapt, customise and share without charge. The concept of 'free' in this discussion is best stated as (Free Software Foundation, 2005):

- 'The freedom to run the program, for any purpose (freedom 0).
- The freedom to study how the program works, and adapt it to your needs (freedom 1). Access to the source code is a precondition for this.
- The freedom to redistribute copies so you can help your neighbour (freedom 2).
- The freedom to improve the program, and release your improvements to the public, so that the whole community benefits (freedom 3). Access to the source code is a precondition for this.'

It should be noted that the Free Software Foundation does not entirely support the term 'open source'. For the purposes of discussion and widely held understanding of open source, I have chosen to use this term in the paper. The open-source software, Moodle, fulfils the criteria listed above for 'free software' and has rapidly built a community of users who share, modify and develop the software for the user community. Users of Moodle have the freedom to download, install, run, and modify the software without cost. This is in contrast to many enterprise systems that have been developed specifically by commercial vendors such as Blackboard or WebCT.

Moodle: An open-source learning management system

The LMS called Moodle (http://moodle.org/), is open source software, and can be configured to run on most operating systems (Macintosh OS X, Windows XP and Linux). Moodle was developed from a social constructivist perspective by Martin Dougiamas at Curtin University in Western Australia (Dougiamas & Taylor, 2003). Moodle has features not found elsewhere, including the ability to embed resources, communication and/or activities centred on a topic of study. The instructor may also specify a variety of modes of operation (from weekly formats, topic-based to social formats).

The acceptance and adoption of Moodle has been extraordinarily successful. At the time of writing, there were more than 1800 registered Moodle sites in more than 120 countries, and it was available in more than 60 languages. The uptake of the software has been so successful that the first user conferences (called MoodleMoots) took place in July 2004. MoodleMoots have been (or will be) held in the United Kingdom, Germany, Ireland and the USA. Moodle is also beginning to challenge the dominance of the pay-as-you-go model of many of the commercial LMSs available. The Dublin City University in Ireland is phasing out WebCT and replacing it with Moodle in a attempt to provide an LMS that is easier for the institution to customize, cheaper to implement and developed in software that is well understood by the information technology services (ITS) department staff who will have to maintain the system (McMullin & Munro, 2004).

The potential of LMSs in teacher education

People are more likely to teach as they were taught and this principle may be extended to 'people design educational environments based upon their experiences (and perceptions) of teaching and learning'. Student teachers (STs) are more likely to adopt the paradigms that reflect their prior knowledge and experience, the manner in which they were taught, and the implicit (or explicit) models of teaching and learning they experienced in their own educational undertakings when they begin to design and develop their own educational environments (Bain & McNaught, 1996).

There is a need for student teachers (STs) to learn the potential of available technology tools for the design of learning environments which can support students to engage actively with content-based learning materials, tasks and peer learners. Clearly, any learning design framework should focus on the affordances offered by a learning management system (LMS) and not just using technology without a specific (appropriate) pedagogical strategy. Figure 1 shows the major elements of a typical LMS divided into three components, communication tools, student tools and course tools. Some of the elements can be in two categories, depending upon how they are intended to be used by the teacher (e.g. the Wiki page). This study has two parts. The first part aimed to investigate if this smorgasbord of tools assisted STs in Hong Kong to design more effective student-centred learning environments in conjunction with developing a better understanding of the affordances offered by information and communication technologies (ICTs). The second part looked at the perceptions of students using Moodle for their learning.

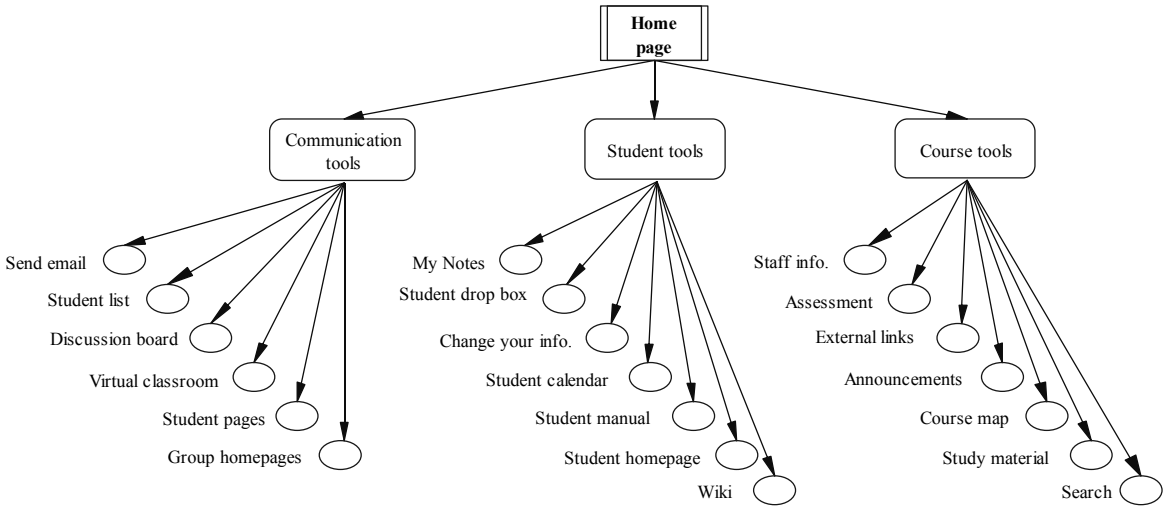

Figure 1: A generic LMS

The context of the Hong Kong Institute of Education

The Hong Kong Institute of Education was formed from the amalgamation of four teacher training colleges in 1994 with the specific mandate to provide high quality teacher education, upgrade the professional standards of the staff and to actively undertake research with the aim of improving teacher education and practice in Hong Kong (see http://www.ied.edu.hk/about_hkied/html/p_msg.html). In addition, the Institute also has the responsibility of contributing to and fostering the appropriate use of information and communication technologies (ICTs) in education in Hong Kong.

The Education and Manpower Bureau (EMB) of the Hong Kong government (what is referred to as the Education Department in several other countries) describes the aims of the Hong Kong school system in a decidedly constructivist fashion. Education in Hong Kong is said to strive to:

- turn our schools into dynamic and innovative learning institutions where students can become more motivated, inquisitive and creative learners;
- link up our students with the vast network of knowledge and information to enable them to acquire a broad knowledge base and a global outlook;
- develop in our students' capabilities to process information effectively and efficiently; and
- develop in our students the attitude and capability for independent life-long learning.

(Education and Manpower Bureau, 2004, Executive Summary)

These goals are described as 'learning to learn' (Education and Manpower Bureau, 1998) and EMB policy documents tend to focus on the development of broad capabilities in students. Learning to learn incorporates the list of clusters of abilities noted by Nightingale, Te Wiata, Toohey, Ryan, Hughes and Magin (1996): thinking critically and making judgments; solving problems and developing plans; performing procedures and demonstrating techniques; managing and developing oneself; accessing and managing information; demonstrating knowledge and understanding; designing, creating, performing; and communicating. If the Institute were going to provide an authentic learning experience for STs, then students must be provided with the opportunities to achieve, articulate and demonstrate the capabilities described by Nightingale et al. (1996) above.

Traditional education settings are often impoverished with respect to efforts to design learning environments that bring about conceptual change and there is evidence that efforts to integrate ICTs into teaching and learning in schools have achieved only technical effects and not produced the desired conceptual changes in students (Becker, 2000; Downes, 2002; Elliott, 1999). Similar effects have been noted in Hong Kong schools (Pearson, 2001). This is in stark contrast to the stated aims of the Education and Manpower Bureau (EMB) noted above.

There is evidence that post-graduate students' beliefs about teaching and learning in Hong Kong were initially developed from their experiences in schools and undergraduate studies prior to their current program of study (Wong, Kember, Wong, & Loke, 2001). Many students came into a post-graduate program from didactic, teacher-centred learning environments in which they were passive recipients of knowledge.

From our experiences at the Institute we have found that one of the continuing challenges in effectively integrating ICT involves moving students away from narrow and technical views of IT-based teaching and learning which have an emphasis on developing skills and teaching about specific software applications.

There is one confounding factor in teacher education in Hong Kong that makes the environment unique for a relatively developed country: not all teachers in schools have formal teaching (graduate) qualifications. In the main, student teachers enrolled at the institute may be categorised as:

- undergraduate, moving to HKIEd from high school;
- undergraduate, with either a teaching certificate or university degree (not teaching or education) and currently employed as practicing teachers;
- post-graduate, having just completed an undergraduate degree in another discipline (e.g. science, Chinese, English); and
- post-graduate, currently employed in schools (mostly secondary) with a number of years of teaching experience and a first degree.

Moodle as a potential change agent in Hong Kong

In schools in Hong Kong, one local vendor in 2004 claimed to have over 200 (almost 25%) of schools using their proprietary LMS <http://www.eclass.com.hk>. Clearly, using an LMS is rapidly becoming a part of the responsibilities and expectations of teachers in Hong Kong. The Institute is one of the major providers of teacher training in Hong Kong, and with this rapid uptake of LMSs in schools, there was a need to look for solutions to this challenge.

It was apparent that there is a need to provide STs with more authentic experience of using an LMS for the design and development of courses, rather than just using a didactic approach. Programmes needed to be developed that enabled STs to acquire the skills (technical and pedagogical) to incorporate an LMS into the design of their future (student) learning environments effectively. For this task, Moodle has a number of unique advantages. It is:

- first and foremost, free open source software;
- developed from a pedagogical viewpoint that is congruent with the stated broader aims of education in Hong Kong;
- multilingual, in particular it has a Chinese interface;
- designed to suit a number of different teaching and learning needs;
- stable and well supported by an international community of educators and technical people; and
- simple to deploy on a server.

Prior to the availability of Moodle, it was not possible to provide STs with an authentic learning experience involving an LMS.

In the modules described in this paper there has been an attempt to shift away from the technical view of information and communication technologies (ICTs), toward approaches that emphasise the learning design of the face-to-face and online environments. The technical skills are acquired by students in order to fulfill specific design elements for teaching and learning in a content area of their choice. It was hoped that using this approach, STs would develop a broader understanding how to use ICTs more effectively for teaching and learning. Therefore, the modules all had a common theme: a focus on various aspects of integrating information and communication technologies (ICTs) into teaching and learning. Subjects as diverse as English language studies, physical education, Chinese language studies and science and computer literacy are examples of content domains selected by the STs.

The Moodle experience at HKIEd

Moodle was used in two ways in this study. The first was as an alternative to the Institute-wide enterprise learning management system (Blackboard). It was introduced into five classes during Semester 2 of 2004–2005 (northern hemisphere). The decision to use Moodle was made on two counts. One of the significant difficulties in using the forums in Blackboard for teaching and learning was the need for students to log in before they could discover if any messages had been posted. In past years, this was perceived by students as a significant limitation to effective communication. The second was the apparent separation between conventional lesson design experienced in Hong Kong schools, in which the lesson content and activities were organised with the individual lesson as the central theme. This is in distinct contrast to Blackboard in which content and activities are organised thematically, with all discussion forums, content, group areas, etc. in an area that is designated Forums, Content, etc. Moodle offers two key differences to Blackboard. Firstly, all content and activities relating to a particular lesson or topic could be grouped together, providing a learning environment with organisation that was more familiar to the HKIEd students. The author saw the second factor as more important for the teaching and learning process: communication. In Moodle each student can specify the email address by which they may be contacted by changing their personal profile. In addition, Moodle forwards all postings from discussion forums automatically to the email address specified by the student, unlike the current version of Blackboard. It was necessary to get the support of ITS to facilitate non-Institute email addresses due to security issues. The outcome of this last feature of Moodle was that students received all messages for all forums that they were enrolled in, which resulted in some surprising feedback from students that will be discussed later in this paper.

The pilot experience: Clearly positive

Moodle was used initially in three modules at HKIEd with approximately 40 student teachers and practicing teachers upgrading their qualifications (McNaught & Kennedy, in press). In two modules Moodle was used as the LMS by the author in a manner similar to the way in which the enterprise system (Blackboard) had been used previously. Anecdotal evidence suggested that students did not find switching from Blackboard to Moodle difficult.

In the third module, Moodle was also used by the author. The module chosen ‘Multimedia courseware development’ (module C described below) was designed for practicing (experienced) primary teachers who were attending a summer programme to complete a teaching qualification. In this module the STs were each provided with access to Moodle at the level of instructor/teacher with full authoring rights. The intention was to provide the STs with an authentic experience involving the development of curricula that was a mix of online and face-to-face teaching. The overall evaluation of the module was 3.11 (with a maximum possible of 4.00) using the standard Institute questionnaire. This is deemed an above average outcome. The assessment task focused student teacher attention on developing strategies for implementing Moodle into their schools in Hong Kong. Students were required to use the LMS to structure the learning environment using multimedia resources developed during an earlier stage of the module.

The assignment task set for these student teachers (STs) was similar to that expressed below:

> **Outline of the assessment task**:
>
> In the Summer Semester you are required to move your multimedia resources developed in Semester 1 into a Learning Management System (Moodle) to integrate ICTs and face-to-face teaching. You may use any of the resources you have developed, but you are also encouraged to re-use resources found online (with appropriate acknowledgement).
>
> In this component of the course you will be expected to:
> - show an appropriate use of ICTs for developing a series of problems for students to solve or engage with;
> - use familiar contexts in order to engage the students in meaningful learning activities;
> - integrate multimedia resources, internet resources and face-to-face teaching appropriately; and
> - show use of appropriate technology (for example, a discussion group with Form 1 or 2 is not reasonable; that is, a task that is better handled by face-to-face teaching at that age level), linking the aims and assessment to the activities.
>
> You are also expected to use the editing tools in Moodle to enhance the design of the Moodle interface, using graphics and colour to clarify and structure the learning activities.

Students selected their own contexts for the assessment. Some examples of the ways in which Moodle was used by the STs in this module to support a variety of approaches to learning include:

- problem-based learning (PBL) approach in some examples;
- solving problems in mathematics for Form 6;
- understanding friction, centre of mass and gravity in the real world;
- problem-based learning in nutrition for Form 4: Designing your own healthy diet;
- problem solving in Hong Kong transportation: How to be a good tourist guide; and
- relating simple machines to the real-world: Investigating the use of simple machines in our lives.

Selected student evaluations about the module are shown in Table 1. The experience and the data support the premise that students had become more independent learners and inspired them to think. However, not all STs perceived the work with the LMS as particularly useful. These STs were, not unexpectedly, almost all involved with teaching students in the lower forms (Years 1 to 3) in which more concrete/ hands-on teaching strategies may be more useful.

Table 1: Selected evaluation results of the pilot module using Moodle as ST-controlled LMS

Question	Module C (n=11)
The module was valuable to my professional development as a teacher.	73%
Through this module I have become a more independent learner.	100%
The learning activities inspired me to think.	100%

A more detailed evaluation of Moodle: Somewhat positive

After the apparent success of the first use, it was decided to look at a larger group and look at the use of Moodle from two angles. The first was from the perspective of using Moodle (the author) in place of Blackboard for teaching in the various modules. The intention was to determine if there were any inherent design elements associated with Moodle that indicated STs preferred Moodle to Blackboard. The second involved repeating the experience of providing a Moodle server to a larger group of STs who have full authoring rights to develop a course using an LMS and evaluating the outcomes more formally. These two tasks were undertaken with five modules (Table 2). Moodle was used in the first four modules in Table 2 by the author as part of the design of the learning environment. The last entry in Table 2 (E1 and E2) was a combined class of Post-graduate Diploma of Education students (PGDE) who were given a task similar to the pilot study. That is, they were expected to integrate a variety of teaching and learning materials developed during the module into a Moodle site. The secondary intention was to then provide a zipped file of the student constructions so that they could take their designs away and use them in future classes.

Table 2: An overview of modules, students and assessment tasks

Module	Nature of Students	Number	Nature of engagement with Moodle
A	BEd undergraduate, no teaching experience (two classes)	60	Work with Moodle on prepared tasks only **
B	BEd undergraduate, no teaching experience	14	Work with Moodle on prepared tasks only
C	BEd, extensive teaching experience	4	Work with Moodle on prepared tasks only
D	FT PGDE, extensive teaching experience	14	Work with Moodle on prepared tasks only
E1*	FT PGDE, no teaching experience	15	Build Moodle site***
E2*	PT PGDE, extensive teaching experience	9	Build Moodle site***

* The group E was a combined FT/PT class.
** Students used Moodle in their course of study in much the same way as they worked with Blackboard.
*** Students had full authoring rights and actively developed a Moodle site.

The assessment for groups A to D was varied. Students in Group A developed a review of the existing literature in their major area of study and a number of multimedia artefacts (e.g. a set of web pages, PowerPoint slides, web-based assessment items, concept maps). Students in Group B primarily developed Webquests with a design document articulating the strengths and weaknesses of their design decisions. Students in Group C were practicing primary teachers studying part-time and were required to create a series of web pages and concept maps for supporting a specific content domain (chosen by the individual student). Students in Group D were required to develop a series of multimedia artefacts including online assessment items, and a design document that articulated the links between the literature and their designs.

Students in Group E was the most technically competent of all groups (at the very least all had undergraduate degrees in computer science or a related field). This group was asked to investigate the strength and weaknesses of LMSs and develop a series of lessons linked by a Moodle site.

Some examples of the assessments produced are:

- a website with English audio for phonetic training (Group A);
- a webquest with an educational pretext of tourist scams for teaching English to mainland Chinese students (Group B);
- video with correct and incorrect technique for basketball (Group C);
- a webquest on the valuation of stocks in business studies in upper secondary school (Group D);and
- developing problem solving skills using Macromedia Flash (Group E)

The common theme in all of the modules (A–E) was the need for STs to justify their design decisions for the multimedia artefacts, online assessment items and LMS site by reference to the educational literature on the use of ICTs in teaching and learning.

Evaluations specifically about Moodle were carried out with students from all five classes. In addition, each module was also evaluated using the Institute standard course evaluation instrument. A total of 84 students in five modules (119 students) responded to the Moodle-specific questionnaire representing a return rate of 71% for the survey. All students had experience in the use of Blackboard in other modules in their studies. In Figure 2, the first and most apparent observation is that a significant percentage of students do not seem to care what LMS they use in their own studies (49% in Q4a). The large non-committed group may also indicate a cultural artefact — a non-committal response that is often typical of Hong Kong students (Bond, 1991). This was a surprising response, as it was believed that many of the design features of Moodle would appeal to students. For example, the automatic forwarding of forum messages to the student-specified email address (rather than she or he having to log into the LMS to see if any new messages had been posted) was considered a way to improve teacher-student and student-student communication by the author. However, the response from three students indicated that receiving all of the postings to a forum in their email account was equivalent to spam. Three comments received for example are:

- Link the forum into the email account is a problem.
- The forum message linked to email, may be to inconvenient as there is too many messages sent to user from forums to email.
- The e-mails sent from the moodle website to my account were way too much. I think I would rather go on the forum to see others sharing more than checking them one by one in my account.

Clearly, one of the perceived strengths of Moodle (by the author) was perceived by three STs as an irritation and inconvenient (but still only 3.6%). Yet the author's past experience indicates that the requirement to log into Blackboard to check for new postings to a Forum was also considered inconvenient. Clearly, it is difficult to keep all students happy.

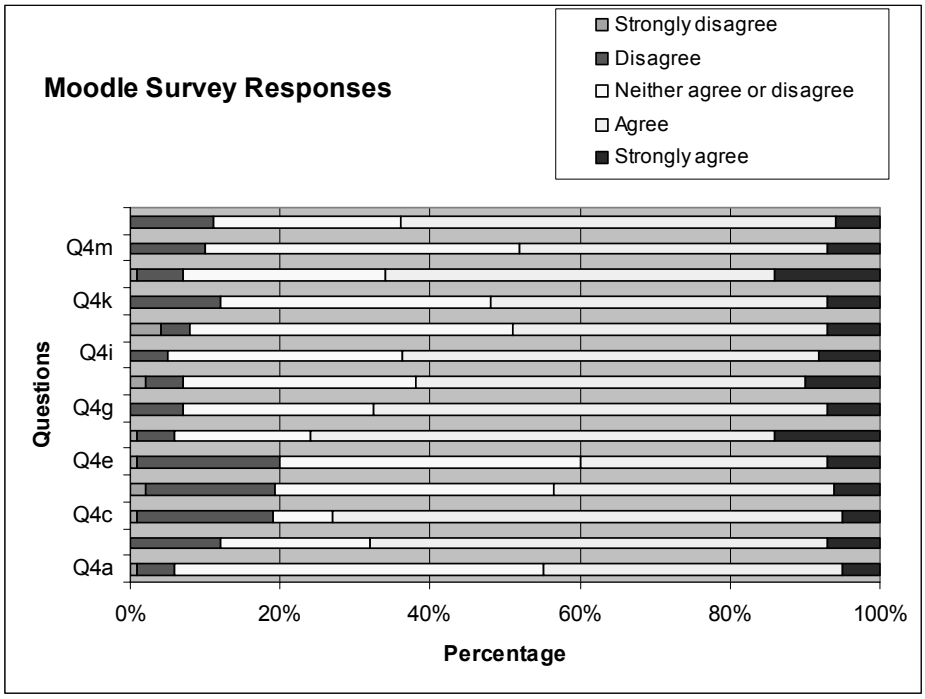

Figure 2: Responses from Moodle survey

For the purposes of understanding, students who express a preference about the LMS they use are shown in Table 3. In Table 3, the students who don't have a preference have been removed and the original five-point Likert scales have been reduced to two components, negative (strongly/disagree), and positive (strongly/agree).

Table 3: Responses from survey about attitudes to using Moodle (n=84)

Questions	**Disagree %**	**Agree %**
Q4a: I prefer using Moodle to using Blackboard.	6	45
Q4b: The Moodle interface was easy to navigate.	12	68
Q4c: The online materials in Moodle were easy to locate.	19	73
Q4d: I entered the Moodle site more often than a similar Blackboard site.	19	43
Q4e: I liked the link between the forum and my own email account.	20	40
Q4f: I liked being able to see an icon showing the file type.	6	76
Q4g: The overall layout of the Moodle interface was pleasant.	7	67
Q4h: The organisation of the resources into groups (week or topic) was useful.	7	62
Q4i: Having of all of the resources in the folder 'Files' was useful.	5	63
Q4j: I liked being able to update my profile.	8	51
Q4k: I liked being able to view forum messages in different ways.	12	52
Q4l: I liked being able to view the feedback given to other students via the forum.	7	66
Q4m: I would consider using Moodle in a school when I graduate.	10	48
Q4n: Overall, I would enjoy using Moodle again.	11	64

It is significant that if the 'neutral' respondents are removed from the results, the majority of the remaining students seem to prefer using Moodle. Clearly, from the data in Figure 2 and Table 3 only a minority of students actively dislike using Moodle.

The results from the open-ended questions are inconclusive. Students were asked what were the best and worst features of using Moodle. Only 43 students wrote any 'best' comments and 32 students wrote any 'worst' comments. Three categories of open-ended comments were common to both best and worst and these have been summarized in Table 4. The results are slightly positive, but clearly students are ambivalent at this point in time. Future analysis will attempt to categorise the nature of students themselves and their comments by their experience in teaching, age (e.g. the PGDE students are older and more experienced teachers than the undergraduate students). In the comments asking for the 'worst feature', five students commented that they could not think of a worst feature.

Table 4: Summary of responses for the 'Best' and 'Worst' features of Moodle for all STs

Response (summary)	**Best (43)**	**Worst (32)**
Easy to use or not easy to use Moodle.	9	4
Forum communication is very convenient and effective, or not.	17	7
Arrangement and availability of module resources and activities is very good, or not very good.	11	3

Only one class consisting of a combined group of part-time and full-time students was given the opportunity to use Moodle as a teacher/designer would. The Institutional evaluation of this group (Group E) was also ambivalent. In the responses from Groups E1 and E2 there was a considerable difference in responses (see Table 5). The experienced teachers perceived that they had gained considerably from the activity involved in developing resources using the Moodle LMS. However, the inexperienced STs in the first group (E1) did not value the experience as highly. This trend was also reflected in the overall responses to the evaluation of the module. The experienced teachers rate the module at an average of 3.34 (SD = 0.21), while the graduates with no teaching experience rate the module much lower at 2.74 (SD = 0.22). It is not clear why there is such a large difference in the perceptions between the groups since both groups attended the same classes, engaged in joint class activities and discussions, undertook the same assessment, and will be employed in full-time teaching in the following scholastic year. This anomaly will be followed up in a later study where students from both groups will be interviewed.

Table 5: Selected evaluation results of the second trial of using Moodle as ST-controlled LMS

Question	**E1 (n=15)**	**E2 (n=9)**
The module was valuable to my professional development as a teacher.	80%	100%
Through this module I have become a more independent learner.	93%	100%
The learning activities inspired me to think.	73%	100%

Discussion and comparison of the two experiences

Comparisons of the pilot with the more thoroughly evaluated second experience with Moodle do not provide a clear picture in all modules and with all groups. There are a number of local factors that have the potential to influence the outcomes of any surveys. These include:

- the prior learning experiences of the students;
- expectations about teaching, learning and study; and
- teaching experience.

Further analysis in which the data from experienced teachers and undergraduates with no teaching experience is separated out may shed light on the differences.

Some of the comments about the *best* features of Moodle addressed the complaints from students experienced by the author when using Blackboard. For example:

- it is much easier to group all the information together, also easy to use and convenient
- the best feature of using moodle is the mail notification when forum messages are added.
- the communication between teacher and student, student and student is better

The age and teaching experience of the STs seem to be factors in the responses, certainly in regard to the use of Moodle as a teacher/designer in the assignments. The grading of ST work in the module was a very high standard with no significant difference between the two groups (although the PT (experienced teachers) STs did score slightly higher on average). The evidence from quality of the assignments submitted suggests that the learning designs developed by the STs were:

- more obviously constructivist designs (e.g. PBL, using web-based realistic simulations/applets);
- better integrated with face-to-face teaching than simply using web pages or internet resources;
- allowed groups of students to develop activities and content more effectively than using other systems (STs working in groups were given equal status as full authors); and
- provided a better sense of accomplishment for students (they could take the resource and move it to another server, as some practicing teachers actually did).

Many STs came into the post-graduate program from didactic, teacher-centred learning environments in which they were passive recipients of knowledge. The inclusion of Moodle as part of the learning design in which one of the assessment criteria rewarded the development of a more student-centred, task-based teaching and learning environment may not have been congruent with the beliefs of the inexperience STs. This would seem to be less of an issue with the experienced STs. However, the results from the module assessment overall suggest that from the author's perspective, the learning goals were achieved.

Conclusion

This paper describes the outcomes of two aspects of using Moodle in the development of knowledge and understanding of ICTs in education in Hong Kong student teacher education. The first involved comparing students' preferences for using Moodle over their previous experiences of using Blackboard. The second element of this paper examined the perceptions of STs who were given full control of a Moodle environment in order to develop curricula suitable for classes they either do teach or may teach in the future.

The comparison between Moodle and Blackboard was not particularly clear-cut, although, on balance, there seems to be an argument that an institute should look at Moodle in a more rigorous manner. In these times of ever-shrinking education budgets, substantial cost savings for schools and universities can be made if an open-source system is used in place of a corporate system. Schools in particular can benefit from a low cost solution to using an LMS in the classroom, although it has been demonstrated recently that Moodle can be scaled up for institutions with 40,000 students (http://moodle.org).

Providing Moodle for STs to build their own eLearning environments enabled students to engage in a realistic development of a more student-centred, task-based learning environment. This may have been in contrast to the prior teaching and learning experiences and expectations of the course materials. The students in the class (Module E) all had high level information technology skills and some written comments from the STs with limited or no teaching experience indicated that they expected to become even more expert as a result of this module.

So, this evaluation provides partial evidence to support the adoption of Moodle. The evaluation also demonstrates the need to consider students' prior experience when weighing up the plethora of factors involved in making decisions about which LMS is likely to be most successful in any given context.

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