

**Free choice of Learning Management Systems: Do student habits override inherent system quality?**

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Review

## Free choice of Learning Management Systems: Do student habits override inherent system quality?

### Abstract

Although multiple studies examine institutional transitions from one learning management system (LMS) to another, or compare system merits, studies examining student's *free choice* of access on parallel LMSs for the same course are absent from the literature. In order to investigate usage in a free-choice situation, identical content was posted at the same time to two different LMSs in a large enrollment class with a diversity of majors. Two prevalent LMSs were utilized in the study; WebCT, which was in existence at a university-wide level previously, and Moodle, which will become the new university-wide system in the 2012-13 academic year onwards. Although this inquiry revealed that most students chose to use the WebCT system (85% WebCT users, 15% Moodle users; both self-reported and log-verified), the reasons given for WebCT preference pertained largely to habit and that most other courses are using the WebCT LMS. In contrast, the reasons given for using Moodle spoke *directly to the attributes of the LMS itself*, namely the interface quality and the way it is organized. This study indicates that institutions should look beyond student usage patterns in making LMS choices, and that LMS quality is sometimes, and perhaps unfortunately, overshadowed by student habit and familiarity.

### 1. Introduction

The widespread use of learning management systems (LMS) represents a significant technological development in higher education. The vast majority of institutions are using an enterprise-level, or campus-wide, LMS (Harrington, 2004, Morgan, 2003). Ideally, the LMS can be a means to conveniently provide access to content, assess students, give feedback, and promote teacher-student and student-student communication. Research on LMS usage patterns and student preferences stand to benefit universities greatly as they make decisions about which system to adopt, as the choice can have a significant and lasting impact on faculty and students. As institutions move forward, many are re-examining of the utility of their LMS and whether a new system may lead to improvements in teaching and learning.

Two of the most popular LMSs are Moodle (Modular object-oriented dynamic learning environment) and Blackboard-WebCT. Blackboard was founded in 1997 and a merger between Blackboard and WebCT in 2006 gave rise to an LMS platform enjoying widespread use for many years, with subscriptions from thousands of academic institutions (Arnone, 2002, Pollack, 2003). Blackboard-WebCT (henceforth referred to as WebCT) enjoys a proprietary platform and vast user base, while its licensing fees from subscribing institutions serve as a revenue source. The first version of Moodle was released in 2002, and it now inhabits a leading position in the "open source" LMS market, with close to 60 million users [1]. This open-source and customizable system is free, except for costs intrinsic to the university for its implementation, (i.e. include staff training, infrastructure and technical costs), which would also be incurred

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3 through the use of any proprietary system. Differences between the features of WebCT and  
4 Moodle have been nicely outlined in detail elsewhere [2].  
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7 Time savings and enhanced communication both among and between students and teachers  
8 appear to be the most highly recounted benefit in LMS usage (Hanson, 2004, Lonn and Teasley,  
9 2009, Dutton, 2004, Morgan, 2003), and new faculty find that LMSs are particularly beneficial  
10 in classes with large enrollments (Porter, 2011). Reports of LMS usage emphasize the posting of  
11 course documents, assignments, and announcements (Dutton, 2004). Their use appears to  
12 support, rather than modify or transform existing teaching practices (Arbaugh et al., 2009),  
13 although it has been suggested that an “accidental pedagogy” may arise, perhaps through  
14 increased self-reflection or an appreciation of the scope and relationships among the course  
15 content (Morgan, 2003, Blin and Munro, 2008). Once adopted, LMS usage has a tendency to  
16 increase among faculty (Harrington, 2004), and it is quite likely that a reliance or preference for  
17 a particular LMS will develop among the faculty, since it can be a valuable time-saving tool once  
18 the initial learning phase for implementation is surpassed.  
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24 Despite the effort (technical support, teacher and student familiarity, etc.) it takes to get a  
25 campus-wide LMS running, institutions are constantly re-evaluating their situation and making  
26 decisions to adopt new LMSs. Multiple reports exist on LMS transitions, comparisons, and  
27 institutional adoptions (Dutton, 2004, Beatty and Ulasewicz, 2006, Payette, 2009, Smart, 2005,  
28 Benson and Palaskas, 2006, Unal and Unal, 2011, Machado, 2007). Issues that affect faculty and  
29 students include whether course content and construction is faithfully preserved during a  
30 migration to a new LMS (Smart, 2005), faculty willingness to acclimatize to a new LMS (Smart,  
31 2005), whether a new LMS is actually better than the existing one (Payette, 2009, Beatty and  
32 Ulasewicz, 2006), and specific student preferences (Payette, 2009, Unal and Unal, 2011,  
33 Machado, 2007). The transition to a new LMS is not to be taken lightly, as it has the potential to  
34 engender complaints from faculty who have developed familiarity with the previous system.  
35 Another factor is the cost of the LMS licensing, which can approach six figures, depending on  
36 the size of the institution (Young, 2002). One statewide university system has estimated LMS  
37 licensing expenses that exceed 1 million (US) dollars annually (Munoz, 2005). Some institutions  
38 may wish to shed this as a cost-saving measure and transition to an open source LMS.  
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45 A key question facing individual departments, faculties, computing/IT centers, education  
46 technology support groups, and institutions as a whole is: Which LMS should be implemented  
47 and why? One would hope that eliciting student feedback, or piloting of LMS comparisons in  
48 authentic classroom situations, is undertaken in the process of making such decisions. Studies  
49 examining LMS choices in an ongoing course where students are provided with multiple LMS  
50 options to engage with the *same material* are unfortunately absent from the literature. Existing  
51 studies examine students with varying levels of LMS exposure depending on the instructor  
52 preferences in existence at the university (Payette, 2009), or situations where students experience  
53 one LMS at a time either by random assignment (Unal and Unal, 2011), or a phasing in of the  
54 new LMS (Machado, 2007) with controls for prior LMS experience. Institutions spend huge  
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amounts of capital (financial, professional, technical, and structural) in the adoption of a campus wide LMS; it is essential to receive timely feedback on that investment choice.

In this study, two parallel LMSs (WebCT and Moodle) were set up for a large enrollment course containing students from diverse backgrounds. The students had free choice as to which LMS they used to access the course content. Which LMS did the students prefer to use? What were their reasons for making that choice? What do the reasons tell us about the quality of the LMSs? The answers to these questions should help inform those who are in charge of making decisions regarding LMS usage for an institution, and also help to guide student engagement with these systems. Furthermore, this study should be of interest to the LMS companies themselves, as it represents a novel situation for examining student LMS choices.

## 2. Research Methods

### 2.1 Institutional LMS usage history

In the 2010-11 academic year, and in prior years, WebCT was the centrally administered and supported LMS at The University of Hong Kong (HKU). At the time of this writing, HKU is in the process of transitioning (and also directly migrating courses) from WebCT to Moodle. In the 2012-13 academic year, Moodle will be the only centrally administered and supported LMS on a university-wide basis. The inquiry was conducted during the 2011-12 academic year, when HKU chose to centrally administer and support *both* WebCT and Moodle on its university portal system. The portal is widely used by students not only for eLearning and course access, but also for email, appointment bookings, event registration, online library tools, and departmental information access, thus acting as a key internet starting point for HKU students.

### 2.2 LMS set-up, survey questions, and categorizations

In the fall semester of the 2011-12 academic year, two parallel LMSs (WebCT and Moodle) were set up for an introductory common core science course, containing a diverse student population (from both science and non-science faculties). The LMSs were used to post: the course syllabus, assessment rubrics, assigned papers for discussion, course announcements, lecture slides, and tutorial slides. For these parameters, postings were done at the same time, with identical content to both WebCT and Moodle. For logistical reasons, WebCT was used exclusively to set-up initial tutorial groups, and to receive one course assignment. Course activity logs were examined for both Moodle and WebCT, and a brief, voluntary, anonymous paper-based survey was conducted on LMS usage at the end of the semester, in conjunction with an overall course evaluation. The survey questions were: 1) Which course management system did you use more often? (options were: Moodle, WebCT, never used either) and 2) Why did you use that system more often? (open-ended).

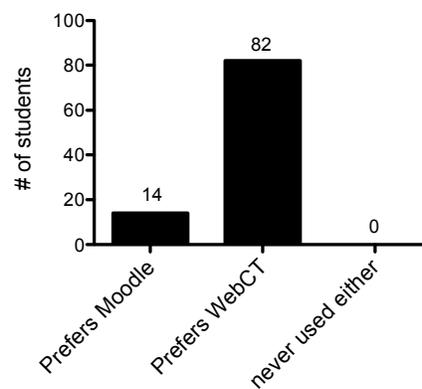
Responses to the open-ended question were categorized. From the Moodle self-report responses, three categories were clearly apparent, while from the WebCT self-report responses, six clear

categories emerged. For example, a comment such as “everything was organized by week” was placed under the category of *organization*. A comment such as “less buttons are needed to click to access the lecture notes/materials” was placed under the category of *ease of use*. In addition to the response categorization, Moodle usage categorization (i.e. heavy, sporadic, never accessed) was undertaken based on the activity completion report log available on Moodle. Students accessing 11 to 19 course items were deemed to be heavy Moodle users; those accessing 1 to 10 items were deemed to be sporadic users, while those students never accessing any course items on Moodle were, of course, deemed to have zero usage. This was performed for comparison to the self-report numbers, and also to examine patterns of usage and characteristics of the users (home faculties, course performance), in the event that an interesting pattern emerged. WebCT usage logs were also examined to determine if the heavy Moodle usage group was also accessing WebCT, and to what extent.

### 3. Results

A total of 96 survey responses on LMS usage were collected (total class = 102). 14 students self-reported that Moodle was their preferred LMS for the course, 82 students indicated WebCT, and zero students indicated that they never used either LMS (Figure 1). In regards to the reasons for the choice, the student responses for Moodle and WebCT differed appreciably.

**Figure 1: Student self-report of LMS usage**



Examples of responses in favor of Moodle included (comment categorization in brackets):

- “I can know the content of the lecture/tutorial notes from the heading of each week's update” (organization)
- “interface more attractive, has a checklist of things to be completed to give better understanding of learning progress” (appearance/checklist)
- “everything organized by week, easier to follow” (organization)
- “arranged according to order of lessons” (organization)
- “less buttons are needed to click to access to the lecture notes/materials” (ease of use)

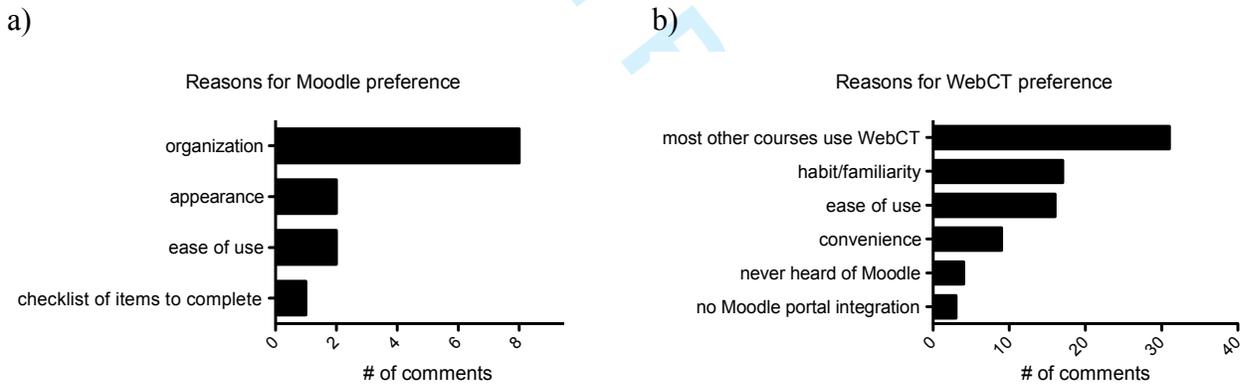
Two of the students who indicated a Moodle preference did not give any reason. The categorizations for the Moodle LMS include organization, appearance, ease of use, and the presence of a checklist of items to complete (Figure 2a). Most comments reflected better organization as the reason for Moodle preference.

In contrast, responses in favor of WebCT included:

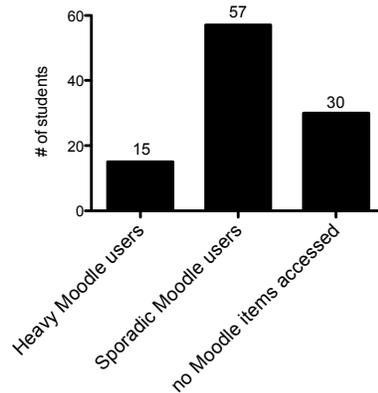
- “because other courses use this system” (most other courses use it)
- “as a habit only” (habit/familiarity)
- “WebCT is perfectly integrated into the portal, very convenient” (No Moodle portal integration)
- “never heard of Moodle” (never heard of Moodle)
- “a lot of courses use it, easier to check one platform” (most other courses use it)

For WebCT, a categorization of the student responses yielded the following reasons: most other courses use WebCT, habit/familiarity, ease of use, convenience, never heard of Moodle, and no Moodle portal integration (Figure 2b). Some of the comments indicated a misconception on the part of the students, particularly in regards to portal integration, which will be addressed further in the discussion section. A majority of the comments (60%) in favor of WebCT pointed to most other courses using the system, and habit/familiarity.

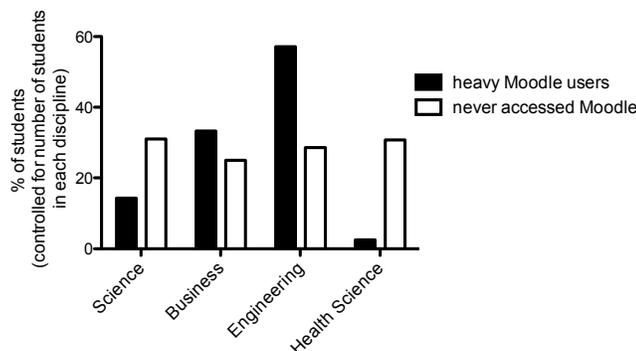
**Figure 2: Reasons for LMS preference**



Through examining the Moodle activity completion report, usage categories could also be established (i.e. heavy users, sporadic users, and those who never accessed Moodle (Figure 3)). Students who accessed 11-19 of the course items (out of a total of 22 course items) were classified as heavy Moodle users. A total of 15 students fell into this category, which was in accord with the self-report data collected on the surveys. Students who accessed 1 to 10 items were classified as sporadic Moodle users; 57 students fell into this usage category. Finally, there was a group of 30 students who never accessed any course items on Moodle.

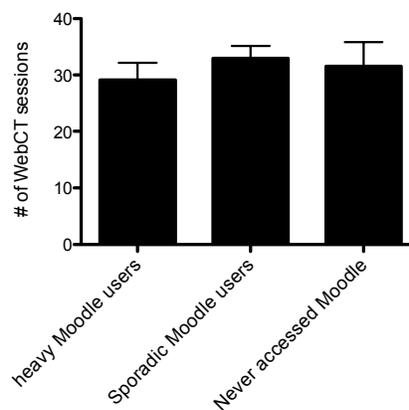
**Figure 3: Moodle usage based on activity report logs**

These usage categories could also be examined for parameters such as student faculty membership (i.e. Do a higher percentage of Science students fall into the heavy Moodle usage category? Do a higher percentage of Engineering students fall into the sporadic Moodle usage category?), and also final course grades. Student faculty membership was divided into 4 categories: Science, Business, Engineering, and Health Sciences (including Medical, Nursing, Dentistry, and Pharmacy students). Although the course also had students from the Faculty of Arts and from the Faculty of Social Science, their numbers were too low (only 1 from each faculty) and thus they were excluded from the analysis. Moodle usage categories were examined based on the percentage of students from each faculty in order to control for overall student numbers [i.e. there were 42 Science students in the course; 6/42 (14%) were heavy Moodle users, while 13/42 (31%) never accessed Moodle] (Figure 4). The percentage of students who never accessed Moodle was fairly evenly composed from four different categories (Science, Business, Engineering, and Health Science). Interestingly, there was a very low percentage of Health Science students (only 1/39 students, or 2.6%), who fell into the heavy Moodle usage category. This strongly suggests a preference for WebCT usage among the Health Science students. This could yield new hypotheses in regards to these students and also for the instructors in this faculty, which will be further addressed in the discussion section. Students falling into the heavy Moodle usage category had higher final grades (+4.3%) although with the large amount of variability naturally inherent in student grades this did not reach statistical significance, and thus should only be extrapolated to other contexts with caution.

**Figure 4: Moodle usage groups from different faculties, controlling for number of students in each discipline**

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3 Interestingly, WebCT usage among the three categories did not differ appreciably. The students  
4 with heavy Moodle usage were still referring to the WebCT site for the course, as indicated by  
5 WebCT usage logs (Figure 5). Many of the students were thus mixed users, even though they  
6 indicated a preference for one LMS. The only non-mixed users were the group that had never  
7 accessed Moodle -- this was the only example of a mutually exclusive use subset. If one  
8 compares the average number of what WebCT defines as “sessions” for the course (where  
9 students have opened the course and are accessing one or more items), then the usage of WebCT  
10 is surprisingly similar among all of the groups (heavy Moodle, sporadic Moodle, and zero  
11 Moodle).  
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16 **Figure 5: Number of WebCT sessions based on Moodle usage groups**



#### 32 4. Discussion

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34 This inquiry indicates some resistance to a new system, or “inertia”, during an LMS transition  
35 period, with many students preferring to use WebCT, the LMS previously in existence at the  
36 university. The main reason for that preference was habit and familiarity (“because most other  
37 courses use it”). In stark contrast, the reasons for Moodle preference were *intrinsic to the LMS*  
38 *itself*, namely the interface’s appearance and organization. WebCT “wins” out of habit, while  
39 Moodle “wins” out of quality and design.  
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43 This supports and extends previous findings for Moodle preferences. Several studies point to  
44 Moodle’s ease of use, chronological arrangement, and increased number of features (Beatty and  
45 Ulasewicz, 2006, Unal and Unal, 2011). The student comments on the Moodle interface in this  
46 study correspond well to the comments made in other studies, which included: “better interface”,  
47 “ease of use”, and “easy access to course materials” (Beatty and Ulasewicz, 2006). In using  
48 Moodle after a period of WebCT usage, 75% of students indicated that they would prefer to use  
49 Moodle as a WebCT replacement (Machado, 2007). However, none of the existing studies  
50 included the element of student free choice of LMSs, and it is reasonable to assume that many  
51 students could be converted to a preference if there is only one new option available. Students  
52 have reported a higher preference for Moodle (as opposed to WebCT) in comparison to faculty  
53 members during a transition between these two LMSs (Payette, 2009). This also supports the  
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3 current study's display of inertia during the transition, in that it is the instructors' imposition (in  
4 other courses that the students are taking) that is likely influencing students towards WebCT  
5 usage. The students explicitly commented on how WebCT was used in most other courses,  
6 which is directly indicative of the instructor LMS choices university-wide. It has also been  
7 suggested that e-learning policies cannot be imposed top-down (Dutton, 2004), and the results  
8 herein would seem to support that notion, with the high number of courses that are still using  
9 WebCT according to the students. Such inertia will need to turn into a hasty transition, as soon  
10 as Moodle is fully implemented as the new LMS.  
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15 Other studies have examined differences in applicability of LMS usage between various  
16 disciplines (Smith, 2008). Indeed, this is an important factor which may influence LMS usage  
17 patterns among students from different faculties in a multi-disciplinary course, because it may  
18 affect prior or concurrent LMS exposure depending on student major. Mathematics for example,  
19 relies more heavily on specialized notation and symbols and less on conventional worded text in  
20 comparison to a humanities or social science course (Smith, 2008). Ease of LMS use for  
21 inputting any specialized notation is a factor for instructor adoption in those disciplines. It  
22 appears that the LMS companies are listening to such concerns and making necessary  
23 adjustments, but the feasibility of the adjustments is still questionable. In this study, a very small  
24 percentage of the health science students fit into the heavy Moodle usage category (2.6% of the  
25 total number of health science students, 1 out of 39). This could be due to an excessive reliance  
26 on the WebCT LMS within the medical, nursing, dental, and pharmacy schools. This finding is  
27 quite useful on an institutional basis, as it may indicate the potential for future difficulties shortly  
28 after the complete LMS switchover in those departments. Other institutions should also be  
29 mindful of LMS adoption patterns (i.e. number of active courses in each faculty) during a  
30 transition period as a harbinger of adjustment issues after a full switchover. Decreased reliance  
31 on Moodle for health science students should not to be generalized outside the confines of the  
32 current study, although this study suggests patterns of LMS usage can provide important cues  
33 and yield new hypotheses on the pedagogical practices of instructors from particular faculties.  
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42 The philosophical underpinnings of the Moodle system adhere to a social constructionist  
43 pedagogy [3]. This foundation is likely to be applauded by many in the education sector, as  
44 would the adaptability and customization that an open source system allows. Interestingly, past  
45 interviews with Blackboard executives indicate a preference for open source features in future  
46 developments of that system (Finkelstein, 2003). The adage, "there's no better way to learn  
47 something than by teaching it", is invoked by the Moodle philosophy. Features in LMSs such as  
48 wikis and discussion boards have the potential to allow for collaborative student activity and the  
49 scaffolding of collective student knowledge. As with any technology, its efficacy depends on  
50 how it is used by the instructor, and social constructivist pedagogies need not be totally reliant on  
51 technology. Although the philosophical underpinnings are admirable, there are indications that  
52 LMSs are not being used in the ideal way that the creators intended (Dutton, 2004). Those in the  
53 education field should constantly aim towards better use of technology, however, there should  
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3 also be recognition that there are many things independent of technology that can improve  
4 teaching (i.e. teacher-student contact, alignment of assessments with learning outcomes,  
5 presentation clarity), which could have a much greater impact than the technology itself. Such  
6 ideas are rarely mentioned in the scholarly LMS discussion. It is also unfortunate that examples  
7 of LMS usage that could be deemed creative and advanced, and more in line with social  
8 constructionist pedagogies, are scant in the literature as well. Studies reporting innovative uses  
9 of LMSs give examples that appear to be a linking of another creative online site or program to  
10 the LMS platform (Perpich, 2010). These innovative uses could occur completely independent  
11 of the LMS, and thus do not rely on the LMS for realization. The LMS only acts as a scaffold or  
12 common meeting place for teacher and student in these cases. There is a significant gap between  
13 what is employed in an LMS and what the instructor intends to employ (Benson and Palaskas,  
14 2006), with the intended uses fitting what many would consider more advanced and  
15 constructivist approaches, while the current uses are more in line with provision of content.  
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22 It has been wisely suggested that LMS adoption and usage should be discussed on an iterative  
23 basis with all stakeholders (Coates, 2005). This inquiry stands as not only the first free choice  
24 study of LMS usage, but more importantly, provides a disclaimer for student opinion -- they  
25 don't always choose what would appear to be "best for them". Unfortunately, the scholarly  
26 dialogue for LMS usage is becoming outdated as LMS features expand and more customizations  
27 are possible. The timely reporting of findings is particularly pertinent to the LMS literature.  
28 Three year gaps between data acquisition and publication of findings (Unal and Unal, 2011),  
29 could be of concern to an audience (although this particular study has utility), as technological  
30 developments in LMSs, particularly in an open source situation, move much more quickly. One  
31 of the most widely cited papers in the LMS field, rightly so because of its depth and quality is  
32 Morgan's 2003 EduCause LMS study (Morgan, 2003). It is almost 10 years since the  
33 publication of that paper. The emergence of another authoritative and high quality review would  
34 be quite timely now.  
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41 The student comments regarding Moodle not being integrated into the university portal,  
42 indicated a misconception, and a puzzling one at that. Moodle was indeed integrated into the  
43 university-wide portal, and appeared right next to the link that students use to access WebCT on  
44 the eLearning platform. Numerous announcements were made in regards to the presence of the  
45 two different LMSs for the course. Presumably, the students making this comment, along with  
46 the students who had "never heard of Moodle", are somehow recalcitrant and not receiving any  
47 Moodle exposure in their other courses. They will soon be forced to adapt as the university  
48 moves forward to exclusive Moodle usage. Heavy Moodle users had a lower utilization of  
49 WebCT, but were still accessing the system. This is an intriguing finding, as one would logically  
50 associate increased preference for one LMS with a marked decrease in the other option. Student  
51 rationale behind mixed LMS usage is beyond the scope of the current inquiry, and could warrant  
52 further study. Concerns about increased administrative workload have been voiced in previous  
53 studies (Benson and Palaskas, 2006). Indeed, the author appreciated the opportunity to test a  
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3 new system while still having the old system in existence as a “crutch” if absolutely necessary.  
4 Furthermore, the current study would have been much more difficult without the university  
5 centrally supporting both systems during the transition.  
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8 Because of the ubiquitous nature of LMSs in universities today, they necessitate attention and  
9 further study. As we move towards a new “digital academe” (Dutton, 2002), we need to be  
10 keenly aware of the tools that we are bringing with us into that new era, and how the students are  
11 using them. As this study shows, looking solely at student usage patterns may not be a good  
12 indicator of the LMS strategy the university should adopt. LMS quality is prone to be  
13 overshadowed by student habit and familiarity.  
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### 17 **Acknowledgements**

18  
19 A portion of this study was presented orally at the Centre for Information Technology in  
20 Education Research Symposium held June 15-16, 2012, in Hong Kong.  
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23 <sup>[1]</sup>[www.moodle.org/stats](http://www.moodle.org/stats)

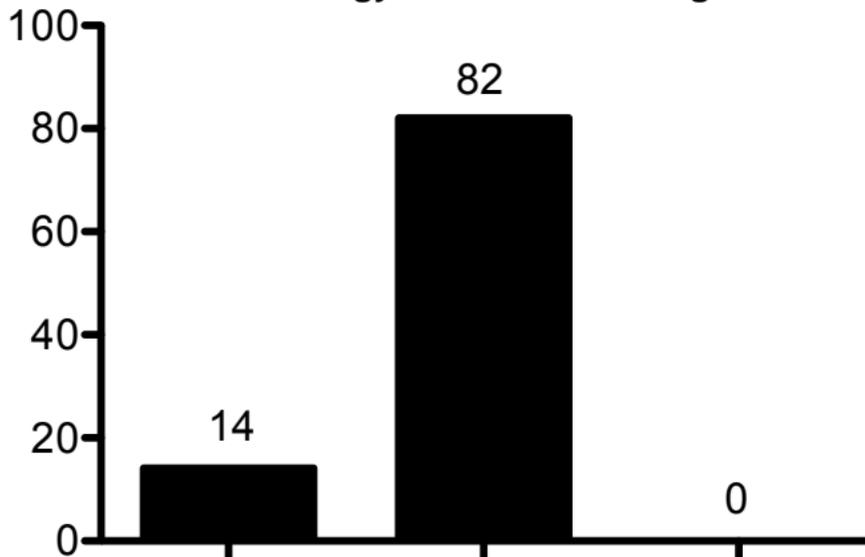
24 <sup>[2]</sup><http://skillspark.ca/info/MoodleandWebCTComparison.pdf>

25 <sup>[3]</sup><http://docs.moodle.org/22/en/Philosophy>  
26  
27  
28  
29

### 30 **References**

- 31  
32 ARBAUGH, J. B., GODFREY, M. R., JOHNSON, M., POLLACK, B. L., NIENDORF, B. &  
33 WRESCH, W. 2009. Research in online and blended learning in the business disciplines:  
34 Key findings and possible future directions. *Internet & Higher Education*, 12, pp. 71-87.  
35 ARNONE, M. 2002. Course-management outfits still seek elusive profits. *The Chronicle of*  
36 *Higher Education*, July 12, 2002. Available at: [http://chronicle.com/article/Course-](http://chronicle.com/article/Course-Management-Outfits/8975)  
37 [Management-Outfits/8975](http://chronicle.com/article/Course-Management-Outfits/8975) (accessed June 2012)  
38  
39 BEATTY, B. & ULASEWICZ, C. 2006. Faculty Perspectives on Moving from Blackboard to  
40 the Moodle Learning Management System. *TechTrends: Linking Research and Practice*  
41 *to Improve Learning*, 50, pp. 36-45.  
42 BENSON, R. & PALASKAS, T. 2006. Introducing a New Learning Management System: An  
43 Institutional Case Study. *Australasian Journal of Educational Technology*, 22, pp. 548-  
44 567.  
45  
46 BLIN, F. & MUNRO, M. 2008. Why hasn't technology disrupted academics' teaching practices?  
47 Understanding resistance to change through the lens of activity theory. *Computers &*  
48 *Education*, 50, pp. 475-490.  
49  
50 COATES, H., JAMES, R, BALDWIN, G 2005. A Critical Examination of the effects of learning  
51 management systems on university teaching and learning. *Tertiary Education and*  
52 *Management*, 11, pp. 19-36.  
53  
54 DUTTON, W. H., CHEONG, P.H. AND PARK, N 2004. The Social Shaping of a Virtual  
55 Learning Environment: The Case of a University-wide Course Management System.  
56 *Electronic Journal of e-Learning*, 2, pp. 69-80.  
57  
58  
59  
60

- 1  
2  
3 DUTTON, W. H., LOADER, B. (ed.) 2002. *Digital Academe: The New Media and Institutions*  
4 *in Higher Education and Learning*, London: Routledge.  
5  
6 FINKELSTEIN, J. A. P., M. 2003. *The evolving role of Course Management System Providers*  
7 *in the Transformation of Education: An interview with Blackboard's Matthew Pittinsky*.  
8 Available: <http://technologysource.org/article/326/> (accessed May 2012)  
9  
10 HANSON, P., ROBSON, R. 2004. Evaluating Course Management Technology: A pilot case  
11 study. *ECAR Educause Center for Applied Research*, 2004, pp. 1-12.  
12  
13 HARRINGTON, C., GORDON, SA, SCHIBIK, TJ. 2004. Course management system  
14 utilization and implications for practice: A national survey of department chairpersons.  
15 *Online Journal of Distance Learning Administration*, 7. Available:  
16 <http://www.westga.edu/~distance/ojdla/winter74/harrington74.htm> (accessed May 2012)  
17  
18 LONN, S. & TEASLEY, S. D. 2009. Saving Time or Innovating Practice: Investigating  
19 Perceptions and Uses of Learning Management Systems. *Computers & Education*, 53,  
20 pp. 686-694.  
21  
22 MACHADO, M. T., E 2007. Blackboard vs. Moodle: Comparing User Experience of Learning  
23 Management Systems. *37th ASEE/IEEE Frontiers in Education Conference*. Milwaukee,  
24 Wisconsin.  
25  
26 MORGAN, G. 2003. Faculty use of Course Management Systems. *Research Study from the*  
27 *EDUCAUSE Centre for Applied Research (ECAR)*. EDUCAUSE. Available:  
28 <http://net.educause.edu/ir/library/pdf/ers0302/rs/ers0302w.pdf> (accessed April 2012)  
29  
30 MUNOZ, K. D., VAN DUZER, J. 2005. *Blackboard vs. Moodle: A comparison of satisfaction*  
31 *with online teaching and learning tools*. Available:  
32 <http://users.humboldt.edu/joan/moodle/all.htm> (accessed June 2012)  
33  
34 PAYETTE, D. L., GUPTA, R. 2009. Transitioning From Blackboard To Moodle - Course  
35 Management Software: Faculty And Student Opinions. *American Journal of Business*  
36 *Education*, 2, pp. 67-74.  
37  
38 PERPICH, D. The gifts we give ourselves: embedding disciplinary tools in LMS International  
39 Conference of the Learning Sciences, 2010 Chicago. International Society of the  
40 Learning Sciences, pp. 138-140.  
41  
42 POLLACK, T. A. Using a Course Management System to Improve Instruction. ASCUE  
43 Conference, June 8-12, 2003 2003 Myrtle Beach, South Carolina. 225-230.  
44  
45 PORTER, G. 2011. Specifics of course management system benefits for new university faculty.  
46 *Higher Education Studies*, 1, pp. 2-7.  
47  
48 SMART, K. A., MEYER, K. A. 2005. Changing Course Management Systems: Lessons  
49 Learned. *Educause Quarterly*, 2, pp. 68-70.  
50  
51 SMITH, G., TORRES-AYALA, AT, HEINDEL, AJ 2008. Disciplinary Differences in E-  
52 learning Instructional Design: The Case of Mathematics. *The Journal of Distance*  
53 *Education*, 22, pp. 63-88.  
54  
55 UNAL, Z. & UNAL, A. 2011. Evaluating and Comparing the Usability of Web-Based Course  
56 Management Systems. *Journal of Information Technology Education*, 10, pp. 19-38.  
57  
58 YOUNG, J. 2002. Pricing shifts by Blackboard and WebCT cost some colleges much more. *The*  
59 *Chronicle of Higher Education*, April 19, 2002. Available at:  
60 <http://chronicle.com/article/Pricing-Shifts-by-Blackboard/16048/> (accessed June 2012)

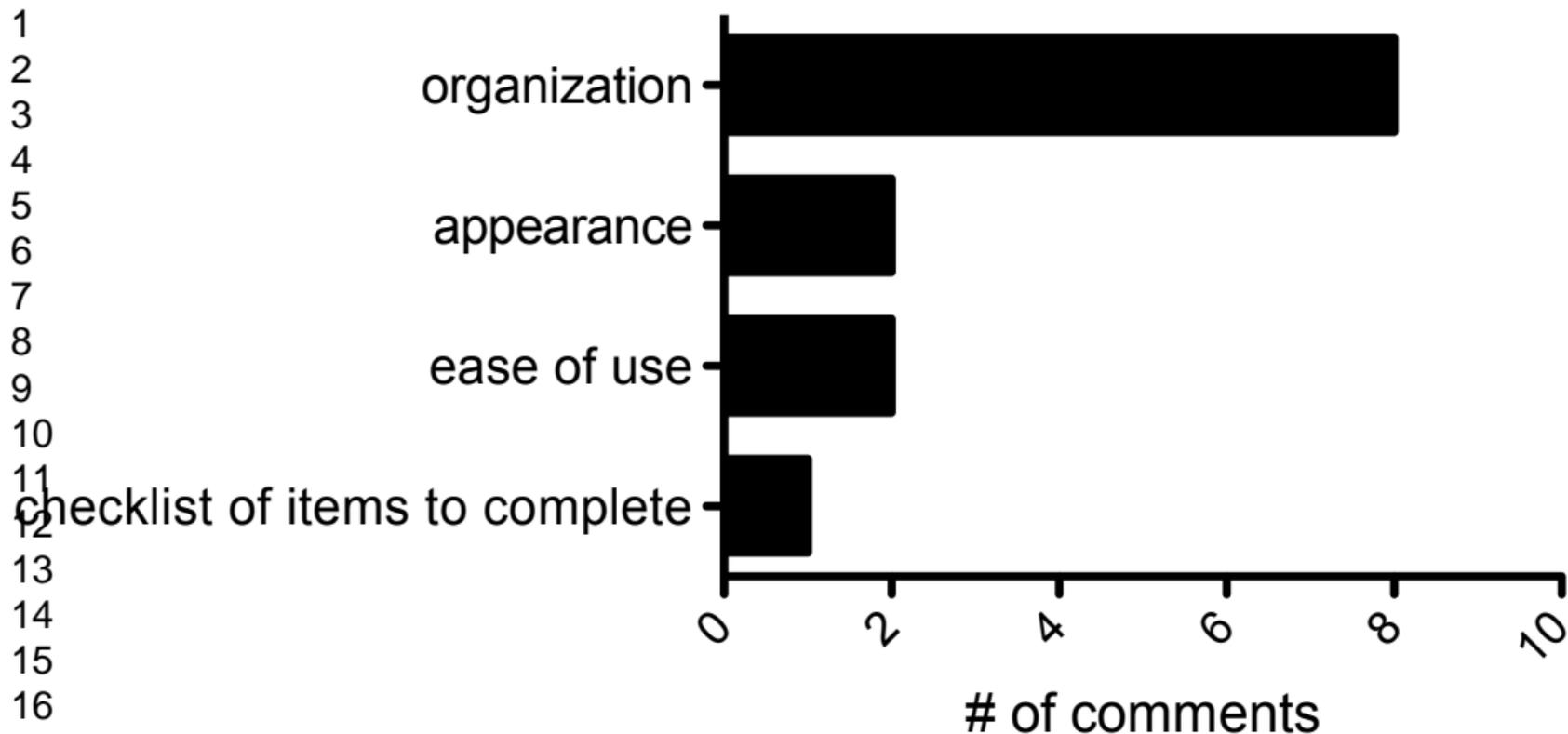


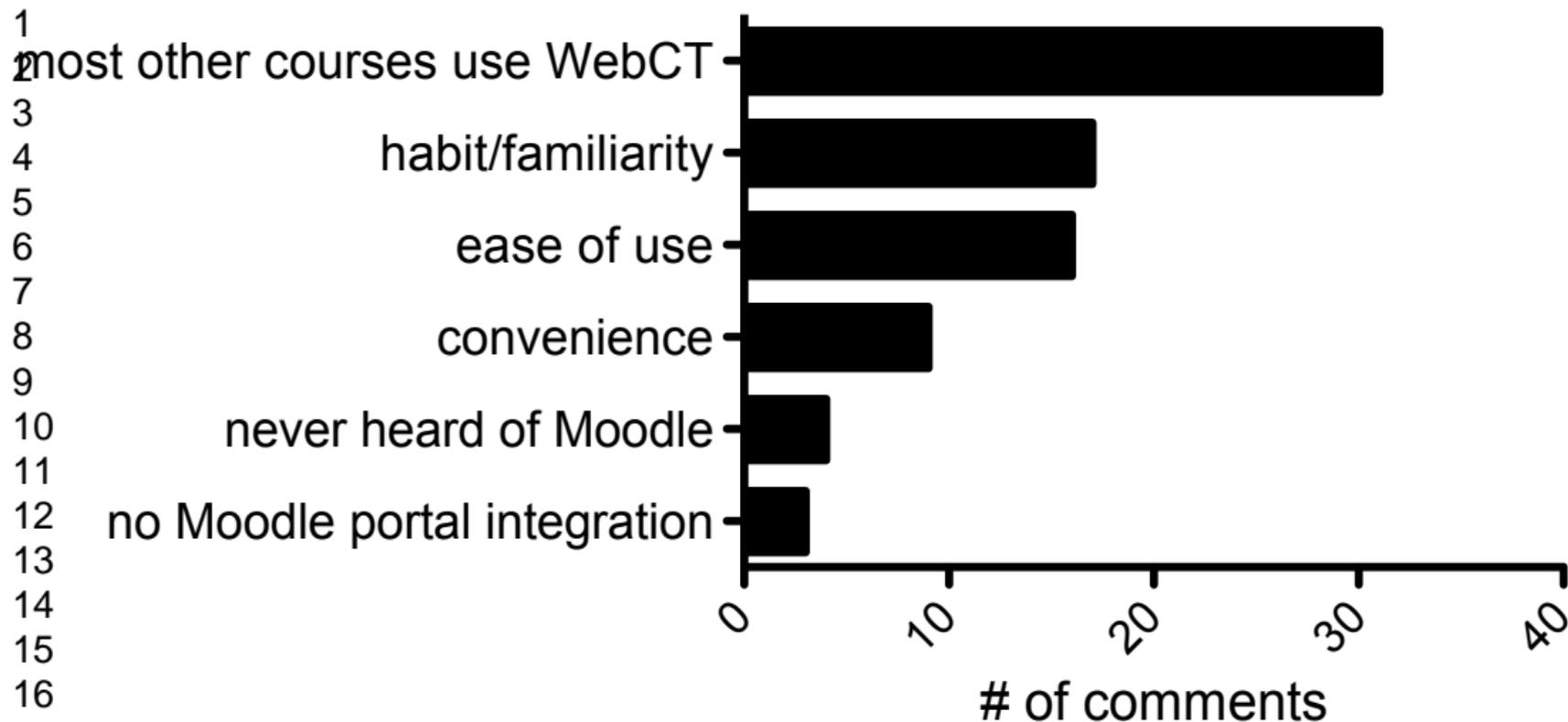
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Prefers Moodle

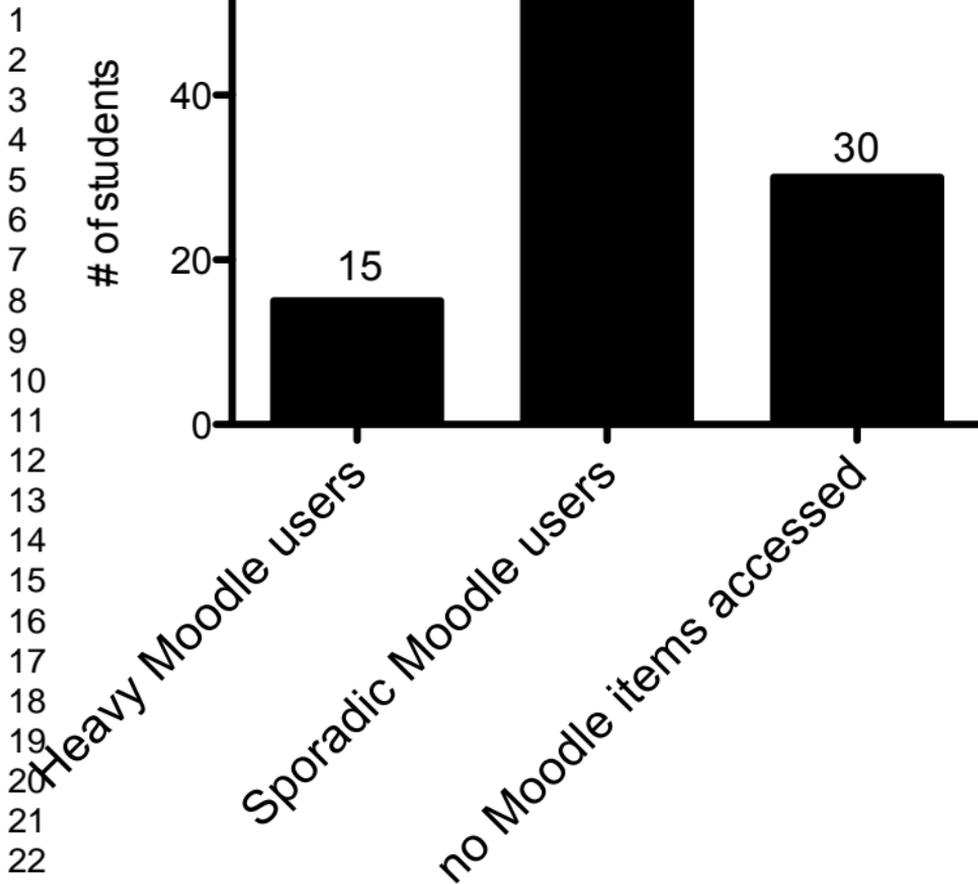
Prefers WebCT

never used either

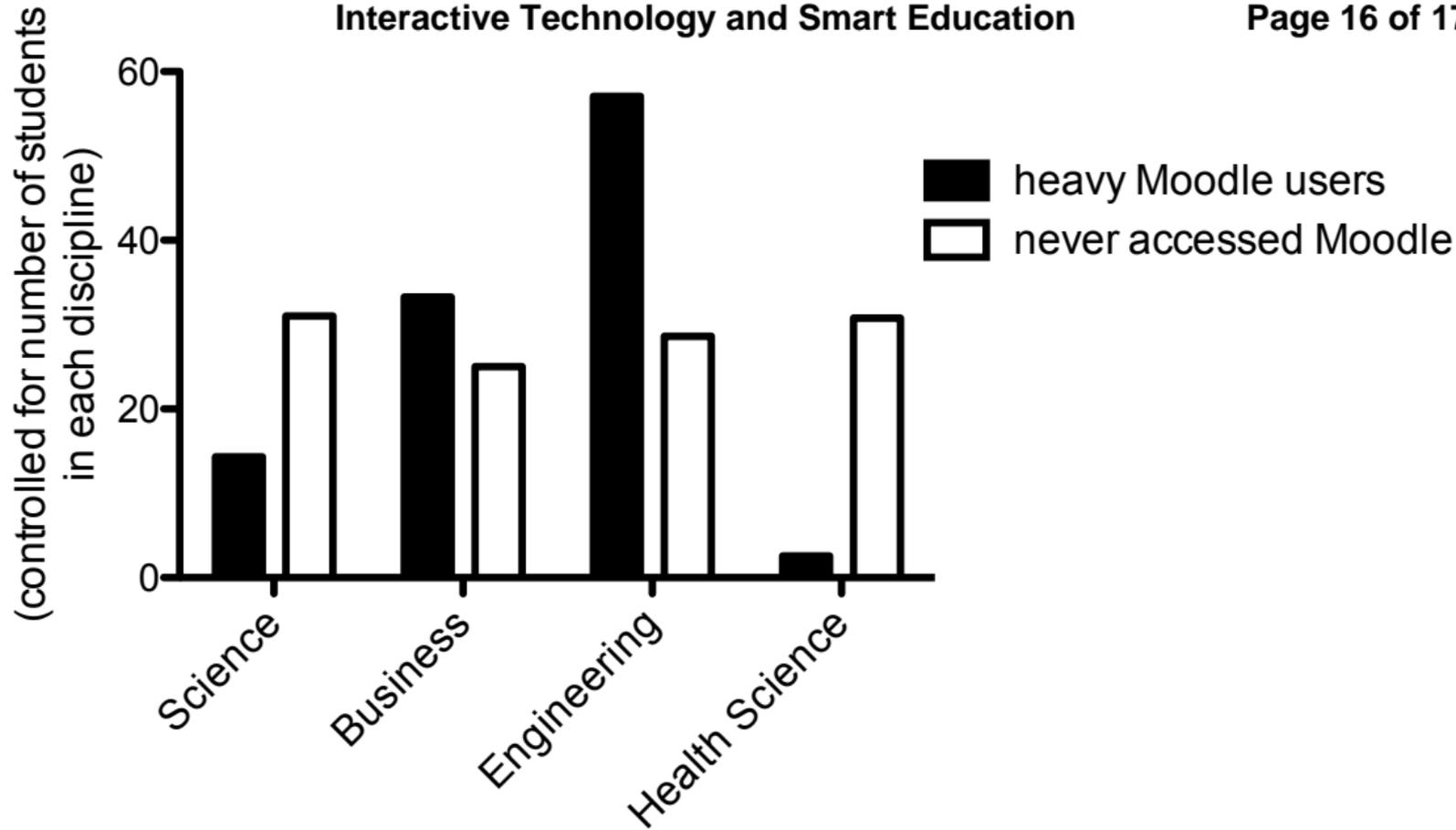
Interactive Technology and Smart Education  
Reasons for Moodle preference



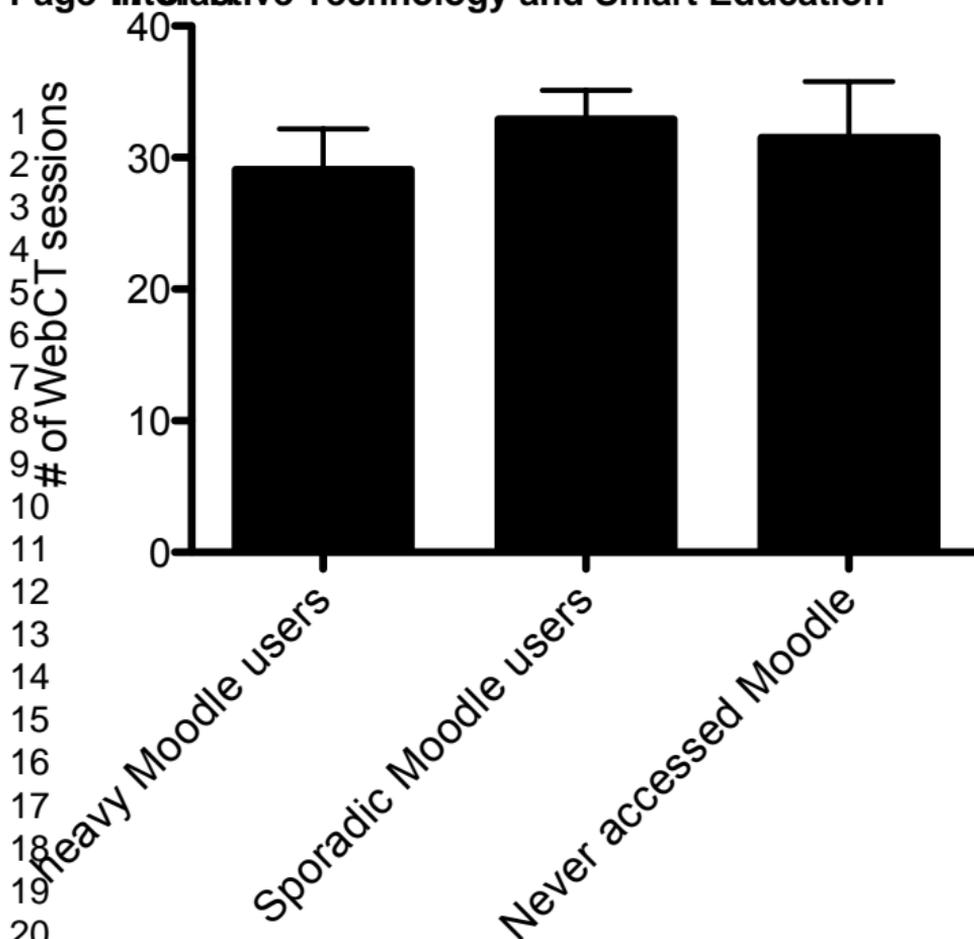
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