Japanese University Students and Learning Management Systems
日本人大学生と学習管理システム

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Abstract
While Learning Management Systems (LMSs) have become a common feature within education systems worldwide, their use in Japanese universities remains minimal. Despite recent government initiatives to incorporate ICT into the education system, many students have never even heard of an LMS by the time they matriculate, and they typically continue to remain highly paper and blackboard dependent in university. In this study I investigate how well 458 university students adapted to the use of a cloud-based LMS. I then go on to identify what factors affect their willingness-to-use, which was found to be an essential factor for successful adaption to LMS usage.

概要
学習管理システム(LMSs)は世界中の教育システムにおいて一般的に使用されている一方で、日本の大学での活用は最低限にとどまっている。教育システムへの ICT の導入という政府による近年の構想にもかかわらず、大学に入学するまでは LMS について聞いたことのない学生は多く、入学後も概して紙や黒板に頼り続けているのが現状である。本研究は 458 人の大学生を対象に、どの程度よくクラウドベースの LMS の使用に適応したかを検証する。加えて、LMS 導入を成功させるため不可欠な要素である、学生の LMS に対する使用意欲や積極性に影響する要因を特定していく。

Keywords: Learning Management System, Japan, university, ICT, willingness-to-use
学習管理システム，日本、大学、ICT、遣る気

Introduction

ICT stands for information and communication technologies, which include computers, televisions, interactive screens, smartphones, the Internet, and so forth. This diverse set of tools and resources enables educators to create, manage, store, and disseminate information, and in so doing ICT has brought about significant changes in the educational processes. In the mid 2000s, the use of Learning Management Systems (LMSs), which do all of the above tasks, reached diffusion levels of approximately 95% in the tertiary education system in the United States of America and United Kingdom (Hawkins & Rudy, 2005; Browne, Jenkins, & Walker, 2006). In language education, instructors have also embraced LMSs as a means to improve the flow and efficacy of teaching and learning in and out of the classroom. In Japan, however, LMS usage still lags noticeably behind despite it being a technologically advanced country.

In April 2010, the Japanese Ministry of Education, Culture, Sports, Science and Technology (hereinafter MEXT) established the "Conference on the Use of ICT in Primary and Secondary Education." Working groups, which included leaders in the information technology and communications industry (notably Fujitsu), developed a comprehensive policy, titled "The Vision for ICT in Education" about the utilization of ICT in the education system towards the year 2020. Central aims of the vision are to digitize the learning environment both inside and outside the school system and develop students' ICT literacy. The ultimate aim of this policy is to revitalize the economy and reverse Japan's

slide in international competitiveness rankings since 1990 (MEXT, 2011).

In practice, however, many schools and universities remain highly paper dependent (e.g., all notices are invariably printed on paper; syllabuses and paper handouts are given out in class; homework is typically distributed and completed on paper; in-class drills are invariably done on paper, etc.) As a result, most Japanese students have never heard of or used an LMS by the time they matriculate.

What then is an LMS? The Organization for Economic Cooperation and Development (OECD, 2005) defines a Learning Management System (LMS) as a form of technology used by instructors to build and maintain courses. It is sometimes called a Virtual Learning Environment (VLE). LMS usage dates back to the 1960s, but it became familiar to most educators following the creation of the Internet and the subsequent launch of Modular Object-Oriented Dynamic Learning Environment (MOODLE). Moodle was developed as an Open Source software in 2002 to support learning based on social constructionist epistemology: In layman's terms this is where an "edgeless" community of instructor(s) and learner(s) co-operate in an asynchronous process to acquire and/or construct knowledge. While it is not entirely clear how social constructionism makes Moodle different from previous systems, some academic institutions have typically given this as a main reason for adopting it (Weller, 2006). Others, such as the large-scale user Open University in the United Kingdom, see the LMS as being a "relatively pedagogy-neutral" medium (Sclater, 2000). I understand this to mean that the LMS is a means of managing learning that is not solely determined and constructed by the instructor.

The main purpose of an LMS is to improve learning flow, creating a seamless or edgeless connection between school and home, and one that greatly reduces dependency on paper. Most LMSs enable teachers or students to do the following:

- Post course syllabuses, assignments, documents, lesson summaries, quizzes, tests, videos, web-links, images, etc.
- Evaluate and keep track of participation, types of error/misunderstanding, grades, progress, etc.
- Engage in synchronous and asynchronous teacher-student, teacher-class, student-student(s), and student-class communication via messages, discussion forums, and surveys.
- Assess assignments, as well as give and collect feedback.

As an educator, LMSs offer me a convenient means to manage many aspects of running a course, such as those outlined above. A notable advantage is that LMSs enable me to employ various forms of media when I create assignments for the students. Naturally, I cannot assume every student will share my enthusiasm. Thus, a simple hypothesis is that satisfied users are more likely to use LMSs to their benefit while frustrated users are more likely to resist usage. I wanted to gain a deeper understanding of how my students felt about using LMSs. More specifically, the focus question of this study was, "How well can Japanese university students adapt to blended learning (the combining of class-based and online learning) by way of using an LMS?" This question is important because research to date in Japan has mainly focused on innovation in the use of LMSs from the teacher end as opposed to actual use by students (see Hinkelman & Grose, 2005; Baskerville & Robb, 2005; Nozawa, 2006; Nozawa, 2007; Stanley, 2007; Brine, Wilson, & Roy, 2007; Bateson, 2008; Bateson, 2009; Nozawa, 2011; Hirschel, 2012).

Criteria for LMS Usage

Selim (2007) identifies four interrelated categories that affect student satisfaction with an LMS: (a) university support, (b) lecturer, (c) student, and (d) information technology. I will use these categories to present the relevant research.

University Support

Czerniewicz and Brown (2009) and Naveh, Tubin, and Pliskin (2010) argue that affirmative university policies that advance LMS usage within the institution often heighten student satisfaction. Such policies include: staff and students' ease of access to computer laboratories, ICT support, sufficient network bandwidth, network reliability and security, videoconferencing facilities, instructional multimedia services, as well as the quality of the university's IT educational provisions. Staples and Seddon (2004) argue, moreover, social norms also affect LMS acceptance when LMS usage is mandatory. Conversely, however, Weaver, Spratt, and Nair's (2008) study found that university-wide mandates can in fact make the experience of an LMS less satisfactory for students. In such situations, teaching staff who feel obligated to use the LMS but lack suitable training are more apt to resent its usage and cannot provide students with the necessary technological support, thereby creating an unsupportive LMS usage environment.

Lecturers

In Thailand, Wichadee (2014) highlights the need for teaching staff to explain to the students the benefits of using an LMS at the outset. In the United Arab Emirates, Selim's (2007) research reveals that students whose lecturers promoted task-based activities or interaction on the LMS, adapted better than those who did not. In Japan, Nozawa (2011), employing a task based approach, explored the use of Moodle as a means for 24 students to learn how to search for information on the Internet, and then collaborate, research, present, and peer-evaluate various topics. While 71% of the cohort enjoyed blended-learning, he notes 71% found Moodle's interface difficult to use (i.e., students found it difficult to do quizzes or answer surveys). Nozawa attributes their difficulties to their ICT inexperience despite widespread use of smartphones and the Internet among the Japanese student population.

Students

A key factor in students' satisfaction with LMS is their awareness of how it will contribute to their academic learning, especially with respect to collaborative learning (Delone & McLean, 2003; Sun, Tsai, Finger, Chen, & Yeh, 2008; Seddon, Staples, Patnayakuni, & Bowtell, 2010). However, Arbaugh and Benbunan-Fich (2007) found that while collaborative LMS environments often result in higher levels of learner–learner and learner–system interaction, students still place greater value on learner–instructor interaction. Furthermore, and perhaps more importantly, Hornik, Johnson, and Wu (2007) observe that when there is a gap between students' preferred learning approach and the promotion of collaborative LMS learning, students will be less willing to use the LMS. Lastly, while researchers often seek to show how the use of LMSs result in improvements in "academic performance," a study by McGill and Klobas (2009) revealed the students' most immediate concern was ease in use rather than obtaining a high grade.

Information Technology

The question of ease-of-use brings us to matters of computer access and ICT literacy. Following the emergence of mobile devices, such as the smartphone and tablet, concerns about access are notably reduced but a number of studies point to continued problems concerning ICT literacy. Hong (2002), Selim (2007), and Liaw (2008) highlight the importance of the students' level of ICT literacy for the successful implementation of an LMS. In Saudi Arabia, Al-Jarf (2009) attributes marked dissatisfaction among freshman students using several LMSs on an English as a Foreign Language (EFL) grammar course to their low-level computer skills and low-level English proficiency. In this study, the LMS content included explanations, examples, exercises, and a discussion forum. Students were also required to post short paragraphs on any topic of their choice. Despite the simplicity of the tasks, the students complained that the LMSs were difficult to use and time-consuming. Al-Jarf notes:

> Many students did not take online instruction seriously as it was not used by other instructors and students. They also believed that online courses should be used for fun and not for credits and serious studying. (2009, p. 6)

In Oman, Al-Naddabi (2007) also attributes students' unwillingness to participate in Moodle activities to low computer literacy levels among the staff and students. In Japan, Miyazoe (2008), comparing usage of Blackboard Academic Suite 7.1 and Moodle 1.7.2, found students adapted fairly well to blended learning, but they preferred Moodle on account of its messaging facilities. Conversely, Kato's (2011) study, involving a larger cohort of 92 English Department students, found most students found it difficult to use an LMS, although he did not attempt to identify why this was the case.

At the other end of the computer literacy continuum, Naveh et al. (2010) observe that computer-literate students are typically quick to express dissatisfaction when their expectations for a high-quality, modern-looking, and user-friendly LMS interface are not met.

Relevance of Previous Studies

The above criteria provide a framework with which to look at how students at Fukuoka University might adapt to use of an LMS. In the following sections, I will provide an overview of the university's support for blended learning and my own approach before going on to describe the survey that I conducted to investigate their views on LMS use. It is important to note here that some of the studies above show successful implementation in a university setting. Others, however, highlight the fact that there have been problems implementing LMSs. In that, students do not always adapt well to blended learning. The authors, however, have not investigated the reasons.

Background

Fukuoka University is a large private university in Kyushu where I have been teaching for the past three years in a full-time capacity. It has a student population of just over 23,000 undergraduate and postgraduate students. Most students come from the Kyushu area, and the foreign student population is minimal and, for the most part, segregated from the Japanese student population. Nearly all students at the university matriculate at 18-19 years of age. Most students arrive at the university already familiar with a number of computing devices, and they are noticeably dependent on their smartphones. Nearly all the students carry these smartphones to class. In contrast to my experiences of studying and teaching in European and North American university settings where tablet usage is a norm, very few students in Fukuoka University bring tablets or laptops to class.

The learning culture in the university is predominantly traditional which is reflected in the physical environment (i.e., classrooms with rows of desks facing blackboards) and the curricular framework (e.g., courses with final tests that carry heavy grade weightings). In contrast with my teaching and learning experiences in tertiary education in American and British universities, ICT equipment is notably dated. A large number of the language teaching staff are still using VHS tapes and cassette tapes for their visual and audio needs, and technological renovations in the classrooms continue to cater to these needs by installing VHS players and cassette players in new "multimedia centers" lodged in the podiums. There are around 10 CALL classrooms but even the newest classroom, which has a very good grouped seating arrangement, has no facilities to monitor students' tablets or even send/collect files to them. Furthermore, WiFi provision in the buildings is for the most part unstable.

In regard to LMS usage, Fukuoka University implemented Moodle as an institution-wide LMS in 2009. Despite the fact Moodle costs Fukuoka University approximately 1 million yen (around 8,500 USD) for yearly server maintenance costs, actual staff usage—the total number of which is approximately 4000—is exceedingly minimal. This is probably related to two

factors. The first is usage is voluntary, and people tend to resist change. The second is the fact that the frequency and quality of Moodle training is poor. At the time of writing, only two three-hour training sessions had been held since 2009, and the training session gave participants very little in the way of hands-on experience and neglected to teach participants how to enroll students in the system. Other factors, such as having to apply well in advance to use the system or add-on-tools probably hindered interest too. As a result, paper usage and wastage at the university remains significantly high. As a rough calculation, paper and printing costs on A4-sized paper alone per foreign language lecturer amount to approximately 190,000 yen each fiscal year. Times this figure by 4,000 and we can see how costly the use of paper is for the university and for the environment.

Methodology

I used a cloud-based LMS called Coursebase (formerly known as LanguageCloud) for four reasons. Firstly, the university's lengthy application procedure to use Moodle could be bypassed. Second, the interface has English and Japanese language settings that can be changed easily by users. Thirdly, the interface of Coursebase is notably simpler than most LMSs. Fourthly, I was an experienced user of the LMS.

I used Coursebase in four different courses that I teach: (a) Reading & Listening Course, (b) TOEIC (Speaking & Writing) English for Specific Purposes Course, (c) Interactive English Course, and (d) Advanced Interactive English Course. Students were required to attend a 90-minute class for face-to-face instruction in a whole-class setting 15 times a term. The 15 classes across the term included whole-class, individual, and collaborative learning activities. LMS registration and induction of the students took place in the first class. I outlined the potential benefits of using an LMS and the students were given an opportunity to discuss these and ask questions only a few students were forthcoming. As a result, I outlined the potential benefits of using an LMS. I then showed students how to:

- Create a username and password
- Change user settings
- Access course information
- Use the messaging service
- Open/submit assignments
- Check assignment grades
- Contact the lecturer and the LMS support service.

There is no in-built facility for peer-collaboration and assessment in this LMS interface. Since my primary aim for this study was to explore students' adaption to using the LMS, I only used Coursebase to deliver assignments to the students outside class. Asynchronous course material was delivered through Coursebase, and its content was created in accordance with the aims of the course. Close-ended tasks (e.g., multiple choice questions) were marked automatically by the LMS and open-ended tasks (e.g., written text) were marked manually using the LMS's coding system and open fields for written feedback. There was no facility in the interface, however, for students to respond to feedback directly on the assignment page.

The following briefly outlines the aims of each course, and how the students in each of the four courses used the Coursebase LMS outside the class during the term. I have used the university's labeling system:

Reading and Listening Course [R&L]
(Mandatory Course – Department of Economics)

The aim of the course is to improve the students' reading comprehension skills and top-down listening skills. On the LMS, students had to choose and complete 10 out of 20 reading assignments, which I had written or adapted from various sources, constituting 50% of the course grade. For each, students were given closed multiple-choice or true-false items designed to both assist and assess reading comprehension, and one question-prompted open-ended item for a written response (one paragraph of at least five sentences).

TOEIC (Speaking & Writing) English for Special Purposes [ESP] *(Mandatory Course – Department of Pharmacy)*

The aim of this course is to familiarize students with the Speaking and Writing Test of Test of English for International Communication, and prepare them to attain a good score. Students had to complete six outside class assignments constituting 35% of the course (5 assignments at 5%/ 1 assignment at 10%). Close-ended activities included word and meaning matching; cloze sentences; identifying sentences as being grammatically correct or incorrect; and multiple-choice items. Open-ended items included sentence writing; paragraph writing; business email writing; and five-paragraph essay writing.

Interactive English [IA] *(Mandatory Course – Departments of Sports)*

The aim of the course was to raise students' awareness of what is entailed in communication and improve their spoken proficiency. Students had to complete 10 assignments constituting 50% of the course grade. Assignment items included reviews of language and communication strategies used in the class. Close-ended activities included grammar and vocabulary multiple choice and matching. Open-ended assignment items included writing conversations (or uploading audio/video conversation).

Advanced Interactive English [IA] *(Elective Course – Department of Humanities)*

As above, the aims of this course were to develop awareness and communicative competency in English. Students had to complete six outside class assignments constituting 30% of the course grade. Items varied, but they were mostly open-ended items requiring students to provide written responses.

Methods

Data were collected via an anonymous Japanese survey instrument administered to 473 undergraduate university students in the first and second semester of 2013.

The student survey comprised of 30 quantitative items organised into the following sections sections.

1. Categorization of the respondents in terms of their department and course.
2. Categorization of the students' IT education, keyboard skills, and previous LMS experience.
3. Categorization of the students' proficiency in using the LMS' functions.
4. Categorization of students' perceptions regarding the LMS's overall ease-of-use, its usefulness, and their willingness-to-use.

Sections 1-3 used Yes/No options. Section 4 used a five-point Likert scale. Finally, a section was included for students to share their views freely.

The frequencies of the responses made for each nominal or ordinal level survey question were tabulated, and expressed as percentages. The internal consistency of each item in each scale was then assessed using Cronbach's alpha values. The internal consistency was found to be satisfactory (Cronbach's alpha $>$ 0.7) bar items concerning their willingness to use an LMS. Furthermore, the Item Characteristics Curves (ICC) for all the Items, except Q20, revealed that the transitions between all five response options are clear since most students with low to average perception score chose "Strongly disagree," "Disagree," or "Not sure," and those with the highest perception levels mostly chose "Agree" or "Strongly agree" with the positive statements on LMS.

Scores were then computed for the scale using a factor analysis approach. These scores were then used as the responses instead of the individual items in the scale. The effects of the explanatory variables on the scores were then assessed using multiple linear regressions. These and the ordinal scale responses were assessed using ordinal logistic regression.

The multivariable ordinal logistic regressions excluded the students' major and type of English course because this led to problems where there was complete separation or perfect prediction. The "major"

variable had many categories some of which had very few subjects. Missing values affected the estimation of the coefficients. Consequently, to assess the effect of English course on the response variables of interest, a univariate model involving only the English course as an explanatory variable was used.

Findings

All students participated voluntarily in the study, and N=458 respondents completed the survey. Gender was not used to categorize respondents. The student ages ranged from 18 to 20, with a mean age of 19.2 years; 64.9% were in their first year; 64.6% were Humanities students and 35.4% were Science students. The majority (53.3%) were enrolled in an ESP course, 32.8% in R&L, and 13.8% in both the IA courses.

As shown in Tables 1 and 2 further below, at the beginning of the term, approximately 65% found it difficult to use the LMS. By the term end, around 30% still found it difficult. For example, they still did not know how to insert web links, photos, or videos, nor did they know how to change their settings or post a message. In response to the item *I do not want to use the LMS in my other language courses*, approximately 30% confirmed this to be the case. Another 30% wanted to use an LMS and the remaining 40% were undecided. In regard to the item, *I wish my other courses (conducted in Japanese) in my department used the LMS*, only 20% responded favourably. The majority, about 60%, affirmed that they would rather have paper information and do paper assignments. Conversely, 20% responded that they did not want paper based information and assignments.

Attending the LMS induction was found to have a direct and significant effect upon students' willingness to access the LMS. During the course, however, students typically sought advice from their friends about the LMS rather than approach me. Receiving an IT education at junior high school and high school was found to have a significant effect on LMS usage. It was noteworthy that only 77.1% of the students had in fact received some sort of IT education. Rather surprisingly, the fact that only 10.5% felt they could use a keyboard with ease suggests that their actual use of computers during those school years was, in fact, minimal.

Table 1. Number and percent of students who answered 'Yes' to questions on computer literacy and knowledge.

Survey question	Yes – n	%
Computer literacy:		
This is the first time I have used an LMS.	440	96.1
I mostly use my smartphone to access the LMS.	334	72.9
I also use a home computer to access the LMS.	236	51.5
I learnt how to use a computer/internet at elementary school.	350	77.1
I learnt how to use computer/internet classes at junior & high school.	356	77.7
I like using computers.	236	51.5
I can type fairly quickly on a computer keyboard.	48	10.5
Getting started:		
My lecturer helped me get started on the LMS.	422	92.1
I worked out how to use the LMS by myself.	136	29.7
When I needed help, I asked other students to show me how to use the LMS.	336	73.4
When I needed help, I consulted the LMS support staff.	38	8.3
When I needed help, I asked my lecturer to show me how to use the LMS.	150	32.0
I now know how to:		
Change my settings (password, email, language, etc).	334	73.2
Post a message to the class.	356	77.7
Post a message to individuals in the class.	196	43.0
Open, save, and submit assignments.	444	97.8
Insert photos/web links/ and attach documents in messages or assignments.	182	39.9
Check my grade.	348	76.3
Find information about the course syllabus, assessment, etc.	384	84.2

It must be noted here that while some keyboards have keys with assigned hiragana symbols, Japanese users typically use the Roman alphabet keys to write Japanese, which then appears on the screen as written Japanese. Being able to use a keyboard with ease also had a direct effect upon being willing to use the LMS. Naturally, those who could not type with ease preferred paper

information and assignments. Lastly, students taking the ESP course, which is focused solely upon taking TOEIC, were far less likely to want paper information and assignments. This was found to correlate with their computer literacy.

Table 2. Response to questions on LSM usability.

Survey question	Strongly Disagree n (%)	Disagree n (%)	Not Sure n (%)	Agree n (%)	Strongly Agree n (%)
At first, I had major difficulties using the LMS	34 (7.5)	86 (19.0)	40 (8.8)	196 (43.4)	96 (21.2)
Overall, it is now easy for me to use the LMS website.	44 (9.7)	94 (20.8)	96 (21.2)	190 (42.0)	28 (6.2)
The LMS website contributed to the course.	14 (3.1)	20 (4.5)	160 (35.7)	210 (46.9)	44 (9.8)
I am satisfied with the course materials posted on the LMS website.	12 (2.7)	22 (4.9)	170 (37.9)	206 (46)	36 (8.5)
I do not want to use the LMS in my other language courses.	22 (4.9)	106 (23.6)	186 (41.3)	94 (20.9)	42 (9.3)
I wish my other courses in my department used the LMS.	58 (12.9)	110 (24.4)	194 (43.1)	74 (16.4)	14 (3.1)
If the LMS had online guidance, I would use it.	36 (8.0)	90 (19.9)	228 (50.4)	90 (19.9)	8 (1.8)
I often accessed the LMS.	32 (7.1)	170 (37.6)	86 (19.0)	154 (34.1)	10 (2.2)
I would rather do paper assignments and have paper information.	20 (4.4)	88 (19.5)	120 (26.5)	134 (29.6)	90 (19.9)
I checked the lecturer's feedback/comments on my assignments.	26 (5.8)	56 (12.4)	100 (22.1)	192 (42.5)	78 (17.3)
I had to study English more outside the class because of the LMS.	74 (16.4)	120 (26.5)	156 (34.5)	88 (19.5)	14 (3.1)

Discussion

How well did the students in this study adapt to use of an LMS? Looking at the overall picture, it can be said that only a minority adapted well to its use in blended learning. What then is impeding a transition to digitalized learning? A primary factor would appear to be the students' ICT literacy. Around 25% claimed they had never received any ICT education since elementary school, which is a surprising and worrying statistic in this day and age. This finding is in line with studies in other contexts (see Hong (2002); Selim (2007); Liaw (2008); Al-Jarf (2009)).

Another finding in the research is that many students—especially those who had never received an ICT education—accessed the LMS via their smartphones. While some students commented on the convenience of being able to use a smartphone, much more complained it was difficult to see the LMS due to a small screen size and the difficulties of typing on a phone. In addition, the timed web security facility, smartphone screen interface glitches, and weak Internet connections made mobile access to the LMS a much more time-consuming chore for students than paper-based information and assignments. Thus, we can say these technical considerations are just as important as an easy-to-navigate LMS interface. However, the fact that these students chose not to use a computer when confronted with these problems can be attributed to either paucity in their computer education or their unwillingness to use the LMS.

While discussion was conducted in class as to the need for ICT skills in the labour market, many students appeared to resist the need to become more proficient. However, it is important to note that the TOEIC (ESP) students were most in favour of using an LMS. There are possible three reasons for their willingness-to-use. The first is that students in this class did see an obvious relationship between ICT usage in education and future ICT usage in the job market. The second is that they are more computer literate. Thirdly, and this information is anecdotal, these students are more scholastically adept than their counterparts on the R&L and IA courses, as the matriculation requirements for these students (Department of Pharmacy) are far more rigorous than for students who entered the Departments of Sports, Economics, and Humanities. Furthermore, despite the class being much larger in size, the TOEIC (ESP) students were notably more attentive to how they should behave in a classroom setting and actively sought to make the learning experience worthwhile.

Some readers might say that test focused courses, such as TOEIC, lend themselves more easily to motivating students and LMS usage. While it is true that TOEIC (Reading and Listening) is a widely known high-stakes test in Japan, TOEIC (Speaking and Writing) is a new test that is not widely known and currently lacks status. It is true that the

former, as a receptive test, does lend itself well to close-ended item content creation on an LMS. The latter, however, places a distinct focus on productive language skills, thereby requiring the use of open-ended items. In this sense, it is more challenging.

The final point that I wish to highlight here is that LMSs are sometimes seen as a solution to the apathy often seen among academically low-level students in many foreign language courses in Japan. However, I believe this view should be treated with some caution. There are five primary concerns. First is their previous ICT education and ICT literacy level. Second is the students' preferred form of access. Third is the nature of the LMS interface itself. Fourth is the nature of the LMS content. Fifth is the nature of the educational culture. As I have noted above, two key factors in the successful implementation of an LMS are the degree to which the university sets up an environment that supports and encourages LMS implementation. This is not to say that LMSs should be avoided when the university is not supportive but their integration needs to be thought out all the more deeply before implementation.

Until then, however, it is likely that students who wish to remain paper-dependent will voice their objections to the digitization of education on teacher evaluations due to their lack of familiarity, proficiency, and capability. This was certainly my experience at the university. Student resistance could impede the diffusion of LMS usage in Japan generally, as many teachers, especially those on part-time contracts, tend to adapt their teaching in order to solicit positive reviews from their students, whether or not the educational practice is in the students' short- and long-term best interests. Therefore, it may well be in teachers' interests to make a collective effort to introduce an LMS in their department. This raises a question for further research as to whether students will adapt better in an environment where there is a collective effort.

To conclude, this study fills a gap in literature to date by not only presenting a wider-scale investigation of Japanese university students' ability to adapt to the use of an LMS in their language education, but also by identifying key reasons as to why a good number of net generation students remain averse to its usage. Thus, while the use of ICT in language education has come of age in many parts of the world, Japanese universities still need to consider more carefully what skills and knowledge their students need to acquire in order to use an LMS on their courses more effectively. This is a necessary step before other innovative approaches in edgeless education can be approached. Until then, paper usage/wastage at Japanese universities is likely to remain unnecessarily high.

References

Arbaugh, J. B., & Benbunan-Fich, R. (2007). The importance of participant interaction in online environments. *Decision Support Systems, 43*(3), 853-865.

Baskerville, B., & Robb, T. (2005). Using Moodle for teaching business English in a CALL environment. *PacCALL Journal, 1*(1): 138-151.

Bateson, G. (2009). Technically speaking: Creating adaptive online learning materials with the QuizPort module for Moodle. *The Japanese Association for Language Teaching CALL Journal, 5*(1), 91-99.

Bateson, G. (2008). Intermediate Moodle: Ideas for language teachers. *The Japanese Association for Language Teaching CALL Journal, 4*(2), 73-79.

Brine, J., Wilson. I., & Roy, D. (2007). Using Moodle and other software tools in EFL courses in a Japanese IT university. In H. Saito & H. Wang (Eds.), *Computer and Information Technology, 2007. CIT 2007 (pp.* 1059-1064). Aizu-Wakamatsu City, Fukushima: IEEE Computer Society.

Browne, T., Jenkins, M., & Walker, R. (2006). A longitudinal perspective regarding the use of VLEs by higher education institutions in the United Kingdom. *Interactive Learning Environments, 14*(2), 177-192.

Al-Busaidi, K., & Al-Shihi, H. (2012). Key factors to instructors' satisfaction of learning management systems in blended learning. *Journal of Computing in Higher Education, 24*, 18-39.

Czerniewicz, L., & Brown, C. (2009). A study of the relationship between institutional policy, organizational culture and e-learning use in four South African universities. *Computers & Education, 53*(1), 121-131.

Delone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information

systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9-30.

Hawkins, B. L., Rudy, J. A., & Nicolich, R. (2005). *Educause core data service: Fiscal year 2004 summary report*. Washington D.C.: Educause.

Hinkelman, D., & Grose, T. (2005). Placement testing and audio quiz making with open source software. *PacCALL Journal, 1*(1), 974-981.

Hirschel, R. (2012). Moodle: Students' perspectives on forums, glossaries, and quizzes. *Japanese Association of Language Teachers JALT CALL Journal, 8(*2), 95-112.

Hong, K. S. (2002). Relationships between students' and instructional variables with satisfaction and learning from a Web-based course. *Internet and Higher Education, 5,* 267-281.

Hornik, S., Johnson, R. D., & Wu, Y. (2007). When technology does not support learning: Conflicts between epistemological beliefs and technology support in virtual learning environments. *Journal of Organizational and End User Computing, 19*(2), 23-46.

McGill, T. J. & Klobasb, J. E. (2009). A task–technology fit view of learning management system impact. *Computers & Education, 52*(2), 496-508.

Al-Jarf, R. (2008). *Are WebCT , Moodle and Nicenet Equally Effective in EFL Instruction?* Retrieved 1 August 2016 from https://www.researchgate.net/publication/268398301_Are_WebCT_Moodle_and_Nicenet_Equally_Effective_in_EFL_Instruction

Liaw, S. (2008). Investigating students' perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the Blackboard system. *Computers & Education, 51*(2), 864-873.

Ministry of Education, Culture, Sports, Science and Technology (2011). *An IT vision of education: Toward the creation of a learning system and schools suitable for the 21st century*. Retrieved 1 August 2016 from http://www.mext.go.jp/b_menu/houdou/23/04/__icsFiles/afieldfile/2012/08/03/1305484_14_1.pdf

Al Naddabi, Z. (2007). A Moodle course: Design and implementation in English for Academic Purposes instruction. In T. Bastiaens & S. Carliner (Eds.), *Proceedings of E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2007* (pp. 1371-1376). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Naveh, G., Tubin, D., & Pliskin, N. (2010). Student LMS use and satisfaction in academic institutions: The organizational perspective. *The Internet and Higher Education, 13*(3), 127-133.

Nozawa, K (2006). Mudoru o riyoshita kontentsu beesu no jyugyo jissen to joho komunyukeeshon (A content-based teaching and information exchanges using Moodle). *Ritsumeikan Studies in Language and Culture, 8*(1), 157-168.

Nozawa, K. (2007). Moodle o tsukatta tachitenkan e-learning kankyo no kochiku to jyugyo jissen: Higengo komyunikeeshon kyoiku o chuushin ni (Developing a multipoint e-learning environment using moodle: Teaching a nonverbal communication class). *Ritsumeikan Higher Education Research, 7*, 107-122.

Nozawa, K. (2011). To Moodle or not to Moodle: Can it be an ideal e-Learning environment? *Political Science, 18*(3): 289-312.

Organization for Economic Co-operation and Development (OECD). (2005). E-learning in tertiary education: Where do we stand? Retrieved 1 August 2016, from http://www.oecd.org/edu/ceri/35991871.pdf

Sclater, N. (2008). Large-scale open source elearning systems at the Open University. *Educause Center for Applied Research*, Research Bulletin, Boulder, Colorado. Retrieved 1 September 2016 from http://oro.open.ac.uk/id/eprint/16307

Seddon, P.B., Staples, S., Patnayakuni, R., & Bowtell, M. (2011). Dimensions of information systems success and systems implementation in a developing nation. *International Journal of Electronic Finance, 4*(3), 221-235.

Selim, H. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers & Education, 49*, 396-413.

Staples, D. S., & Seddon, P. (2004). Testing the technology-to-performance chain model. *Journal of Organizational and End User Computing*, 16(4), 17-36.

Sun, P., Tsai, J. R., Finger, G., Chen, Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education, 50*(4), 1183-1202.

Weaver, D., Spratt, C., & Nair, C. S. (2008). Academic and student use of a learning management system: Implications for quality. *Australasian Journal of Educational Technology, 24*(1), 30-41.

Weller, M. (2006). VLE 2.0 and future directions in learning environments. Proceedings of the first LAMS conference. Sydney. Retrieved 1 August 2016 from http://connect.educause.edu/Library/Abstract/LargeScaleOpenSourceELear/46878

Wichadee, S. (2014). Students' learning behavior, motivation and critical thinking in Learning Management Systems. *Journal of Educators Online. 11*(3), 1-21.

Appendix

Translation of the Original Questionnaire Survey Questions

Computer literacy:

1. This is the first time I have used an LMS.
2. I mostly use my smartphone to access the LMS.
3. I also use a home computer to access the LMS.
4. I learnt how to use a computer/internet at elementary school.
5. I learnt how to use computer/internet classes at junior & high school.
6. I like using computers.
7. I can type with ease on a computer keyboard.

Getting started:

8. My lecturer helped me get started on the LMS.
9. I worked out how to use LMS by myself.
10. When I needed help, I asked other students to show me how to use the LMS.
11. When I needed help, I consulted the LMS support staff.
12. When I needed help, I asked my lecturer to show me how to use the LMS.

I now know how to:

13. Change my settings (password, email, language, etc).
14. Post a message to the class.
15. Post a message to individuals in the class.
16. Open, save, and submit assignments.
17. Insert photos/web links/ and attach documents in messages or assignments.
18. Check my grade
19. Find information about the course syllabus, assessment, etc.
20. At first, I had major difficulties using the LMS
21. Overall, it is now easy for me to use the LMS website.
22. The LMS website contributed to the course.
23. I am satisfied with the course materials posted on the LMS website.
24. I do not want to use the LMS in my other language courses.
25. I wish my other courses in my department used the LMS.
26. If the LMS had online guidance, I would use it.
27. I often accessed the LMS.
28. I would rather do paper assignments and have information on paper.
29. I checked the lecturer's feedback/comments on my assignments.
30. I had to study English more outside the class because of the LMS