

From Paper to Digital Text: How Well Can Fukuoka University Students Adapt to Using an Online Learning Management System?

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Abstract

This record of research outlines a study conducted at Fukuoka University that has since been submitted to the *Journal of the Internet and Higher Education*. The study brings attention to the fact that Japanese universities are still highly paper dependent. By way of a more sustainable approach to education, this study explores how well Japanese university students can adapt to the use of digital text by way of using Learning Management Systems (LMS), which are in common use overseas. Specifically, the students' LMS proficiency and willingness to use a LMS was analyzed in relation to various organizational factors, such as, course type, IT education, and LMS experience. 458 participants took part in the study, and the data was collected by a survey, which was successfully checked for reliability. In this paper, I will outline the methodology and key findings, and then discuss in brief some of the key considerations. The survey tools and tables will not be published in this record due to copyright complications.

概要

日本の多数の大学では、印刷や用紙に多額の費用が費やされているが、このような教材を用いた指導方法は持続可能ではない。その代案は、ブレンド型学習 (blended learning) に不可欠なデジタル形式への移行だ。日本では、ブレンド型学習を運営するための学習管理システム (LMS=Learning Management Systems) が導入され始めたばかりのため、今回の調査では次の質問に焦点を当てた：「日本の大学生は、LMSを使用したブレンド型学習に適応することができるのか？」調査では、学生のLMS運用能力とウェブベースのLMS使用への意欲について調べた。アンケート調査を通じてデータを収集、回収されたデータは適切にその信頼性が確認された。調査の結果、ごく少数の学生しか、うまく適応できていないことが明らかになった。適応する意欲のない理由は、

十分なIT教育を受けていないこと、キーボードの扱いに慣れていないこと、スマートフォンからLMSにアクセスする傾向、そして可能性として学業の質との関連性が挙げられる。その後、適応への成功事例についても考察する。

Introduction

Japanese universities, including Fukuoka University, typically spend millions of yen on purchasing paper and making photocopies each year. It is, in short, an unsustainable practice, and one that needs to be reevaluated in light of current environmental and fiscal concerns.

The main alternative to paper is the use of digital text, which is part and parcel of blended learning. By way of a working definition, blended learning (also called *hybrid learning and mixed-mode learning*) applies to educational practices that use both in-person and online learning. Its design and execution varies greatly from one educational setting to another, but an ideal environment is generally given as one in which the online and in-person learning experiences are parallel, and that they clearly and beneficially complement each other.

Learning Management Systems (LMS) are now a common means by which to conduct both blended learning and distance-learning courses in tertiary level institutions. The Organization for Economic Cooperation and Development (OECD, 2005) defines an LMS as a form of technology used by instructors to build and maintain courses. Historically, their usage can be traced back to Programmed Logic for Automated Teaching Operations (PLATO) at the University of Illinois at Urbana-Champaign in the 1960s. Widespread use of the LMSs, however, did not take off until the 2000s following the development of Modular Object-Oriented Dynamic Learning Environment (MOODLE)¹

and rapid expansion of the Internet. Today, there are numerous Open Source (e.g. MOODLE, Sakai, and LAMS) and for-profit learning management systems (e.g. Blackbird, WebCT, etc.) available to educators and students, and most of them do some or all of the following in one system:

- Upload or post course syllabuses, assignments, documents, lesson summaries, quizzes, tests, audios, videos, web-links, images, etc.
- Evaluate and keep track of student usage, participation, types of error, 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 qualitative feedback

Hawkins, Rudy & Nicolich's (2008) study of 994 academic institutions in the US shows LMS diffusion stands at 97.5%. Similarly, Browne, Jenkins, & Walker (2006) write 95% of all higher education institutions in the UK were using LMSs. As of January 2015, Moodle had a user-base of approximately 53,000 registered sites offering around 7,500,000 courses to roughly 70,000,000 users in 228 countries in 100 languages (See the Moodle site for current statistics). These figures represent just the tip of the iceberg, since there are numerous LMSs now available to institutions worldwide. In Japan, however, the uptake of both blended learning and the use of LMSs have been noticeably slow. Furthermore, educational institutions in Japan remain dependent on paper and photocopying even when the institution is investing in the maintenance of an LMS.

This is the case at Fukuoka University. Fukuoka University implemented Moodle as an institutionally wide LMS in September 2009. In 2015, Fukuoka University spent approximately 1,000,000 yen (around 8,500 USD) for its yearly server maintenance costs.² Staff usage of MOODLE, however, remains starkly

minimal across the campus, and few have attended the two training provisions made available by the IT support team to date.

Paper usage is high. By way of an example, 29 members of staff at the Language Education and Research Center used approximately 250,000 pieces of A4 sized paper (roughly 8,600 pieces per head per annum) at the cost of 190,000 yen.³ Each photocopy then costs approximately 3 yen, which makes the total cost approximately 940,000 yen per academic year (32,400 yen per head). If we suppose a similar usage of paper and photocopying across the campus, then the yearly fiscal cost is approximately 126,300,000 yen (roughly 1,000,000 USD).⁴ Naturally, there are environmental costs to be considered too.

Research regarding LMS usage in Japan

Research in Japan regarding the use of LMSs is limited, and is focused for the most part on innovativeness in use. Furthermore, studies to date have tended to be small-scale, and are not always rigorous in their methodology or analysis. Since blended-learning is still in its founding stages in Japan, I felt a focus on participants' use of LMSs was needed in order to better understand where we stand in regard to their use in this particular context. Thus, my research question was simply: 'How well can Japanese university students adapt to blending learning by way of using an LMS?'

This is an important question to ask because a review of literature reveals that while LMS usage has been typically well received by students in North America, North Europe, parts of Asia, and Australasia, it is not always the case. For example, Al-Jarf's (2009) research in Saudi Arabia reveals a marked dissatisfaction among freshman students using WebCT, Moodle, and Nicenet on an English as a Foreign Language (EFL) grammar course.⁵ The university students in this study complained that the LMSs were difficult to use and time-consuming, and they openly stated that they wanted to use textbooks

¹ MOODLE was developed as Open Source software in 2002 to support social constructionist epistemology of teaching/learning in web-based communities. While it is not entirely clear how social constructionism makes MOODLE different from other LMSs, academic institutions have typically given this as a main reason for its adoption (See Weller, 2006). Others, such as the large-scale user Open University (UK), see it as being 'relatively pedagogy-neutral' medium (Sclater, 2000).

² This information was provided by the IT support team. No data, to date, has been collected by the university in regard to students' perceptions of Moodle.

³ Please note, this figure is for A4 paper alone, and it does not include the B5, B4, A3 and other paper size usage. It costs 1,890 yen per box of A4 2500 papers).

⁴ In 2014, there were 1379 tenured members of staff and 2584 adjuncts.

and paper assignments. Al-Jarf writes, ‘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 not for credits and serious studying’ (2009, p. 6). Al-Jarf attributes their dissatisfaction to the students’ low-level computer skills and low-level English proficiency. Similarly, in Oman, Al-Naddabi (2007) writes only a small number of students were willing to participate in Moodle activities. In this particular study, students also complained of unwanted messages from the LMS jamming their email accounts. Again, the author attributes dissatisfaction to low computer literacy levels not only among the students but also the staff.

The matter of students’ willingness to use an LMS and effective usage is quite convoluted, but a key factor is satisfaction. This is simply because satisfied users are more likely to want to access and use an LMS in the course of their learning. Would students at Fukuoka University be satisfied by their experience of using an LMS, and willing to use it? If not, what factors cause dissatisfaction?

Methodology & Methods

Wary of the difficulties that MOODLE had posed students in Oman and Saudi Arabia, I decided to conduct the study using a cloud-based LMS by the name of Coursebase (formerly Languagecloud). The LMS’s interface is notably simple, and an added advantage is that its language setting can easily be changed from Japanese to English. Furthermore, the website can easily be accessed by smartphone, tablet, or computer.

Four types of general credit courses were selected for this study:

- English for Specific Purposes (ESP)
- Reading and Listening (R&L)
- Interactive English (IA) Mandatory
- Interactive English (IA) Elective

For all, students were required to attend a 90-minute class for face-to-face instruction fifteen times a term. In class, students used a designated textbook and

supplementary materials. While classes included individual and collaborative learning activities, there were no extended group-work projects. Furthermore, no collaborative work was arranged for outside the class for two reasons. Firstly, there are no in-built facilities for discussion forums or peer-assessment in the Coursebase interface. Secondly, since the Japanese students are not so accustomed to collaborative learning, I felt the inclusion of this approach might confound the results.

In the initial class, LMS registration and induction of the students took place, which included highlighting the benefits of using an LMS.⁶ The students were shown how to:

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

Asynchronous course material was then delivered through Coursebase, and material content was produced in accordance to the type of course. The content included both close-ended and open-ended tasks. The former were marked automatically (automated feedback can also be provided), and the latter were marked manually using the LMS’s highlight and categorisation system. Additional comments were also added in the appropriate fields. By way of an example:

Reading & Listening Course [R&L]

(Type: Mandatory)

Students had to complete ten reading assignments constituting 50% of the course grade. For each, students were required to read an article with supporting visuals and complementary videos. Each had 12 questions. The first ten questions were closed multiple-choice or true-false items designed to both assist and assess reading comprehension. The last reading assignment question presented the student with two or three questions that

⁵ The LMS content course involved explanations, examples, exercises, and a discussion forum. In addition, the students had to post short paragraphs on any topic of their choice.

⁶ While an attempt was made to engage the students in a discussion of the potential benefits of using an LMS by asking questions to elicit their views. Only a few students were forthcoming.

prompted an open-ended written response (one paragraph of at least five sentences) to the article. The final listening question required students to open a weblink that would open another website where they could search for related listening content of their choice, and complete the audio exercise. Answers were then copied and pasted into Coursebase.

Data was collected via an anonymous survey instrument administered to 473 undergraduate university students in the first and second semester of 2013. The survey instrument was written in English, and translated by an accredited translator into Japanese so as to ensure all students could understand the questions. N=458 respondents completed the survey. All of the students were Japanese, and the mean age was 19.2 years (SD = 0.84).

Section One of the survey served to categorize the students into department, year, and English course type. Section Two then questioned the students about their IT education since elementary school; keyboard skills; previous LMS experience since elementary school; how they accessed the LMS; and how they sought help. The third section containing seven items looked at their actual LMS proficiency. For example: *I know how to change my settings/ I know how to open, save, and submit assignments/ I know how to post a message to an individual in the class/ etc.* Items in the first three sections used Yes/No options for reasons of simplicity. Section Four, containing ten items, used a five point Likert scale (including reversed statements), and sought to establish the students' satisfaction with the LMS and their willingness to use it as a tool of learning. For example: *Overall, it is now easy for me to use the LMS website / I do not want to use the LMS in my other language courses/ I would rather do paper assignments and have information on paper/ etc.* Finally, Section Five enabled participants to write freely about their thoughts about the LMS.

The frequencies of the responses made for each nominal or ordinal level survey question were tabulated. After this, the internal consistency of the survey items in each scale was then assessed using Cronbach's alpha values. When the internal consistency was found to be satisfactory (Cronbach's alpha >0.7), the scores were computed for the scale using a factor analysis approach. Instead of the individual items in the scale, these scores were then used as the responses.

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. To assess the effect of the type of English course on the response variables of interest, a univariable model involving only the English course as an explanatory variable was used.

Findings

Descriptive statistics

A total of 458 students completed the survey. The majority (64.9%) of the students interviewed were in their first year. Most (64.6%) were in the Humanities while the rest (35.4%) were in the Science disciplines. Students were drawn from a number of majors within their disciplines. The majority (53.3%) of them were enrolled in an ESP English course, followed by R&L and IA English courses at 32.8% and 13.8% respectively.

It was found that roughly 65% of the participants found it difficult to use the LMS at the beginning of the term, and by the end of the term 30% still found it difficult or somewhat difficult to use the LMS interface, even though it is notably simple. For example, 60% still did not know how to insert a web link (e.g. copy and paste into the field); or insert or attach a photo, audio file, document, etc (e.g. click the paperclip icon, browse for a file and click confirm); or post a message (e.g. click the message button, enter text, and then click the send button).

In response to the item *I do not want to use the LMS in my other language courses*, roughly 30% said that they did not wish to use an LMS. Conversely, roughly 30% said they wanted to use an LMS, with 40% undecided. In response to the item *I wish my other courses in my department used the LMS*, nearly 40% indicated they did not wish to do so for any type of course at all, and only 20% expressed a wish to do so. While just over 60% of the participants felt the content on the LMS contributed directly to their learning, in response to the item *I would rather do paper assignments and have information on paper*, roughly 50% stated a clear wish to only receive information and assignments in paper form. Conversely, 20% did not want have paper assignments-the same participants who wished to use an LMS for other courses.

Statistically significant findings include:

Effect of explanatory variables on students' proficiency in tasks on the LMS (Q13-19): Learning how to use computer/internet classes at junior & high school was significantly associated with an increased proficiency score.

Effect of explanatory variables on whether student often accessed the LMS (Q27): A lecturer's help when getting started with the LMS was significantly associated with the odds of being in a higher agreement category on the questions about frequency of access to the LMS; OR=2.90 (95% CI: 1.05-8.31).

Effect of variables on whether a student would rather do paper assignments and have paper information (Q28): Students who reported that they had learned how to use a computer/internet at elementary school; liked using computers; or could type with ease on a computer keyboard had statistically significantly lower odds of being in a higher outcome category.

Effect of variables on whether a student would rather do paper assignments and have paper information (Q28): Compared to the students taking the ESP English course, the odds of being in a higher response category (tendency to agree with the question on use of paper assignments) was significantly higher in students in the IA English course; OR=2.27 (95% CI: 1.03-5.08). The odds was lower compared to that in students taking the R&L English course; OR=0.89 (95% CI: 0.51 - 1.57).

Discussion

Returning to the original question: How well can Fukuoka University students adapt to blending learning by way of using a Learning Management System (LMS)? In short, looking at the overall picture revealed by the factor analysis, we can say that only a minority of this cohort adapted well and were willing to use an LMS in blended learning.

What then is impeding a transition to digital text in Fukuoka University? As to be expected, it was statistically significant that there was lower tendency among computer literate/keyboard proficient students to prefer paper-based information and assignments, and for them to have an increased proficiency score in using the LMS. This finding is in keeping with Hong (2002), Selim (2007), Liaw (2008), and Al-Jarf (2009) who highlight the importance of the students' level of

computer literacy.

What was surprising, given the extensive role that computers and the Internet plays in our everyday life, is that 22.3% of the participants indicated that they had never received any form of IT training since elementary school. Secondly, despite the fact that 77.1% had received some sort of IT education since elementary school, nearly all of the participants (96.1%) had never used an LMS before. Thirdly, only 10.5% felt they could use a keyboard with ease; suggesting very limited usage in their education until university.

Another important factor was the fact that students—especially those that had received no IT education—predominantly used their smartphones to access the homework. Even though some students commented on the convenience of being able to use smartphones, more comments were made outlining various frustrations of using a smartphone to access an LMS, e.g. small screen, unable to type easily, timed security function, interface glitches, and weak Internet connections. These problems, however, did not preempt the students to use a computer or tablet instead of a smartphone. This is not a matter of access since all students have access to a computer or at the university, but rather reluctance or ignorance about computers or tablets.

The last point that I wish to raise, and a matter well skirted in academic literature, is that there was an obvious relationship between the academic quality of the students and their proficiency in use as well as willingness to use an LMS. In that, even though the LMS assignments on more the ESP course were more extensive and demanding, pharmacy course students adapted well to the use of the LMS in contrast to the students from other departments on the R&L and IA courses. This relationship, however, is difficult to prove because universities in Japan are not inclined to reveal the scholastic quality of their students (e.g. the GPA scores, etc.) due to concerns of privacy. The matter is more convoluted because GPA scores cannot always be relied upon as accurate measurements of scholastic ability or intelligence. The matter of intelligence, however, is an important consideration because LMSs and online learning is often seen as a way to engage and educate low-level students. This study indicates, however, that low-level students will experience more difficulties in learning how to use an LMS, even if its interface is simple, and thus, its effectiveness as a tool of learning would appear to be reduced.

Since students (73.4%) in this study were inclined to seek help from each other, it may well be the case that familiarization with the LMS over greater lengths of time will result in better adaption. However, there are a number of factors/practices that may well hinder or prevent that from happening. Firstly, poor and limited IT educational provisions, both at the secondary and tertiary level in Japan, are adversely affecting students' acceptance and adaption to online learning. Secondly, mandatory LMS policies have been shown to be ineffective in literature. In that, reluctant teaching staff tends to have a negative effect over student usage, and also hinders the development of a community of e-learning adopters, and the dissemination of good practices. Thirdly, successful adaption also depends upon staff development; namely IT knowledge; knowing how blended learning differs from traditional approaches; e-learning material being able to develop; and so forth. Where found lacking, such staff will not be in a position to provide inductions or resolve minor technical issues. Fourthly, the practice of conducting teaching staff evaluations may well hinder adaption to digital text. In this study, students were apt to complain about having to use the LMS or computers to check course information or do their assignments on the evaluation form. If it is the case that the institution's administration panders to students' preferences, then there will be a greater risk that teaching staff, especially adjuncts, will avoid teaching practices that dissatisfy students in any particular way, even if they are in their short-term and long-term interests. As an example of a long term interest, if students remain adverse to the use of digital and online technologies, the less likely students will acquire the technological literacy, confidence, and skills that are required in today's labour market.

Conclusion

To conclude, this initial study found that only a minority of university students could adapt well to the use of digital text by way of using a LMS. Poor and limited IT educational provisions at the secondary school level, poor and limited keyboarding skills, and possibly lower intelligence levels prevented students from being able to navigate simple interfaces on computers and tablets. As a result, these students tended to rely heavily on smartphone use to access the LMS and do

assignments, which in turn led to various frustrations in use and a continued preference for paper information and assignments. About 20% of the students, however, were willing and keen to use an LMS in their language and other studies. Further research is required to see if these results are true of other LMSs, and whether adaption changes over greater lengths of time. Finally, further research needs to be taken upon the effects of LMS use on students' course evaluations in Japan; the values that students place on LMS use; as well as more exploration of the relationship between students' cognitive levels, online educational technology, and educational effectiveness.

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