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A cross-cultural comparison of students' perceptions of IT use in higher education

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Ensuring the most effective use of information technology (IT) in higher education requires that instructors understand not only the capabilities of the technologies themselves, but also how their use is perceived by students. This paper reports on the results of a questionnaire administered to 74 students at a small private women's college in Japan. It seeks to compare Japanese undergraduate students' perceptions of IT use in their courses with those of their peers in the United States and Canada via selected findings of The ECAR Study of Undergraduate Students and Information Technology, 2010. It further seeks to identify the Japanese students' own self-efficacy for using technology and their opinions on its importance. The findings suggest that the Japanese students surveyed are using a surprisingly wide range of technologies in relation to their coursework and that their experiences, perceptions, and preferences differ somewhat from their North American counterparts.

Introduction

As information and communication technologies continue to develop at a rapid pace, their role in higher education continues to evolve as well. While it is obviously important for instructors, administrators, and support staff to stay abreast of the latest technological innovations and the potential affordances they may provide for fostering improved teaching and learning, it is arguably even more important to consider the use of information technology (IT) in higher education from the perspective of students themselves. Indeed, issues related to students' experiences, perceptions, and preferences regarding IT use in higher education

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must be inseparably linked to the effectiveness of any particular technological tool used for educational purposes. Although for many the common wisdom may be, as Jaskyte, Taylor, and Smariga (2009) put it, that "today's students are more technologically capable and expect the educational experience to acknowledge this" (p. 111), it is important to periodically revisit the actual validity of these claims and not rely on mere assumptions to guide the implementation of IT for instructional purposes as research on student attitudes and perceptions of technology can become quickly outdated (Elwood & MacLean, 2009).

Fortunately, the EDUCAUSE Center for Applied Research (ECAR) has been making strides in assessing the experiences, perceptions, and preferences of undergraduate students in relation to IT by directly surveying large samples of students from institutions across the United States and Canada every year since 2004. Their work, made freely available online in the annually published *ECAR Study of Undergraduate Students and Information Technology,* serves to provide both quantitative data and qualitative description about each year's cohort of undergraduate students involved in the study as well as to track the changes revealed amongst these cohorts over time as the technologies evolve. While other studies have attempted to assess similar subject matter, the vast scope, long-term commitment, and notable profile of the ECAR studies have made them important cornerstones for many involved in higher education. Unfortunately, for those who work primarily with non-traditional students or those from other higher education contexts, the ECAR studies' focus on characterizing the views of "traditional students" from the US and Canada means that the findings, while thought provoking, are most likely not readily applicable. Indeed, the great majority of ESL and EFL students are expressly outside of the scope of the ECAR studies and, in all likelihood, not represented in any study of comparable breadth, depth, currency, or standing.

The nearly three million Japanese students attending four-year university or two-year junior college in Japan represent but one sizeable student population whose experiences, preferences, and perceptions of IT use in higher education have not been as thoroughly examined as those of the US and Canadian students of the ECAR studies (Japan Ministry of Education, Culture, Sports, Science and Technology, n.d.). While much more modest studies conducted in Japan do seek to provide some of these same details on a smaller scale, the unique contexts in which they are often conducted, the dramatic differences between one institution and another, the prospect of ongoing change in IT, and language barriers between researchers all serve to severely limit how generalizable or useful any findings may be. In order for instructors, administrators, and support staff in Japan to have access to the kinds of valuable information that can be revealed through studies like those of ECAR, it is clear that a great deal more research into these areas must be conducted, shared, and discussed.

This study seeks to contribute to a more in-depth understanding of Japanese undergraduate students' preferences for and perceptions of IT use in higher education in comparison to selected findings from *The ECAR Study of Undergraduate Students and Information Technology, 2010* by answering the following central research question:

- How do Japanese undergraduate students' experiences, perceptions, and preferences in relation to IT use for coursework compare to selected findings from *The ECAR Study of Undergraduate Students and Information Technology, 2010?*

Furthermore, though not addressed in the ECAR study in the same way, this study also

seeks to establish the students' overall self-efficacy rating for using IT and their opinions on the importance of technology skills by addressing two additional research questions:

- How do Japanese undergraduate students rate their own abilities at using technology?
- Do Japanese undergraduate students feel that technology skills are important?

It is believed that the findings from this study may provide insight into how a small sample of current Japanese university students perceives the use of IT in conjunction with their coursework, their own technological skills, and the importance of such skills. Moreover, it is hoped that a comparison between the findings of this study with those from a recent iteration of *The ECAR Study of Undergraduate Students and Information Technology* may shed light on both the major differences as well as any similarities that may exist between these student populations in regards to their preferences toward IT use in higher education and better inform those involved in making decisions about the IT to be used in their educational endeavors.

Literature review

Although Japan can rightfully be considered as one of the world's most technologically advanced countries, this technological sophistication does not necessarily follow to the educational realm. While Japan's Ministry of Education, Culture, Sports and Technology has stressed the importance of IT use by instructors at all levels of schooling in Japan for many years (Japan Ministry of Education, Culture, Sports and Technology, 2008), particularly those in higher education (Japan IT Strategic Headquarters, 2006), recent appraisals of the implementation of these policies, such as that of Aoki (2010), have determined that "there has been a big gap between the government vision and the actual implementation of ICT in education" (p. 858). Aoki (2010) notes several reasons for this gap: the generally passive nature of predominantly lecture-based classes, a pervasive sense of apathy towards university education exhibited by many students, and, most critically, an overall shortage of "pedagogical innovation in educational institutions in Japan" (p. 858). Contrary to what many people would expect given Japan's general technological capabilities, Aoki (2010) assesses the recent state of IT in Japanese higher education in this way: "In reality, the application of technologies in education in Japan is far behind of other developed countries" (Abstract).

While the apparent lack of enthusiasm for IT use for educational purposes may begin to be better understood when the unique cultural context of higher education in Japan characterized previously is considered, another factor that has served to limit its appeal is the sense that students are often not adept enough at using instructional technology to make it worth the instructor's effort (Lockley, 2011a). In fact, Lockley (2011a) goes so far as to point out that "some teachers even refuse to use computers in class, believing that they will have to waste time teaching students the very basics such as how to plug in a laptop" (pp. 93–94). It seems as though despite plentiful access to technology, the Japanese government's policies ostensibly aimed at the promotion of computer literacy skills amongst junior high school and high school students (Moriyama et al., 2009), and a reported moderate use of technology in school as far back as elementary school by a majority of recent university students (Gromik, 2009; Lockley, 2011a), Japanese students often arrive at the post-secondary level with vastly different technological proficiencies and substantial deficiencies in terms of their formal technological literacy skills (Castellano,

Mynard, & Rubesch, 2011; Lockley, 2011a; Lockley, 2011b; Murray & Blyth, 2011; Stout & Yamauchi, 2012). In particularly, Murray & Blyth (2011) found that the first-year students in their study had little prior experience with word processing, spreadsheet, and presentation software while Lockley (2011a) pointed out that even those who had learned about this software may not have had the opportunity to actually make use of it in any real world application. Although recent studies have also presented findings that seem to question whether recent Japanese undergraduates truly warrant the image that they are generally lacking in the range of specific technological skills needed to make effective use of IT for university coursework (Lockley & Promnitz-Hayashi, 2012; Stout & Yamauchi, 2012), the image continues to persist among many instructors in Japan.

Methodology

In order to provide preliminary answers to the research questions posed in this study, a brief questionnaire was created and administered to students at a small, private women's college in Japan in April 2011. The female student respondents were drawn from a convenience sample of second-year undergraduate students majoring in English and asked to voluntarily complete a survey. In total, 74 responses were received, compiled, and analyzed. It should be noted that the great majority of classes at this institution are held in traditional classrooms equipped only with a projector and screen, digital visual projector, DVD/CD player, VHS player, and cables to connect the instructor's own laptop computer to the Internet and the projector. While there are several classrooms equipped with computers for in-class use, strict procedures and a prerequisite computer orientation course for students typically limit the use of these rooms for most classes except upper level seminars.

The paper-based survey created for this investigation, the *Information Technology Use Survey* (see Appendix A), consisted of a series of 10 questions (both closed and open) intended to elicit information about the students' experiences, preferences, and perceptions related to IT use in conjunction with their classes as well as their opinions on their own self-efficacy and the importance of technology skills. As one of the primary intentions of this study was to draw a comparison to the results of *The ECAR Study of Undergraduate Students and Information Technology, 2010,* many of the survey questions were adapted from that study's survey instrument, which is partially included in the full report by Smith and Caruso (2010), though some of the language and technology examples have been modified for ease of comprehension by the intended respondents who are all non-native English speakers. After the *Information Technology Use Survey's* responses were collected and analyzed, they were compared against the relevant portions of *The ECAR Study of Undergraduate Students and Information Technology, 2010,* the most recent iteration of the study at the time the survey was conducted. As this study's survey was given to students during the third week of the participants' sophomore year, the results are most likely a reflection of their use of IT as freshmen and, as a result, are more directly comparable to the freshmen respondents surveyed for the ECAR study, a noted subsection whose results are cited separately whenever possible in what follows.

Findings and discussion

Although the survey administered in this study was rather modest in scope, the information it reveals about the Japanese students' experiences, perceptions, and preferences toward the

use of IT in their coursework is telling, especially when compared to the results from The ECAR Study of Undergraduate Students and Information Technology, 2010.

Survey question 1 attempted to determine the participants' experiences using a selection of the most popular core technologies and web-based tools in relation to coursework as addressed in the ECAR study's survey questions 12 and 13 (see Smith & Caruso, 2010, pp. 102–103). As Table 1 shows, the responses to the survey indicate that a much higher percentage of Japanese students reported using some technologies such as Content Management Systems (CMS) and spreadsheet software more than their American counterparts, while others, like the college/university library website, were used much less or, in the case of clickers and video-creation software, not at all.

Table 1: Reported usage rates of core technologies for coursework among ECAR and Japanese students

Core technology	All ECAR students	ECAR freshmen subset	Japanese students
College/university library website	69.7%	68.7%	31.1%
Presentation software	66.8%	61.9%	64.9%
Content Management Systems	66.5%	61.5%	93.2%
Spreadsheet software	44.9%	38.2%	97.3%
E-books	24.2%	26.3%	1.4%
Course podcasts/videos	18.1%	16.8%	1.4%
Clickers	17.1%	28.5%	0.0%
Instant messaging	16.2%	17.4%	10.8%
Graphics software	14.7%	11.0%	16.2%
Video-creation	7.2%	7.1%	0.0%
Audio-creation	5.5%	5.5%	1.4%

Note. All ECAR data is reproduced from the original report by Smith & Caruso (2010).

The dramatic differences in many of these figures are not only surprising, they are somewhat puzzling. While the fact that the students in this study are all sophomore English majors who have presumably taken many of the same courses as first-year students would explain high use of CMS if any of these common courses required it, the nature of the students' reported use of spreadsheet software is unclear. Although many, if not all, of the students who noted using spreadsheet software most likely encountered it in an introductory computer course commonly taken as an first-year elective at this institution, its potential connection to any coursework beyond this remains uncertain and in need of further investigation. On the other hand, the relatively low reported use of the Japanese students' library website is not at all surprising given its antiquated homepage and database layout, which have since been completely redesigned and updated, coupled with the fact that academic libraries are generally undervalued and underused in Japan (Ishimura, Howard, and Moukdad, 2007).

Interestingly, the Japanese students in this study reported using some web-based technologies like wikis and video-sharing sites in rates notably higher than their American peers as can be seen in Table 2.

Table 2: Reported usage rates of web-based technologies for coursework among ECAR and Japanese students

Web-based technology	All ECAR students	Japanese students
Wikis	33.1%	62.2%
SNSs	29.4%	21.6%
Video-sharing	24.3%	46.0%
Blogs	11.6%	17.6%
Online virtual worlds	1.4%	2.7%

Note. All ECAR data is reproduced from the original report by Smith & Caruso (2010).

It seems likely that with the low reported use of the college library website mentioned previously, many students probably turn to the most well known wiki, Wikipedia, to get basic information for their courses. As English language learners without many opportunities to engage with native English speakers in real life, the relatively high use of video-sharing sites also makes sense. The unanticipated rate of course-related social network site (SNS) use among the Japanese students surveyed at 21.6%, while slightly less than that found in the ECAR study, is nonetheless noteworthy and will be discussed at greater length in relation to the results of questions 5 and 6.

Three questions from the survey (questions 2–4) attempted to ascertain what Smith and Caruso (2010) note in the ECAR study "may be the ultimate question regarding IT in a student's experience" (p. 91): overall student preference for the use of IT in their classes. Smith and Caruso (2010) also point out that in their US and Canadian samples over the past seven years, "majorities of students… prefer only a "moderate" amount of technology in their courses" (p. 91). In their responses to the most comparable question on the *Information Technology Use Survey,* the Japanese students expressed a remarkably similar preference toward IT use in class with 59.7% of the respondents preferring "some" use, compared to 57.7% of respondents who expressed a preference for "moderate" use in the ECAR study (Smith & Caruso, 2010). Approached in another way, question 3 asked the Japanese students if they would like to use more kinds of technology in their classes and only 37.8% responded favorably. The responses to the open-ended follow-up question (question 4) revealed that video-sharing sites and PowerPoint were the two largely unused technologies most often requested by students to be added to the current range of technologies used in relation to their coursework.

As some of the most popular web-based technologies in recent years, the use of SNSs for educational purposes has also come into the purview of the ECAR study. Two questions from the *Information Technology Use Survey* broached the use of SNSs by the students surveyed. As noted earlier in Table 2, 21.6% of the Japanese students surveyed stated that they had used SNSs in relation to university coursework compared to 29.4% of students in the ECAR study (Smith & Caruso, 2010). Question 5 of the *Information Technology Use Survey* asked if students would like to use social network sites for classes, 55.4% of the participants responded favorably, a seemingly much stronger endorsement than the 26.1% of ECAR participants who said that they would like to see more use of SNSs in their courses. When asked if they were "friends" with any of their instructors on any SNSs, 45.9% of the Japanese students surveyed responded affirmatively while only 31.9% of the ECAR participants reported having faculty "friends" on social network sites (Smith & Caruso, 2010).

One final point of comparison between the Japanese student participants of this study and their American and Canadian counterparts of the ECAR study is student perception of instructor use of IT in courses. As Smith and Caruso (2010) note, "the effectiveness of the IT used to convey learning is only as successful as the instructor's ability to use it...students are as aware of this as anyone in higher education" (p. 86). While the ECAR results indicate that 47.2% of students felt most of their instructors used technology effectively (Smith & Caruso, 2010), a much larger percentage of the Japanese students, 83.8%, expressed this view. Such a high percentage of Japanese students who view their instructors' use of IT as effective is somewhat surprising given the general impression on campus that most instructors are using the limited classroom technology available to them in rather traditional ways (e.g., DVD/CD and VHS players for audio/visual material, PowerPoint slideshows for lectures, static websites for accessing content online). However, without the opportunity to conduct a more intensive qualitative examination of this issue, it is impossible to conclude if these students feel they have actually witnessed effective use of technology by their instructors or if they feel that these instructors *should* be good at using IT given their standing as university faculty, which is typically seen as a highly-esteemed position in Japanese society.

Although not directly addressed in the ECAR study, two other important factors in determining students' perceptions of and preferences toward the use of IT for educational purposes are the students' perceptions of their own abilities at using technology and the sense of importance they hold for such skills. *Information Technology Use Survey* question 8 sought to establish the students' own rating of their self-efficacy at using technology. Contrary to expectations, the results indicate that 85.2% of the respondents considered themselves as average or better users of technology, with 25.7% of these Japanese female students rating themselves as "good" or "excellent" technology users. Given that this study was conducted at a women's college and research has long recognized the existence of a persistent, yet narrowing, technological gender gap with males typically being more likely to make more robust use of IT (Hargittai & Shafer, 2006; Zoe & DiMartino, 2000), such a relatively large percentage of high self-efficacy assessments is encouraging. That said, the fact that 14.8% of the students surveyed consider their technological abilities to be "bad" or "very bad" creates an obvious area of concern as to how IT can be smoothly integrated into classes with such a diverse range of reported abilities.

Finally, when asked in question 9 if they felt that technology skills were important, 96% of the students responded affirmatively. While this high percentage of affirmative responses is noteworthy, it is also somewhat perplexing when juxtaposed with the results of question 3 outlined earlier in which only 37.8% of the students expressed a desire to use more kinds of technology in their classes and the overall desire expressed for only a moderate use of IT in their coursework. The open-ended follow-up question, question 10, asked the students to elaborate on their reasons why such skills were important and the categories of responses most frequently cited were found to be: 1) for future jobs, 2) for schoolwork now, and 3) because these skills are generally useful in daily life. Ultimately, it seems that although the Japanese students surveyed in this study have a good sense of the importance of technological skills both in the present and the future, they are not overwhelmingly enthusiastic about the prospect of expanding the use of IT in their university courses.

Limitations

Several aspects of this informal study must be acknowledged as limitations. For one, the use of a relatively small convenience sample does not allow for random sampling or much generalizability of any of the findings garnered. It must be acknowledged that any direct comparison between the results of this study with those of *The ECAR Study of Undergraduate Students and Information Technology, 2010* is implicitly difficult given the dramatic differences in scope, resources, and populations sampled. While this study surveyed 74 female sophomore English majors at one college in Japan, the 2010 ECAR study surveyed a total of 36,950 students representing a range of majors from 100 four-year institutions and 27 two-year institutions in the US and Canada of which 34% were freshmen, 42% were seniors, and 62.5% were female (Smith & Caruso, 2010). The survey instruments themselves were different too. While the *Information Technology Use Survey* was a 10-item, paper-based questionnaire written in simplified English asking students to reflect on all of their college courses to date, the ECAR study employed both a 70-item, web-based survey asking students to only reflect on their current courses as well as focus group interviews for qualitative data. Indeed, the lack of a more open, qualitative component in this study is another aspect that limited the depth of the findings garnered. One final limitation of this study worth noting was that the survey was conducted in English, a non-native language for the respondents, which may have affected their understanding of the questions and possible answer options.

Conclusion

Contrary to expectations given the generally lackluster image of IT use in Japanese higher education propagated both in the literature and between instructors, the findings of this study seem to indicate that not only are the Japanese undergraduate students surveyed using a wide range of IT in relation to their academic coursework from the first year, but a majority of these students also see themselves and their instructors as relatively effective users of technology. While several noteworthy differences between the experiences, perceptions, and preferences of the Japanese student participants of this study and those of *The ECAR Study of Undergraduate Students and Information Technology, 2010* were revealed, the overall preference for moderate use of IT in higher education was found to be comparable between these two populations. Although this study can provide no firm conclusions regarding the best ways to utilize IT to support teaching and learning at the post-secondary level in Japan, the findings it suggests may serve to recalibrate how instructors approach the use of IT in their university classes in Japan in a way more attuned to just how much exposure the students are likely to have in their university courses and how important they generally recognize technological skills to be. Importantly, the findings may also serve as a reminder of the diverse range of experience and abilities likely to be exhibited amongst undergraduate students in Japan and of the need to utilize technologies in a way that adequately addresses those who may need greater instructional support.

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Appendix A – Information Technology Use Survey

Please answer the following questions about your thoughts and experiences using technology for your classes. Neither your responses nor your willingness to participate will have any bearing on your grade in this class. Your responses will remain confidential and secured throughout the study and will be destroyed after its completion.

1. Which of the following have you used for class at this university? Check all that apply.

- ☐ Word processing software (like Word)
- ☐ Presentation software (like PowerPoint)
- ☐ Spreadsheet software (like Excel)
- ☐ Graphics software (like Photoshop)
- ☐ Audio-creation software (like Audacity)
- ☐ Video-creation software (like iMovie)
- ☐ Course podcasts or videos
- ☐ Instant Messaging (Chat)
- ☐ Discussion boards or online forums
- ☐ Social network sites (Facebook, Mixi, etc.)
- ☐ Content Management Sites (like Moodle)
- ☐ Wikis (like Wikipedia)
- ☐ Blogs
- ☐ Video-sharing sites (like YouTube)
- ☐ Online virtual worlds (like Second Life)
- ☐ University library website / database
- ☐ E-books
- ☐ Clickers

2. Which best describes your preference?

- ☐ I prefer taking courses that use *only* information technology.
- ☐ I prefer taking courses that use *a lot* of information technology.
- ☐ I prefer taking courses that use *some* information technology.
- ☐ I prefer taking courses that use *a little* information technology.
- ☐ I prefer taking courses that use *no* information technology.

3. Would you like to use more kinds of technology in your classes?

- ☐ Yes
- ☐ No (Please skip the next question).

4. If so, what kinds?

_____

5. Would you like to use social network sites (like Facebook or Mixi) for classes?

- ☐ Yes
- ☐ No

6. Are you friends with any of your university instructors on any social network sites like Facebook or Mixi?

☐ Yes
☐ No

7. Do you feel that most of your university instructors are good at using technology in classes?

☐ Yes
☐ No

8. How would you rate your abilities at using technology?

☐ Very bad ☐ Bad ☐ Average ☐ Good ☐ Excellent

9. Do you think that technology skills are important?

☐ Yes
☐ No (Please skip the next question).

10. If so, why?

_____

Thank you for your time.