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ICT Usage and Student Perceptions in Cambodia and Japan

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Abstract

This paper looked at two Information and Communications Technology (ICT) contexts that initially appeared very different. It presents results of a survey administered in Cambodia (*n* = 130) and Japan (*n* = 328) which show that, excepting a few tasks, students in both countries were far from 'native-like' in terms of digital literacy (Prensky 2001). Students from both countries responded similarly about (a) where they learned about ICT (for example, computers and cell phones) and (b) the usefulness of ICT for four school subjects. They also indicated feeling minimal anxiety when using technology. Furthermore, similar gender differences were in evidence in both countries where willingness to use technology (WUT) was concerned. Overall, Japanese students exhibited a greater distinction and range in their choices when given the option to use technology or paper to accomplish various tasks, whereas Cambodians opted for technology in every situation and displayed a narrower (perhaps less discriminate) range for those choices.

Keywords: ICT – willingness to use technology – student perceptions – technological usefulness – technology anxiety

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Background

In his book *The World is Flat* Thomas Friedman posited that national economies have a pressing need to develop ICT education, as the knowledge economy is a fluid world in which the international economic ranking of a country can change depending on effective use of technology (Friedman 2006). This paper investigates two very practical concerns where ICT education is concerned. First, we wanted to more fully understand what we could reasonably ask 'English as a Foreign Language' (EFL) students to do in order to accomplish their schoolwork (for example, typing assignments, researching material on the Internet, sending and receiving electronic communication). Second, when completing tasks involving technological devices proved challenging, we wondered what factors might have been culpable. The overall goal of the study is to provide a characterization of ICT usage and student perceptions that will contribute to the debate as to how ICT can be introduced, used or further integrated into foreign language classrooms. While data from two seemingly disparate contexts in Asia inform this study, several commonalities emerged, suggesting that further research in other contexts would be prudent.

Acquisition of IT Proficiency

This study will explore the underlying matrix of factors that influence the use of technology in educational settings, with special emphasis on foreign language settings. Analogous to matrices in second language acquisition (Gardner 1985; MacIntyre & Charos 1996), that matrix would include such factors as proficiency, motivation, anxiety and willingness to communicate (or use technology).

One useful matrix has been Davis' Technology Acceptance Model (TAM; Davis 1989), which was updated by Venkatesh and Davis in 2000. Originating in attitude theory (for example, Fishbein & Ajzen 1975), TAM posits the causal relationships between system design features, perceived usefulness, perceived ease of use, attitude toward using technology and actual usage behavior, which can be grouped into a triad of design features, perceptions, and actual usage. King and He's (2006) meta-analysis of studies involving TAM found it to be robust, yet it has been criticized as limited in scope (Legris, Ingham & Collerette 2003). While underlying models can adequately account for how humans experience computer usage (for example, Levine & Donitsa-Schmidt 1998; Thompson, Higgins & Howell 1994), the rapidly evolving nature of ICT means that an assumption of stasis should be viewed cautiously. Research regarding factors such as student perceptions can become outdated, and it is prudent to periodically update knowledge about, and instruments dealing with, student use of technology and their perceptions thereof.

To date, most matrices, including the present study, have considered the influence of proficiency on technology use. Proficiency likely subsumes Davis' *ease of use* as a higher degree of proficiency presupposes increased ease of use. In a perhaps somewhat premature announcement, Prensky (2001) posited the advent of 'digital natives', young people raised with and therefore surrounded by technology who would consequently develop native-like proficiency much as people acquire their first or native language. While research from the Organization for Economic Cooperation and Development (OECD, 2005a) and other sources has suggested that young people have developed some familiarity and proficiency with ICT, many are far from being natives in the language of the cybersphere (Bennett, Maton & Kervin

2008; Kennedy, Judd, Churchward, Gray & Krause 2008). Indeed, Bennett, Maton and Kervin (2008) found that many accounts of the purported 'digital natives' have forwarded extreme arguments, lacked empirical evidence and "sparked an academic form of 'moral panic' " (p. 9). While a full study of how the advent of 'digital natives' might influence education will require the use of both quantitative and qualitative approaches, it is first necessary to establish a baseline of ICT usage and student perceptions. The current study attempts to fill that gap in two contexts and it is hoped that further research using a variety of methods will be facilitated.

A second construct used in the current study concerns willingness (or reluctance) to use technology given the opportunity to do so. Similar to the widely-used Willingness to Communicate (WTC) concept in second-language acquisition (McCroskey 1992; McCroskey & Richmond 1991), the technological analogue, WUT, is defined as 'the extent to which technology users would use technology to do tasks when presented with the choice of technology (for example, a computer) or a non-technological medium (for example, paper) to attempt the task' (WUT; MacLean & Elwood 2009: 164). Presaging actual use of technology, it resembles TAM's *attitude toward using computers* (Davis 1989).

A third point recognized some time ago when technology was a nascent pedagogical tool (for example, Heinssen, Glass & Knight 1987; Martocchio 1994) is that anxiety about technology can mediate acquisition of proficiency with technological devices. Research has continued to the present day, with the focus having broadened to include frustration (Ceaparu, Lazar, Bessiere, Robinson & Shneiderman 2004). Bozionelos (2004) investigated socio-economic factors underpinning usage and anxiety, and Rosen and Weil (1995) found a "unique, culture-dependent model of computer anxiety" (p. 45) in each of the 10 countries they investigated.

The configuration of TAM suggests the importance of perceptions as one facet deals with attitude while two more facets deal with perceptions. Culpan (1995) noted that positive user attitudes are essential to effectively implement a teaching program using technology. Looking at computers and technology use in language classrooms, Allum (2002) found that Japanese students had overwhelmingly positive feelings about using computer assisted language learning (CALL).

Furthermore, external factors also exert an influence. As educators are well aware, institutional decisions influence the course of educational practices, and in Japan and Cambodia powerful, centralized agencies such as the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and the Ministry of Education, Youth and Sport (MoEYS), respectively, set educational policy from the general outline through detailed syllabi. Although educational policy is not researched explicitly in the current study, against this background we will explore ICT acquisition to perhaps enable the most appropriate decisions possible to be made. As Legris, Ingham and Collerette (2003) noted, "Information systems implementation is costly and has a relatively low success rate" (p. 191), thus highlighting the stakes involved.

In the baseball movie, *Field of Dreams*, the main character is told, 'If you build it, they will come' (Gordon, Gordon & Robinson 1989). This may be an apt metaphor for how technology is implemented in many educational contexts as the overriding paradigm seems to be that if technology is available, then people will use it. Underpinning this are two assumptions: first that educators and learners will use technology *if* it is available, and second, that it *is* available. Technology use is often premised with the notion that technology is widely available, both inside and outside the classroom, and the availability of ICT plays an indispensable role in its implementation or lack thereof. The current study investigates two

contexts, one with technology readily available and the other with limited technology, to explore these claims.

Two Very Different Contexts

With the acquisition of technological proficiency including various factors, the current study investigates whether those factors appear in two different contexts. Though these share the broad criterion of being in Asia, they are quite different. Demographic data document two countries at nearly opposite ends of several spectra with, for example, Japan having the second largest economy in the world while Cambodia is the 123rd largest. Moreover, in education level, per capita income and availability of technology, stark differences also exist (Table 1).

Table 1. Demographic Information for Cambodia and Japan Samples

	Context	
Demographic category	Japan	Cambodia
Population (millions)	127.9	14.7
GDP (billion US$)	4911	11
Fixed telephone lines / 1000	400*	3.1
Cell subscribers / 1000	862.9	288.3
Computers / 1000	407.2**	3.6
Internet users / 1000	688.5**	4.8*
Broadband subscribers / 1000	235.3	0.6*
Population covered by mobile signal	99.8%*	92.5%*

Note. Figures with no asterisk are 2008 data, with a single asterisk are 2007 data, and with a double asterisk are 2003 data. From "ITU's ICT Eye," by International Telecommunications Union (ITU) 2009a. Retrieved June 27, 2009, from http://www.itu.int/ITU-D/icteye/Default.aspx

The data in Table 1 reveal several things. First, in Japan the number of fixed telephone lines (400 lines/1000 people, or 2.5 people per line) is likely near saturation as a family of three would need just a single line. Moreover, 86.3% of people own cell phones. In contrast, in Cambodia there was one fixed telephone per 278 people, yet more than one person in four has a cell phone. Similar ratios are apparent for computer availability: 407 computers per 1000 people in Japan compared with just three or four per 1000 people in Cambodia. Internet users are similarly distributed, and broadband use was even more limited, with fewer than one person in 1000 having broadband access in Cambodia.

In Cambodia, data were collected at the National Institute of Education (NIE), a national training centre for teachers located in Phnom Penh. The NIE has some 1000 students in training for teaching or administrative roles, yet a ratio of just one computer to every 18 students (MoEYS 2004). In Japan, however, data came from a large, national university with numerous computers on campus for some 16500 students (University of Tsukuba 2008); moreover, recent data indicate that 92% of students have their own computer (Elwood & MacLean 2009). In K-12 public schools in Japan, too, ICT is widely available, with one computer for every 9.7 students and 99.9% of public schools having Internet access (MEXT 2006).

Even when ICT is available, however, basic realities often mediate usage. Table 2 shows data from the ICT Price Basket, a list of necessary goods and services that provides a baseline for comparison over time and context. Costs in Cambodia are generally high, with, for example, a fixed telephone line consuming one-sixth of per capita income. The average

monthly subscription cost for an entry-plan 256 kps Internet service is about US$89 per month in Cambodia, while it is US$45 in Bangladesh and US$17 in Vietnam (World Bank 2009a). Moreover, broadband access is prohibitively expensive, costing more than *twice* the average per capita income.

Second, most connections are quite slow, with a 256 kbps dial-up connection (the most common) having just 1/360 the speed of a typical 92.8 Mbps broadband connection in Japan (OECD Broadband Portal n.d.; World Bank 2009a). Geographically, too, the Cambodian situation is skewed, with ICT primarily available in cities and larger towns.

In addition, electricity to run computers is not a constant. As of 2004, publicly provided electricity in Cambodia was available to only 13 percent of the total population and just 5 percent in rural areas (ASEAN Center for Energy 2004). That paucity is offset to some extent by private and individual efforts, with a high incidence of generator use. As late as 2007, industry in Cambodia derived 36.2% of its energy needs from generators (World Bank 2009a).

Table 2. ICT 2008 Price Basket Values

	Context	
ICT pricing information	Japan	Cambodia
World rank	24	132
ICT Price Basket Components		
Cost of Fixed Telephone Line	0.6%	17.9%
Cost of Mobile Access	1.0%	11.2%
Cost of Broadband Access	1.0%	201.2%
ICT Price Basket Value**	0.9%	43%
GNI per capita* US$	37670	540

Note. *The GNI per capita is based on the World Bank's Atlas Method. **The ICT Price Basket Value is the sum of the three sub-baskets as a percentage of GNI per capita, divided by 3. From "Measuring the Information Society: The ICT Development Index," by the ITU, 2009b. Retrieved June 27, 2009 from http://www.itu.int/ITU-D/ict/ publications/idi/2009/index.html

Given the large differences in availability of technology, one might expect Japanese students to be much more proficient with ICT. However, the OECD's triennial Programme for International Student Assessment (PISA) offers a somewhat different story. The 2003 iteration examined 15-year old students in 41 countries, of which 32 had data on ICT usage. Among those 32, Japan ranked toward the bottom with only 15% of participants having had access to computers for five years or more. 79% of Japanese students had access to a computer at home, yet just 37% used their computers frequently. Japan scored very low in ICT use in programs and software, and second lowest in Internet and entertainment usage of computers. Japan had among the lowest confidence levels on all three indices used, and fewer than half of Japanese students were able to use home computers for schoolwork. Japanese students were among the least positive in their attitudes toward computers (OECD 2005b).

Responses to IT

Japan

In Japan, ICT is both more affordable and widespread than in Cambodia, yet it is somewhat sporadically implemented. Institutional initiatives to improve the overall situation have

focused to date on adding equipment (the 'if you build it' impulse). With the financial heft of the MEXT, national universities such as Tsukuba have invested substantial resources in upgrading IT facilities, resulting in more opportunities to use ICT.

Japan has the second largest economy in the world in GDP nominal figures (World Bank 2009b). Devastated during World War, it has benefitted from some 50 years of peace, prosperity and near-constant economic expansion. Japan was an early promoter of the use of ICT in schools, and in 1994 began with the 100 schools project (United Nations Educational, Scientific & Cultural Organization (UNESCO) 2008). The country's leaders set 2005 as a target date for becoming the foremost IT nation in the world (IT Strategic Headquarters 2001), a still unrealized goal toward which some progress has been achieved. Despite its first-rate infrastructure, Japan has actually fallen from 17th to 19th place in the World Bank's Knowledge Economy Index (KEI) rankings, a measure of the success of ICT implementation (World Bank 2008), thus suggesting that outlay for equipment and subsequent ease of access does not necessarily result in increased use (Ono & Zavodny 2007).

Moreover, training for existing teachers lags behind this outlay of resources. In 2006, Japan's National Institute of Multimedia Education (NIME) surveyed 880 tertiary education institutions and found that only some 30% had implemented faculty development for using ICT (NIME 2007).

Furthermore, the spread of the nearly ubiquitous cell phone is striking: in the general population, some 95% of Japanese people possess cell phones, and among university students the number is 100% (MacLean & Elwood 2009; Thornton & Houser 2005). While cell phones still cover basic tasks such as talking and texting, most also capably handle taking photos, using the Internet, recording audio and video files, and even reading QR codes. Versatile and powerful, the cell phone carries a host of possibilities in both everyday life and for educational use.

Cambodia

In Cambodia the situation bears similarities to that of post-war Japan. Cambodia's economy ranked 123rd in the world in 2008 (GDP nominal figures, World Bank 2009b), largely due to its extended post-war struggle with decolonization, civil war and invasion. Cambodia ranked eighth out of ASEAN's 10 countries in terms of ICT infrastructure and use (it was not one of the 134 countries ranked in the KEI). Cambodia's first plan for using ICT in education was promulgated in 2004 with a target date of 2015 for full implementation (MoEYS 2004). Moreover, in 2007, MoEYS, UNESCO, the Open Institute, and the Asian Development Bank targeted development of ICT and its integration into education. This has been manifested in the allocation of software and hardware resources towards six Regional Teacher Training Centres and NIE (K. Im, personal communication, December 25, 2008).

However, prohibitively high costs, limited availability and other factors continue to beguile further implementation of ICT in education and in daily life. Cell phones, however, have spread, overtaking regular phones and computers numerically (International Telecommunications Union (ITU) 2009a), and they appear in the current study as the technological device of choice for many tasks.

Goals of the Current Study

In light of the above realities, the current study sought to better understand the acquisition of ICT proficiency in the foreign language classroom and, against that background of ICT

acquisition, investigated ICT competency, perceptions and usage in two very different contexts. A second objective was to elicit data for use on a micro-level (that is, improving pedagogical practices) and on a macro-level, helping inform educational policy development given the reality of funding decisions and limitations.

Research Questions

The foci of this study emerged from several areas of research. The first focus was students' levels of comfort and proficiency *vis-à-vis* different kinds of technology, and second was the perceived usefulness of technology. The third focus was learners' preferences regarding technology, primarily for technology versus non-technological media (WUT), and then for mobile devices versus non-mobile devices.

The resulting research questions were therefore:

1. According to their own perceptions, how proficient are students at various technological tasks?
2. Are students anxious about or while using technology?
3. Will students indicate a preference for technological media (for example, computers) versus non-technological media (for example, paper)?
4. How do students perceive the usefulness of technology for various school subjects and in future situations?
5. Will students prefer mobile devices or non-mobile devices for various tasks?

Method

Participants

A total of 458 university students participated in this study, including 328 in Japan and 130 in Cambodia (Table 3). The Japanese participants were enrolled at Tsukuba University. In the Cambodian sample, male participants outnumbered females by a ratio of seven to three, and the average age was 26.80, whereas the Japan sample was nearly evenly divided between genders and slightly over 19 years of age.

Table 3. Demographic Information for Cambodia and Japan Samples

	Cambodia	Japan
Sample size	130	328
Major(s)	Education	Various
Gender	70.00% male	52.99% male
Age	26.80	19.18

Data Collection

The questionnaire included 20 Likert-scale items, 28 percentage items and a demographic section which documented age, gender and university major (Table 4). A 5-point semantic-differentiation scale was used for the Likert items, anchored by 1 (strongly disagree) and 5

(strongly agree) with a neutral midpoint of 3. This instrument closely follows MacLean and Elwood (2009), which drew upon existing instruments (Davis 1989; Heinssen, Glass & Knight 1987; McCroskey 1992; McCroskey & Richmond 1991). Administered in Japanese for the Japanese context, the survey was first translated into Japanese, back-translated for accuracy, and revised accordingly. For the Cambodian context, it was administered in English with simultaneous translation and clarifications by a native speaker of Khmer. In Cambodia, data were collected using printed surveys, while in the Japanese context the majority of data was collected using personal response systems, small electronic devices for individual users which send information to a USB hub and employ software for immediate aggregation (eInstruction 2009).

The first 10 questions dealt with participants' abilities with a variety of technology tasks. The first five queries included touch-typing and communication tasks in cyberspace, namely Internet surfing and doing e-mail by cell phone and computer. The following two questions asked about using Word and Excel, while the next two looked at proficiency manipulating software and hardware (for example, downloading files and software and connecting peripheral devices).

The second set of questions asked about students' perceived anxiety while doing technology tasks. These included touch-typing, net-surfing and taking tests. These were followed by two subscales on perceived usefulness of technology, first for four school subjects and then for future uses (for example, for work).

The questions that underpin the WUT construct were next, with 11 items that asked whether respondents would choose technology or traditional means like paper for different tasks. Among those tasks were writing a memo, writing a five-page report, communicating with your teacher, looking at reference material (for example, paper handouts versus viewing web pages), doing a presentation (using an overhead projector versus using PowerPoint), and communicating with someone (face-to-face versus Internet chatting).

The following section looked at where ICT knowledge was acquired. The specific queries dealt with knowledge learned at school and the type of knowledge learned from friends. The final section was similar to the WUT scale and investigated preference for different devices (for example, for cell phones or for computers) when doing a particular task.

Analysis

First, data were carefully screened for non-normality and the presence of outliers. Second, the subscales were screened for unusual behaviour of items, dimensionality, and adequate category function using Rasch analysis (Linacre 2006)[1]. Descriptive statistics provided an overview of individual items, and differences in means between the two sub samples were investigated using *t*-tests. To reduce the chance of Type I errors, a false discovery rate correction (Benjamini & Hochberg 1995) was applied to each of the questionnaire's six subscales.

[1] A detailed account of the Rasch analyses used is beyond the scope of this paper, but is available upon request from the authors.

Results

A detailed perusal of subscale performance indicated that most functioned well (Table 4). Internal reliabilities of respective subscales ranged from .61 to .93, with the shorter usefulness scales, as expected, exhibiting slightly lower reliabilities. Inter-item correlations were also acceptable (with one exception), ranging from .41 to .64. From Rasch analysis, all but one subscale exhibited adequate item and person reliability, and appeared to be sufficiently unidimensional.

However, the WUT subscale was more complex. For both the Japanese and Cambodian contexts regular principle component analyses (PCA; SPSS 2004) and Rasch PCA of residuals indicated the presence of multiple dimensions, thus replicating the results reported in MacLean and Elwood (2009). The strongest component in the Japanese context included Items 21-23 and 24-26; with such items as writing memos, doing a budget and writing a five-page report, it appears to address *Asynchronous Communication* oriented toward personal use. The second component addresses tasks involving *Interaction* with others on a synchronous or near-synchronous level; among the five items were contacting one's teacher and doing presentations.

These components also appeared in the Cambodian context. The configuration of the two components changed slightly, as contacting one's teacher moved from *Interaction* to *Asynchronous Communication*. However, the other items remained in the same groupings. Given these results, the WUT construct appeared to function similarly in these very different contexts.

Table 4. Subscale Statistics

Section	*n*	Scale	Subscale Reliability	Item/Person Reliability	Inter-item Correlation
Proficiency	10	Likert			
Japan			.90	.99/.87	.47
Cambodia			.93	.97/.89	.56
Anxiety	3	Likert			
Japan			.68	.60/.87	.41
Cambodia			.74	.64/.67	.49
Useful subjects	4	Likert			
Japan			.76	.98/.59	.44
Cambodia			.78	.94/.73	.47
Useful future	3	Likert			
Japan			.70	.99/.49	.43
Cambodia			.84	.96/.73	.64
WUT[a]	11	%			
$Japan_{Asynchronous}$	6		.59	1.00/.57	.19
$Japan_{Interaction}$	5		.52	.98/.40	.18
$Cambodia_{Asynchronous}$	5		.82	.86/.84	.44
$Cambodia_{Interaction}$	6		.83	.83/.54	.47
Cell vs. PC	9	%			
Japan			.67	.99/.65	.18
Cambodia			.88	.87/.84	.46

Note. Subscale reliability is from SPSS, and item and person reliability are from WINSTEPS. [a]*Interaction* and *Asynchronous Communication* denote the two WUT components.

The first research question (*According to their own perceptions, how proficient are students at various technological tasks?*) was addressed by investigating 10 common technology-related tasks (Table 5). In the Cambodian context, only in word processing did participants rate themselves competent (3.19), and even that only slightly exceeded the midpoint of 3. In the Japanese context, however, participants indicated some proficiency in surfing on a cell phone, doing mail on a computer, and doing word processing, and the competence levels were higher for surfing by computer (3.70) and doing mail on a cell phone (4.00).

Table 5. Perceived Technological Competence

	Country		
	Cambodia	Japan	Sig
1. Touch typing	2.77	2.54	-
2. Surfing by cell phone	1.98	3.25	**
3. Surfing by computer	2.30	3.72	**
4. Doing mail by cell phone	1.98	3.97	**
5. Doing mail by computer	2.57	3.51	**
6. Word processing	3.19	3.42	-
7. Using a spreadsheet (Excel)	2.67	2.79	-
8. Downloading movies	2.05	2.59	**
9. Installing software	1.73	2.72	**
10. Installing hardware	2.13	2.65	**

Note. Statistically significant differences are indicated by a double asterisk ($p < .01$).

Posited to comprise one facet of the conceptual model of acquisition of technological skills, anxiety concerning technology was investigated with a 3-item subscale (Table 6). In both contexts there appeared to be little anxiety associated with the use of technology: in the Cambodian context, for example, all three means were well under the midpoint, with surfing the Internet rated the lowest at 2.16. In the Japanese context, participants indicated higher levels of anxiety for typing (2.58) and test-taking (3.09); the latter slightly exceeded the neutral midpoint. However, anxiety perceived while taking a test on a computer could very well be a juxtaposition of test anxiety and – if present – anxiety about technology use. As such, this result should be interpreted with caution.

Table 6. Perceived Anxiety When Using Technology

	Context		
	Cambodia	Japan	Sig
11. Typing	2.27	2.58	*
12. Surfing the Internet	2.16	1.98	-
13. Taking tests	2.37	3.09	**

Note. Statistically significant differences are indicated by a double asterisk ($p < .01$) or a single asterisk ($p < .05$).

The third series of items addressed the perceived usefulness of technology for school subjects and in the future (Table 7). In both the Cambodian and Japanese contexts, technology was perceived as useful for learning a foreign language and science, while in math and the students' first language it was perceived as less useful with mean values below the midpoint. In the Cambodian context, technology was perceived as most useful for learning a foreign language ($x = 3.55$), which bodes well for language educators.

The second subscale (Items 18-20) looked at perceived usefulness in the future in three areas: for private use, for one's job and for study. In all three areas, participants indicated that technology would be useful in the future, and differences between contexts were all statistically significant. The largest emerged with respect to private use, for which Japanese students (x = 4.37) indicated a much stronger sense of future usefulness than did their Cambodian counterparts (x = 3.48).

Table 7. Perceived Usefulness of Technological Devices

	Country		
	Cambodia	Japan	Sig
School subjects			
14. For learning a foreign language	3.55	3.22	*
15. For learning math	2.85	2.63	-
16. For learning science	3.10	3.30	-
17. For learning native language	2.93	2.78	-
Future areas			
18. For private use	3.48	4.37	**
19. For one's job	3.83	4.19	**
20. For study	3.98	3.67	**

Note. Statistically significant differences are indicated by a double asterisk ($p < .01$) or a single asterisk ($p < .05$.

An unexpected finding was a similar zigzag pattern in these very different contexts (Figure 1). A statistically significant difference between means occurred only *vis-à-vis* learning foreign languages; to wit, in the rightmost three categories, data between countries were statistically indistinguishable.

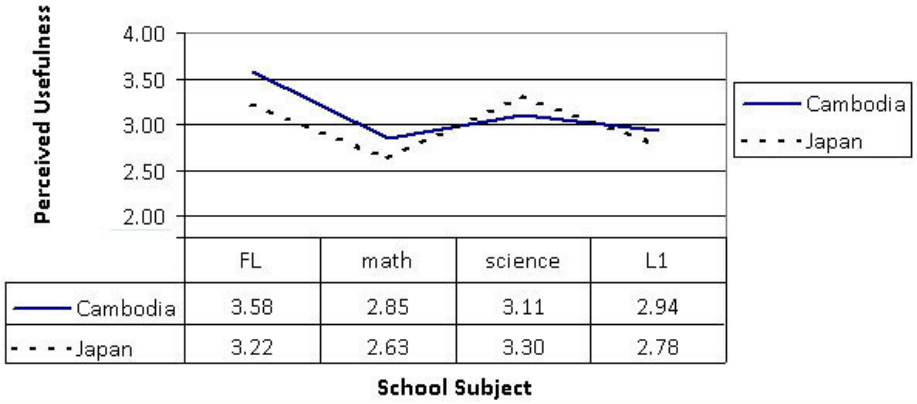

Figure 1. Perceived Usefulness of Technological Devices for Four School Subjects

The third research question dealt with Willingness to Use Technology (WUT; MacLean & Elwood 2009). Japanese participants indicated strong preferences for paper when writing memos or taking tests and a smaller preference for paper when looking at reference material. In the other eight tasks, a preference for technology was evident, although using Internet chat was just slightly preferred to chatting face-to-face.

However, in the Cambodian context, participants indicated a preference for technology on all 11 items, with only test-taking (x = 48.47) being close to the neutral midpoint. Interestingly, in

the Cambodian context responses had a range of 14.06 percentage points (34.41 to 48.47), while in Japan the range of 65.08 percentage points (16.38 to 81.46) was much larger.

Table 8. Willingness to Use Technology (Percentages)

	Country		Sig
	Cambodia	Japan	
21. Memo	39.78	77.43 (paper)	**
22. Test-taking	48.47	81.46 (paper)	**
23. 5-page report	40.17	24.24	**
24. Contact teacher	37.65	19.07	**
25. Do budget	35.74	41.08	-
26. View reference material	43.35	57.31 (paper)	**
27. Get info	39.21	38.45	-
28. Do presentation	39.88	16.38	**
29. Divide restaurant check	36.76	23.98	**
30. Exchange mail	34.81	18.25	**
31. Internet chat / face-to-face chat	34.41	47.13	**

Note. Higher percentages indicate preference for traditional media (indicated by "paper" in parentheses), and lower percentages thus indicate preference for technological devices (not indicated). Statistically significant differences are indicated by a double asterisk ($p < .01$).

Participants also were questioned about where technological knowledge was acquired and whether it was shared (Table 9). In both contexts, students indicated that more computer knowledge than non-computer technological knowledge was learned at school, but the difference in Japan was much larger (46.69 versus 11.45) than in Cambodia (39.46 versus 27.03).

Second, rather little teaching of skills occurred, with means on Items 37 and 38 well beneath the midpoint. In Cambodia, participants noted having acquired a larger portion of knowledge about cell technology at school than did the Japanese participants. Furthermore, educational software was used sparingly in both contexts although it was used somewhat more in Cambodia ($x = 2.31$) than in Japan ($x = 1.80$).

Table 9. Places Where Technological Knowledge Learned

	Country		
	Cambodia	Japan	Sig
Percentage items			
32. Non-cell at school	39.46	46.69	**
33. Cell tech at school	27.03	11.45	**
34. From friend	29.32	30.33	-
35. Cell by oneself	36.39	44.11	**
36. Cell tech from friend	31.88	26.18	*
Likert-scale items			
37. Teach friends PC	2.36	2.31	-
38. Teach friends cell	2.30	1.93	**
39. Use software for language ed	2.31	1.80	**

Note. As noted, Items 32-35 were percentages, and Items 37-39 were Likert-scale results (5-point scale). Statistically significant differences are indicated by a double asterisk ($p < .01$) or a single asterisk ($p < .05$).

For the final subscale, preference for a PC versus a mobile device yielded several interesting findings (Table 10). First, on all nine items, the Cambodian respondents indicated a preference for mobile devices, while the Japanese respondents strongly preferred PCs for three tasks and slightly preferred PCs for two more. For four tasks (Items 45-48), mobile devices were preferred by both groups, and of those four, only the means for paying bills and doing e-mail with pen pals were significantly different.

In five areas the differences between the two contexts were starkly and significantly different. The largest difference was for viewing web pages (81.58 in Japan versus 35.38 in Cambodia), which likely reflects the relative paucity of computers in the Cambodian context.

Table 10. Preference for PC vs. Mobile Device for Various Tasks (Percentages)

	Context		
	Cambodia	Japan	Sig
40. Take test	29.16	67.04 (PC)	**
41. Use dictionary	37.26	59.69 (PC)	**
42. View homepage	35.38	81.58 (PC)	**
43. Receive information on class cancellation	25.57	51.77 (PC)	**
44. Communicate with teacher	30.79	54.25 (PC)	**
45. Calculate money	29.58	28.20	-
46. Pay bills	23.45	33.17	**
47. Do e-mail with penpal	29.80	21.78	**
48. Do regular e-mail	35.01	29.47	-

Note. Higher percentages indicate preference for computers (indicated by PC in parentheses), and lower percentages thus indicate a preference for mobile devices (not indicated). Statistically significant differences are indicated by a double asterisk ($p < .01$).

Discussion

In these two disparate contexts, the existence of dissimilar perceptions and abilities was expected, yet this was not uniformly true. In general, ICT was perceived as useful, with strikingly similar patterns about perceived usefulness *vis-à-vis* school subjects yet different, albeit positive, views on future uses of technology. Where Cambodians viewed technology as useful for school, work and lastly personal use, the inverse was true in Japan. Students in Cambodia rated themselves as proficient in the use of word processing only, whereas Japanese students felt somewhat confident using word processing, doing mail by computer and surfing the Internet with cell phones as well as computers.

Anxiety appears to play virtually no role in the acquisition of technological proficiency, which may indicate that young people have reached a peaceful co-existence with technology. Many studies indicating significant degrees of anxiety were conducted in the 1980s and 1990s, when technology was in a much more nascent state, but familiarity with technology appears to be firmly embedded in the consciousness of university-age students now.

Where preferences for technological media versus non-technological media (paper) were concerned, Japanese students indicated a more varied approach to the use of these tools, whereas Cambodians preferred technology and the use of cell phones in every instance. Japanese students preferred paper for writing memos and tests, as well as when looking at reference material. A similar response pattern was evident regarding preferences for the use of mobile devices such as cell phones. This suggests that Cambodia would be fertile ground

for implementing ICT, with expectations and some knowledge evident yet little equipment available except cell phones. This has led policymakers to suggest mobile phones could function as an ICT gateway (Tha 2003).

Naturally, in the best of all possible worlds, educational institutes could provide unlimited ICT support, but the reality is somewhat different as limited fiscal resources slow progress toward ICT implementation. Moreover, availability does not necessarily equate with usage.

Implications

Let us return to the two-part mantra mentioned above. The implementation of technology is based on two assumptions, namely, that educators and learners will use technology if it is available and, second, that it is available. In the Japanese context ICT is becoming increasingly common, but the Cambodian context has a rather different reality. Instead of complex technological systems, in that context perhaps simpler solutions – mobile, wireless educational initiatives – would be more realistic.

Second, the lack of significant results regarding anxiety has at least one interesting implication. As noted above, implementing new systems can be both time-consuming and at the root of affective reactions like anxiety. However, the absence of anxiety suggests that technology has become firmly ensconced in the psyches of today's university students, most of whom were, after all, born after early versions of Windows appeared.

Third, and on a very hopeful note, ICT was roundly viewed as being useful in the future, even if seen in mixed terms regarding current school subjects.

Conclusion

This study has shown that, given an overwhelming disparity where resources are concerned, predictable distinctions exist between Cambodia and Japan in ICT usage and student perceptions, yet notably similar patterns also exist. Japanese learners expressed relatively higher levels of proficiency in nearly all areas, and a higher degree of proficiency correlated with a higher willingness to engage in interaction using technology in Japan but not in Cambodia. However, surfing the Internet, sending mail and word processing were the only areas where Japanese students indicated any assured confidence in their abilities, while only in word processing did Cambodian students rate themselves as proficient. With the exception of these few tasks, students in both countries were far from native-like (Prensky 2001). Japanese students exhibited a greater distinction and range in their choices for using different media (for example, technology versus paper), whereas Cambodians opted for technology in every situation and displayed a narrower (perhaps less discriminate) range for those choices. Students from both countries indicated that school was the primary place where they learned about computers (suggesting government policy has succeeded to some extent), whereas they learned the better part of cell phone usage by themselves. Students in both countries expressed little anxiety when using technology. In both contexts, technology was perceived as useful for learning a foreign language and for science; furthermore a strikingly similar zigzag pattern was revealed for student perceptions about the use of ICT in all four school subjects surveyed. Finally, males from both countries indicated a higher degree of willingness to use technology (WUT).

Japanese students appeared competent in many of the tasks that led us to undertake this study whereas Cambodian students were not. Nonetheless, an intriguing pattern appears when comparing the haves versus the have-nots. In a relative sense, Japanese students appear surprisingly less proficient than expected given their abundant access to technology

and the reality that ambitious government-mandated ICT goals and ample resources have been extant for much of these students' lives. Japanese students indicated more concern about ICT applications in their personal lives, less so for professional uses and least so for academic uses. Cambodian student responses were precisely the opposite (though somewhat muted). Furthermore, Cambodian students indicated a significantly higher use of educational software, despite the fact that it is abundantly more available in Japan. This highlights perhaps the most important finding of this study: access does not necessarily equate with proficiency or even willingness to use technology (WUT).

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