

Japanese students' experience of ICT and other technology prior to university: A survey

Thomas Lockley

Kanda University of International Studies
thomas-l@kanda.kuis.ac.jp

It has been observed that many students seemingly lack information and communication technology (ICT) skills when entering university. This paper looks at the experience young Japanese people have had of using technology, in particular ICT, prior to entering university. The data was collected by means of a questionnaire (N=105) and found that students have engaged with numerous technologies in a large variety of situations. The aim is to inform teachers, learning advisors and universities (perhaps change this to "university administrators") of the practicalities of using ICT in class and how to manage technology within curricula; a variety of suggestions are made.

Introduction

A glance around a university classroom in Japan reveals that virtually all students own and use mobile phones, iPods or MP3 players proficiently. However, one often hears teachers talking about young Japanese people's lack of ICT¹ know-how and the challenges universities and companies face when young people (perhaps change "young people" to "new employees") join their ranks. It seems reasonable from this to assume that students' general technology literacy must be considerable, but their more formal technology literacy may be lacking something.

This paper was born of the observation, that among first year students at the university where the data for this paper was collected, there are a large variety of proficiency levels evident. This is challenging for teachers when setting ICT based exercises, some teachers even refuse to use comput-

ers in class, believing that they will have to waste time teaching students the very basics such as how to plug in a laptop.

Informal soundings prior to this research revealed that very few students claimed they did not know how to operate a computer; a lot of others said they could, but had little or no knowledge of seemingly common programs, such as Microsoft Word and PowerPoint; and some appeared to struggle with simply getting online.

For teachers and learning advisors in Japan to be able to plan for curriculum modernisation, normalisation of **CALL**, self access centres and more generally for hardware expenditure, it is clearly imperative to have a clear picture of what prior experience students have with technology and how this will translate to everyday university life. Institutions of all levels also need to know what their students have done with technology at home and in previous schooling and how they can potentially transfer these skills to the educational sphere.

This paper will, by means of a survey, show a snapshot of how 105 first year university students have interacted with technology in their pre-university lives in and out of the educational sphere. It will look at the implications this raises and make some suggestions.

ICT and technology in daily Japanese life and education

According the Organisation for Economic Cooperation and Development (**OECD**), 87.2% of Japanese households have access to a computer and 67.1% of households are online; ranking 6th and 18th among the 40 **OECD** countries respectively (**OECD**, 2010). The Ministry of Internal Affairs and Communications (**MIC**) reports that Japan enjoys the world's highest broadband speeds and lowest consumer costs and furthermore that, although access to internet at home is slightly hindered among lower socio-economic groups and the elderly, among under 50s in general well over 90% are online (**MIC**, 2009).

Japan in general and Tokyo in particular has the highest mobile phone ownership in the world (Takahashi, 2008) and the largest number of 3G mobile phone users (**MIC**, 2009). Regardless of age, gender, income or educational status, these are used largely to access the internet and email (Mito & Ono, 2008) rather than exclusively for phone calls, thereby blurring the boundaries between **ICT** and mobile technologies in a way not yet seen in other countries. Mobile phones have become central to young peoples' identities and social networks (Boase & Kobayashi, 2008).

The Japanese Ministry of Education, Culture, Sports, Science and Technology (**MEXT**), states that the purpose of **ICT** in schools "is to promote computer literacy in students in order to develop their abilities to participate in a society that is information oriented" (Moriyama et al., 2009, p.310). In 2002/3 a new Course of Study (government guidelines for schools, but schools have much leeway in interpretation and implementation (Lockley, 2011) was promulgated, introducing a new compulsorily curriculum area called Information Studies.

There are three different strands to Information Studies in senior high school, labeled A, B and C (**MEXT**, 2006). All school must offer at least one of them. Information Studies A concentrates on basic **ICT** skills such as word processing, spreadsheets and PowerPoint. B involves the scientific side of computing, including hard and software, operating systems, and network functioning. C deals with social issues and computing, including **ICT**'s role in business, government and the social services. For students who aim to leave senior high school and enter the **ICT** workforce directly, there is also a vocational subject option which covers higher level computer skills (**MEXT**, 2006). Verno & Chujo (2009) state that initially

most schools lacked the means to offer anything but Information Studies A, however over the last 6 years this has developed to nearly half of schools offering also options B and C.

The junior high school Information Studies curriculum teaches basic skills, some multimedia functions, and the role and ethics of ICT in daily life. Elementary schools have no specifically stipulated curriculum, but teachers are encouraged to use computers in other subject areas such as regional, environmental and social studies (Ohashi, 2010).

In 2006, MEXT figures stated that there was one computer for every 5.7 students in senior high schools, 6.9 in junior high and 9.6 in elementary schools, 89.5% of these were connected to the internet. This picture of relative technological plenty is confused somewhat by the fact that it has been estimated that many school computers are old models, with approximately 400,000 still running on Windows 98 or Windows Me (Salzberg, 2007). As these platforms are no longer supported by major software manufacturers, this limits the use of these computers to old or outdated programs. The reason for lack of spending on up-to-date hardware is that Japanese schools simply don't have the cash to spare. They spend most of their budgets on salaries, 87.4% compared with 74.7% in the Republic of Korea and 69.7% in the UK (Lockley, 2011).

So despite the new Course of Study, lack of modern equipment could be one of the reasons why the ICT proficiency and confidence of Japanese school students is one of the lowest in the OECD, particularly in higher level computing tasks such as programming and multi-media presentations but also in routine tasks such as email and typing (Cosgrove et al., 2005).

This lack of confidence could also be a wider social issue of which teachers see only the tip. MIC (2009) found that a large proportion of the Japanese population feel "insecure" when using the internet and ICT, and ICT confidence in general ranks very low internationally. Furthermore, ICT investment, and presence in both the public and private sectors is one of the lowest in the industrialised world.

In schools, students of both sexes report low confidence. However, there is near parity in confidence between male and female students, particularly in the routine tasks. This stands in contrast to most countries where males are overwhelmingly more confident (Cosgrove et al., 2005). Moriyama et al. (2009) also found that female students have a clearer vision of ICT's real life applications, and the need to study to acquire computing skills.

Among teachers, Joshi et al. (2010) found that Japanese teachers of young children had significant concerns over the use and effectiveness of ICT in lessons. This was not related to teachers own proficiency with ICT, but Joshi et al. (2010) suggested that training of how to integrate computers in class was lacking. It is worth noting however they produced no convincing evidence for the latter, and Verno and Chujo (2009) write that more and better training is now being enacted, with new teachers especially being comprehensively trained pre-service. MEXT (2006) maintains that 97.4% of teachers are computer literate, with 76.8% able to incorporate ICT into their subject area.

Methodology

This study employs a mixed method data collection survey, requiring quantitative responses to five-point continuous and numerical data scale based questions with qualitative comments to back up, strengthen and establish foundations for the quantitative data. The questionnaire was administered on SurveyMonkey.com which provides a dedicated web page for every questionnaire, restricting access to invited participants only. Questions were

in English and Japanese and students could respond in either language, whichever they felt more conformable with. This questionnaire was based on a previous questionnaire created and administered by Langdon (2011) to investigate teacher and learner attitudes to the use of technology in **EFL** classrooms. Langdon constructed his questionnaire from interviews with 6 students about their use of **ICT**.

Instruments

The data was collected from 105 first year students at a foreign language university in Chiba City. Exactly two-thirds ($n=70$) were female and enrolled on English or International Communication majors.

The questionnaire comprised 20 questions, 8 of which have been used as data for this paper. Questions five and seven use a continuous data scale to provide measurable categories and restrict the data to analyzable portions. Questions nine and six collect nominal data to establish clear percentages.

To create the tables reproduced below; responses were converted in to percentages, and rounded to the nearest whole number. This provides a clear picture and enables comparison of the figures in a straightforward manner. The classification of qualitative comments differs for each question and is explained in context below.

Findings

The findings give an interesting view of the use of technology by young Japanese people, in pre-university settings, as shown below.

Table 1: Home technology use

5) What types of technology do you use at home?										
	Computer	Mobile phone	iPhone	iPod	TV	MP3	DVD	CD	Radio	Other
Every day	58%	95%	7%	46%	76%	27%	2%	10%	7%	0%
Several times a week	38%	1%	1%	10%	13%	13%	18%	23%	8%	2%
Once a week	2%	1%	0%	0%	2%	2%	29%	30%	28%	4%
Once a month	0%	0%	1%	1%	2%	2%	36%	20%	25%	0%
Never	2%	3%	91%	44%	7%	56%	15%	17%	34%	94%

Note: All percentages rounded up to the nearest whole number.

Out of school use

The answers to question five (Table 1) show that nearly all students have computers at home, use mobile phones and televisions and possess some kind of music storage/ listening device. These are all used at least several times a week by 96%, 96%, 89% and (combining figures for iPod and MP3 players) 95% respectively. These devices are virtually universal.

96 The figures equally show that iPhones have yet to saturate the student market (7%) and

DVDs, CDs and Radios are used infrequently but at least once a month by the majority of students; 85%, 83% and 66% respectively.

The 16 qualitative responses were too few to classify easily, but these three were classed as typical:

"I use computer and TV everyday but I don't use I pod or CD."

"I often use iPod Touch and watch YouTube but I have no time to watch TV."

"[I use] computer [sic] for homework and listening to music, television for enjoyment, mobile phone to contact home and CDs for study and entertainment."

There is a wide variety of technology being used regularly at home and for both entertainment and study.

Table 2: Pre-university non school use

9) Did you use computers before coming to university, but not in school? (for example at home, in an internet café, in a friend's house)	
Yes	86%
No	14%

The answers to question nine in Table 2 show that students commonly used computers in a non-school setting before coming to university, but the figure is below the MIC (2009) reported figures of 95.5% for this age group. This question attracted 53 comments, of which 77% explicitly mentioned home use. Of the final 27% of responses, in all but 6%, there was no comment on where ICT had been used, simply what kind of use; it is possible that these responses may also indicate home use.

School use

Table 3: Technology use at school

6) Did you use technology at school before coming to university?	
Elementary School (ages 6–12)	68%
Junior High School (ages 12–15)	86%
Senior High School (ages 15–18)	89%

The answers to question six in Table 3 indicate a high usage levels at all levels of school prior to university, though predictably the figures increase for the later stages, this is due to the level of schooling, but also due to the increased proliferation of ICT in schools (the subjects of this research would have started elementary school in 1998 and left in 2004 before the new Course of Study was properly underway). However, why haven't 11% of students had any exposure to any technology at senior high and 14% at junior high schools?

The 51 comments added give more detail, they were again not easily classifiable due to their variety, but three broad strands were identified and these four comments were chosen as typical.

"I study how to use computer in elementary school. I got cell phone when I was 3rd junior high school student. I bought a iPod when I was high school student"

“When I was in elementary school, I learn about typing, how to [...] send e-mail. In junior high school, I learned about how to presentation and how to use word”

“Word, excel, powerpoint and internet”

“I learned powerpoint but now I can't use it”

The first strand gives a brief history of technology use and perhaps is a good indication of changing fashions and consumer technology advances. Computers have been in homes the longest, followed by mobile phones and the iPod is a relatively recent innovation.

The second strand is represented by quotes two and three, and shows that many students have plenty of experience of different computer programs. Quote two also indicates at what stage the programs were introduced at school, simple typing and email at elementary school followed by more complicated applications, powerpoint and word, in junior high school. This broadly equates to the Course of Study guidelines.

The third strand indicates, that just because a program has been taught does not necessarily mean that the program has been learned or indeed the information retained.

Table 4: Pre-university school use

7) What type of technology did you use at school before coming to university? (e.g. in class, preparation for class, homework)											
	Computer	Mobile phone	iPod	TV	MP3	DVD	CD	Radio	Personal Organizer	Voice Recorder	Other
Every day	25%	81%	36%	65%	25%	5%	17%	6%	3%	0%	00%
Several times a week	41%	4%	9%	14%	10%	24%	26%	10%	1%	4%	0%
Once a week	23%	1%	2%	4%	1%	22%	26%	11%	1%	1%	3%
Once a month	8%	1%	2%	5%	7%	29%	14%	14%	2%	8%	1%
Never	4%	13%	51%	12%	57%	21%	17%	58%	92%	88%	96%

Note: All percentages rounded up to the nearest whole number.

The responses to question seven in Table 4 show, as the literature reported, that Japanese schools use technology extensively in their curriculum. 89% reported using computers at least once a week, 83% televisions and 69% both DVDs and CDs. There were 17 extra responses to this question and 76% of them described ways that they had used technology in school. These three quotes are representative:

“[for] homework and restudy what I learned in school and look for something I don't know and I can't find answer in book”

“I often watched TV when I was junior high school student”

“I used PC for my report in the school”

Technology then, as maintained by MEXT, is used as a key component of Japanese schools' teaching methods, and across the curriculum. Students themselves are using ICT outside of school to back up their learning.

Although given the pervasiveness of mobile phones among young Japanese people it shouldn't be, the 81% of students who used mobile phones in class on a daily basis was

unanticipated. This may reflect the wording of the question which does not specify whether the technology was used for educational purposes or not. It would be difficult to conceive of current teachers engaging with m-learning, though this could change in the future. The same could be said of daily iPod and MP3 use, 36% and 25% respectively. The comments unfortunately do not shed any more light on this finding.

Discussion

It is clear that Japanese households are full of technological appliances, including ICT, and the survey data shows that virtually all the respondents to the survey are both familiar with and possess many different technological tools and are also online outside university. They are also surrounded by technology in other locations and, this is not just being used for entertainment, but also for study and has been for many students since they were young children.

Why then the issues noted in the introduction? Is the problem in schools? The survey data backs up the literature in showing that technologies of various sorts are used extensively and on a daily basis in schools. The most commonly used technology was computers, with 89% using them at least once a week; it seems students engage with ICT frequently. Lack of modern equipment could however be a large reason for the lack of confidence reported in the literature. If the programs used are older and simpler than the more modern ones at university, then that would clearly be a confounding factor for many students. The students may also be familiar with desktops rather than laptops, which are the dominant hardware at the university where this research took place.

Questions however must be raised about the 11% of respondents who report having no exposure to technology at all during their senior high school years, not to mention the 14% in junior high school. A minority of schools are clearly not giving their students their stipulated requirement for Information Studies. That said it is a small minority and should not be dwelt on overly.

The survey data did suggest that students had learnt about programs such as PowerPoint, Excel and Word, but that they had forgotten how to use them. This could possibly mean that once having engaged with these programs, they did not have the opportunity to actually use them in a real life application, e.g. as a learning tool in another (non-ICT) subject area. There is no evidence to support this however, indeed the survey data a literature suggest that this may not be the case. There could possibly be a mismatch between school curricula and real world usage, though again the literature suggested that this should not be the case if most schools are following the Course of Study guidelines and enacting Information Studies, regardless of which stream.

It may also be possible that although students are familiar with software in Japanese, the computers used in the university where this research took place are overwhelmingly English language only. This would be the same in many contexts where CALL takes place in Japan. Despite the fact that the participants are enrolled on EFL courses, they may well never have encountered English language computers before and this may well cause hesitation before use.

One unintended finding was the fact that 81% of students admit to using mobile phones in class. This does raise the point that they are unlikely to be paying undivided attention to the lesson; rather they are probably using mobiles for social reasons. iPods and MP3 players are even more distracting, if a student is listening to music, are they able to listen

to the teacher? If discipline is lacking, maybe students are not listening carefully enough to take in what is being taught, Lockley (2011) found that many senior high school students did indeed admit to this and even Rohlen writing in 1983 found students ignoring the teacher to be quite common, especially in non-academic schools. This is a far larger question than the remit of this paper, but as a factor contributing to the problem, it could be a significant one.

One last point that was not allowed for in the questionnaire's construction and administration is students' possible unwillingness to look too clever in front of other students in the first few weeks of lessons in a new educational institution. The transition between educational institutions can be a traumatic time and in the making of new friends, many students do not want to look too clever or say the wrong thing. It is possible that they know far more than they are willing to show and this could account for the seeming wealth of experience shown by the survey data and individual teachers believing the reality on the ground is not what it seems on paper.

Conclusion

This research was carried out in a private foreign language university in the Kanto area, and as such the results may not be generalizable for the whole population of university freshman students in Japan. It should also be noted that reported rates of pre university home computer usage among the participants in this research are 9.5% below the nationally reported figure of 95.5% (MIC, 2009) for this age group.

No socio-economic data or information on which Information Studies course was followed at senior high school (A, B or C) was collected. The literature suggested that the availability of personal funds has no bearing on mobile phone usage, but may have slight influence on the availability and use of ICT among the age group surveyed. This data should be collected in any future survey along with information about what course of study participants followed in school. Further factors that could be looked at in more detail are teacher training and ICT use across the curriculum rather than just in Information Studies lessons. It is anticipated that further research encompassing these points will be carried out in the 2012/13 academic year.

The implications of this paper are that although there is a seeming lack of ICT knowledge and familiarity among Japanese university intakes, this does not necessarily reflect the reality of the situation. All students should, and most have had, at least basic ICT lessons in junior and senior high school. Virtually all have computers at home, though many may have more experience of using mobile phones to access the internet. Teachers and learning advisors should not shy away from using ICT in class or in self-access centres; they should also not be overly concerned if students appear apprehensive and should not necessarily take the lack of confidence at face value. Lack of confidence does not necessarily mean a lack of knowledge.

For language universities especially, the suggestion that young Japanese females have more vision of the use and application of ICT is useful as there are more female students enrolled on language courses. This promises a smoother transition to using ICT in class as, given the right support from teachers, students should be able to support each other and be willing to work harder.

100 It is suggested that a short, standardised "refresher" or "Information Studies in English" course could be enacted in the early period of the freshman year to bring all students up

to a minimum standard and familiarize them with English language software. Given their prior experience, this would not need to include more than the very basics of how to start up programs and a few simple applications. It would both make the planning of lessons and advising sessions easier and also enable the students themselves to feel more confident, thus speeding up the process of incorporating ICT effectively in lessons.

Universities want to give their students the best possible education, and consequently spend large amount of money on technology of all sorts to help facilitate this. This survey shows that teachers and learning advisors should not hesitate to use this technology in lessons; rather they should embrace it and enable students to develop the skills that they probably already possess, but perhaps just lack the confidence to utilise to the best of their abilities.

Note

1. This paper uses the term “technology” throughout. Technology is defined by the Merriam Webster dictionary as “the practical application of knowledge especially in a particular area.” This is a wide ranging definition, and as such this paper restricts its meaning to cover only technological tools which are encountered on a daily basis, potentially have a wide ownership among the subjects of this research and possibly have some pedagogical function. Despite the collected data covering various “technology,” the paper’s main focus is Information and Communications Technology (ICT). There should be no confusion between the meanings of technology and ICT; where the word ICT is used it refers to computers only and where the word technology is used it refers to all the technological tools mentioned elsewhere in the paper.

References

- Boase, J., & Kobayashi, T. (2008). Kei-Tying teens: Using mobile phone e-mail to bond, bridge, and break with social ties – a study of Japanese adolescents, *International Journal of Human-Computer Studies*, 66, 930–943.
- Cosgrove, J., Zastrutzki, S., & Shiel, G. (2005). A survey of ICT in post-primary schools. *The Irish Journal of Education*, 36, 25-48.
- Joshi, A., Pan, A., Murakami, M., & Narayanan, S. (2010). Role of Computers in Educating Young Children: U.S. and Japanese Teachers' Perspectives. *Computers in the Schools*, 27(1), 5-19.
- Langdon, C. (2011). Good technology does not necessarily equal good pedagogy – an investigation into the educational efficacy of technology in EFL. *Research Institute of Language Studies and Language Education*, 21, 21–37.
- Lockley, T. (2011, March). Sea Change in Japan. High school English lessons. Paper presented at the 2nd International Conference on Foreign Language Learning and Teaching, Bangkok, Thailand.
- MEXT (2006). 学校における情報教育の実態調査の結果 [The results of a survey on the current situation of ICT in schools]. Retrieved 23 February, 2011, from http://www.mext.go.jp/b_menu/houdou/18/07/06072407.htm
- MIC (2009). Publication of the 2009 White Paper “Information and Communications in Japan.” *Communications News*, 20 (10), Retrieved 15 March, 2011, from http://www.soumu.go.jp/main_sosiki/joho_tsusin/eng/Releases/

- Mito, A. & Ono, H. (2008). The diffusion of mobile Internet in Japan. *The Information Society*, 24, 292-303.
- Moriyama, J., Kato, Y., Aoki, Y., Kito, A., Behnoodi, M., Miyagawa, Y., & Matsuura, M. (2009). Self-efficacy and learning experience of information education: in case of junior high school. *AI and Soc*, 23, 309-325.
- OECD (2010). OECD key ICT indicators. Retrieved September 13, 2010, from http://www.oecd.org/document/23/0,3343,en_2649_34449_33987543_1_1_1_1,00.html
- Ohashi, Y. (2010). What's happening in primary school? *Media Education in Japan*, 2. Retrieved from <http://mediaedu.jimdo.com/archives/vol-02-primary-school/>
- Rohlen, T. (1983) *Japan's high schools*. Berkeley and Los Angeles: University of California Press.
- Salzberg, C. (2007). Japanese Schools May Switch to Linux, OhmyNews. Retrieved September 14, 2010, from http://english.ohmynews.com/articleview/article_view.asp?no=348867&rel_no=1
- Takahashi, T. (2008). Japanese young people, media and everyday life, towards the internationalizing of media studies. In Drotner, K. & Livingstone, S. (Eds.), *International handbook of children, media and culture* (pp. 413-430), London: Sage.
- Verno, A., & Chujo, M. (2009, March 11). Growing a computer science requirement. Message posted to http://blog.acm.org/archives/csta/2009/03/growing_a_compu.html#comments

Author biodata

Thomas Lockley lectures in International Communication at Kanda University of International Studies in Chiba Japan. After qualifying as a language teacher from Sheffield University (UK), he taught French, German and Japanese in UK secondary and primary schools for four years. His research and teaching interests include secondary education and self-perceptions.