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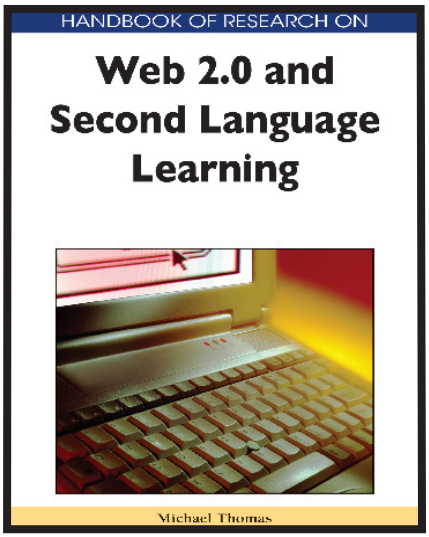
Handbook of Research on Web 2.0 and Second Language Learning

Edited by: Michael Thomas, Nagoya University of Commerce and Business, Japan



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-Professor Mark Warschauer, Department of Education, Department of Informatics, University of California, Irvine, USA

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Michael Thomas (PhD) is associate professor in EFL at Nagoya University of Commerce & Business (Japan). Previously he taught second language learning and CALL at the University of Heidelberg (Germany). His research interests are in the language/literature interface, philosophy of linguistics, and learning technologies. He is author of *The Reception of Derrida: Translation and Transformation* (Palgrave, 2006) and editor of the *Handbook of Research on Web 2.0 and Second Language Learning*. He is on the editorial boards of the *International Journal of Emerging Technologies & Society*, the *Asian Journal of EFL*, the *Asian ESP Journal* and the reviews board of the *British Journal of Educational Technology*. He is editor-in-chief of the *International Journal of Virtual and Personal Learning Environments*. His current research focuses on a new book entitled, *Diversity in CALL*, with Glenn Stockwell.

Handbook of Research on Web 2.0 and Second Language Learning

Michael Thomas
Nagoya University of Commerce and Business, Japan

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Chapter IX
Digital Natives, Learner Perceptions and the Use of ICT

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ABSTRACT

Prensky (2001) posited the emergence of a new generation of "digital natives" fluent in the language of cyberspace and familiar with the tools of user-generated content. If correct, the existence of this group would necessitate a thorough reconsideration of pedagogy to meet their radically different learning needs, which dovetail with the nascent Web 2.0 and its communities of users. The study examined in this chapter addressed a series of questions about the implications of digital natives in Japan, and found contemporary users of technology to be in firm control of only a limited number of skills. Learner use and perception of technology appeared to be mediated by several variables: technological proficiency or the lack thereof, tradition, willingness to use technology (WUT), and gender. The research instruments utilized in this chapter were analyzed and found to be psychometrically adequate. It is argued that these categories and scales will provide a useful resource for further attempts to understand the potential of Web 2.0 and the concept of the digital native in other educational traditions and contexts.

INTRODUCTION

In a sequence familiar to millions of readers of Dr. Seuss, a nameless, behatted gentlemen is persuaded over the course of a book to answer that timeless question: Would you eat green eggs and ham? Sam, a most persistent sort, pursues our nameless hero through thick and thin, finally achieving his goal after a spectacular train crash that leaves the crew and passengers soaking wet. As many 5-year-olds (and, of course, adults) can attest, the green eggs and ham are a smashing

success. Central to this study was a similar question, specifically about learners' use and perceptions of technology in classrooms. Computers have now been a part of many people's lives for a full generation, leading to what Prensky (2001) termed "digital natives" and "digital immigrants." In Prensky's formulation — analogous to what happens in language acquisition — natives grow up immersed in and thereby acquire their first language (L1) and culture (C1), which in Prensky's paradigm are digital language and culture. Those not fortunate enough to have that immersion experience can never completely acquire that L1 and C1, retaining instead a "digital accent" much as geographical immigrants do when learning a second language (L2) and culture (C2).

Moreover, Prensky points to the problems inherent in having non-native instructors in charge of education in the digital language. He suggests that digital-native students are fundamentally different to traditional (i.e., non-digital-native) students and thus require a new pedagogy. As an example, Prensky suggests that digital natives are used to receiving information quickly, multi-tasking, and parallel processing. Immigrants, however, are used to slower information, uni-tasking, and linear processing, and digital-immigrant teachers thus expect students to deal with tasks in a more traditional fashion that does not suit many of them well.

In the sphere of second language learning, this hypothesis appears at least superficially true. Even today, in many pedagogical situations learners and teachers alike fail to utilize technology effectively, if at all, in spite of its immense promise. Web 2.0, for example, moves beyond the static delivery of information or tasks such as publishing in a traditional sense, which is simply the public presentation of one's work. While presenting a work is an important pedagogical step (Bruner, 1986) and underpinned Web 1.0, it pales in comparison to the possibilities offered by Web 2.0. The nascent Internet or Web 1.0 was and remains similar to a textbook in being an inert object devoid of meaning until acted upon or engaged with, whereas the interaction of a person or people with that book (Web 2.0) yields something far from inert or meaningless. That basic premise, what O'Reilly (2005) termed the creation of a community, finds an appropriate equivalent in L2 acquisition theory in Holliday's (1999) "small cultures," which refer to groups of individuals with shared interests. In O'Reilly's (2005) delightful words, "a conversational mess of overlapping communities" emerges, illustrating the basic, interactive premise of Web 2.0.

Against this tapestry of immense albeit nascent potential, the question persists of how educators are progressing in fulfilling that vast promise. With Internet access, digital natives as students, and beleaguered digital immigrants as instructors, why is technology used sparingly, inefficiently, or ineffectively? Answers may lie with instructors that simply do not speak the language of digital natives as Prensky suggested, or those answers might lie elsewhere. Limited availability of and proficiency with technological media may inhibit tapping the potential of the Internet and its Web 2.0 components. Moreover, recent research suggests that the much-heralded generation of digital natives may in fact be very minimally proficient speakers of this new web language (e.g., Bennett, Maton, & Kervin, in press; Kennedy, Krause, Judd, Churchward & Gray, 2006; Kvavik, 2005; Kvavik, Caruso & Morgan, 2004). In short, contemporary students may lack skills with technology or the propensity toward using it.

This situation stems at least in part from the fact that current understanding falls short of fully explaining how learners (including education students) experience technology, as well as how they perceive it when it is presented to them in pedagogical situations. The current study looks at one pillar of this dynamic, namely, the learner. These learners of English as a Foreign Language (EFL) were in Japan, and replications of this study, both in Japan and abroad, would be prudent steps. Furthermore, the second important pillar of

the educational scenario, the teacher, also bears investigating. With a plethora of educational software and widespread technology available, is technology used well? If not, why not? As Sam might have asked in this context: Would you use technology?

BACKGROUND

Three threads informed this study. The first was an assessment of Prensky's (2001) digital native-immigrant paradigm, namely the issue of whether contemporary students are more able and willing to utilize technology than their forebears. Second, with the wave of the future being mobile and thus "untether[ed] … from local cabling" (Alexander, 2004, p. 40), it is important to consider how recent technology has affected user perceptions. As Beckers and Schmidt (2001) have observed, it is an ongoing question whether Internet use and the emergence of technologies such as mobile phones will decrease or increase occurrences of computer anxiety. Third, as Rosen and Weil noted in a key (1995) study of computer anxiety, people's lives are so "intricately intertwined with technology" that it is unlikely that the items on their instrument could adequately capture the vast amount of "personal" technology that makes people anxious on a daily basis (p. 58). The rapid pace of technological advances implies that any measure of user perceptions of technology will necessarily be an evolving construct (Dyck, Gee, & Smither, 1997), and as such measures warrant ongoing consideration.

MOORE'S LAW INCARNATE

One trend evident in the technological world is the rapid development of computers. Although never intended as an iron-clad law, Moore's (1965) statement that the number of transistors on a chip doubles approximately every two years has important implications for this study. While it is true that improved hardware does not necessarily imply a proportionate increase in software performance (Wirth, 1995), this ability to fit more transistors on a chip does allow for increasingly complex devices which integrate many capabilities. The cumulative effect is to enable increasingly sophisticated and diverse machines and applications. It also implies that any measure of student attitude towards technology or computer/technology anxiety must be periodically examined and reformulated due to the speed at which technology in general is changing. Thus it is necessary to update and continue research in this area, in order to stay informed of the changing nature of student responses to technology.

A typical indication of the extent to which technology has advanced can be seen in Rosen and Weil's (1995) article, which noted that over 75% of all Americans and well over half of all Germans, Japanese, and Australians owned telephones. Fast forward to the present, a world where over 2 billion people own mobile telephones. In a related trend, much of the research to date has dealt with computers (which, in the early parlance of the cybersphere, were microcomputers) rather than smaller and more mobile devices that have proliferated in today's world. This is summarized nicely in Wagner's (2005) words:

Although tablets and laptops have provided the means and the methods for demonstrating that learning no longer needs to be classroom or course bound, the anticipated rush toward mobile learning will be sparked by the obvious draw of short, stand-alone programs. Current trends suggest that the following three areas are likely to lead the mobile movement: educational games, language instruction, and performance support and decision support tools. Effective mobile learning programs will require new digital communication skills, new pedagogies, and new practices. (p. 51)

There has never been a device that has spread so rapidly and with so many implications as the mobile phone. A recent report from the International Telecommunications Union (2007) reported that the number of mobile phone subscribers tripled from 2000 to 2005, reaching well over 2 billion in 2005, and it is forecast that this figure will reach 3 billion subscribers in 2008. In Japan, the country where this study was conducted, over 95% of households owned cellular phones in 2005 (Ipsos, 2006). A study by Thornton and Houser (2005) found that 100% of 333 participating Japanese university students had mobile phones that could view standard web pages as well as send and receive standard Internet e-mail. This finding is echoed in the present study, in which 100% of the participants were found to own a mobile phone.

It was therefore a goal of this study to update knowledge in the field to reflect the current situation, and to examine the possibility that the advent of mobile devices has engendered a significant difference in learners' approaches toward and attitudes about computers. Moreover, this study compares learners' use and attitude toward computers and mobile devices (e.g., cell phones).

THE SOFTEST OF SOFTWARE

All of the finest hardware and software, however, amounts to nothing if the user is incapable or unwilling to utilize it. The softest of software — the human element — must be engaged for technology to play a role in learning. Positive user attitudes are essential for the effective implementation of a teaching program using technology (Culpan, 1995). Ancillary to this is the considerable effort that has gone into looking for underlying models that articulate items that can factorize the many variables that are entailed in the complex process of how humans experience computer usage (e.g., Levine & Donitsa-Schmidt, 1998; Thompson, Higgins & Howell, 1994). In the field of second and foreign language acquisition (SLA and FLA, respectively), a similar trend has occurred with an ongoing search for a workable theory. In SLA and FLA, models of language acquisition include such constructs as attitude, aptitude, experience, competence, confidence, self-efficacy, and autonomy (e.g., MacIntyre, 2007; Yashima, 2002). Furthermore, SLA and FLA areas of research which have relevance to the scope of this inquiry include work accomplished regarding age differences (Long, 1990; Oyama, 1976; Patkowski, 1990), transfer (Odlin, 1989; Schachter, 1974; Sharwood-Smith & Kellerman, 1986), and interaction (Hatch, 1978; Long, 1981; Swain, 1985). Gardner's 1989 work concerning multiple intelligences would also be a consideration for the further exploration of issues examined in this chapter.

As is true in SLA, FLA, and the computer field, the plethora of attempts to measure attitudes toward using computers points toward the difficulty inherent in operationalizing underlying constructs. Rosen and Maguire's (1990) meta-analysis of computerphobia studies examined 81 research reports that utilized 66 different measurement instruments. Any analysis of computer or technology anxiety should look carefully at the instruments and method of analysis used in previous studies, and the current study delves into the workings of the instrument utilized.

THE JAPANESE SITUATION

Given the continuing need to look at learners' perceptions of computer usage, let us turn to the situation in Japan, where this study was conducted. Cell phones are ubiquitous in this context — 57% of junior high school students have cell phones, but the figure jumps to 96% for high school students. Thornton and Houser (2007) found that 100% of their university-student participants had cell phones, and in our own classrooms all 600+ students had cell phones. Moreover, cell phones are not just accoutrements: high school students aver-

age one hour and 48 minutes per day doing mail and browsing the Internet on their cell phone(s). The figure is somewhat lower for junior high school students at just one hour and 15 minutes per day ("Students using cell phones," 2007).

According to Technorati, an Internet search engine that monitors the blogosphere, 37% of all blog postings in the fourth quarter of 2006 were in Japanese (compared to 36% in English). As much as 40% of that Japanese blogging may be done on mobile phones (Hardin, 2007).

Tsukuba University, where the majority of this research took place, is one of the more competitive Japanese universities to enter. Students come from throughout the Japanese archipelago, and they thus represent a geographic cross-section of highly-motivated Japanese university students. Furthermore, 100% of the students that participated in this study had cell phones, and all had at least rudimentary knowledge of computers. The sample from two private, less competitive universities nearby represents primarily local students, but they exhibited similar skills with mobile technology and computers.

RATIONALE

The aims of this research included looking at students' proficiency with various technological devices, students' preference for PCs or mobile devices given the choice of format, and a construct we have labeled willingness to use technology (WUT). In the fields of communication studies, McCroskey et al. (1992) and McCroskey and Richmond (1991) have extensively investigated the notion of "willingness to communicate," commonly dubbed WTC. This is the notion that people display WTC differently in various contexts, depending on, for example, the nature of the relationship of the listeners and the type of discourse (e.g., a speech vs. casual conversation). The actual matrix involves three groups and four tasks, which result in 12 permutations (e.g., doing a speech in front of a group of strangers, a group of acquaintances, or a group of friends). This notion has underpinnings in the social construction of meaning (e.g., Gergen, 1999; Schotter, 1993), in which meaning depends on both parties in the interaction. Understood to be the willingness to enter into communication, which is a volitional process (MacIntyre, 2007), it does not necessarily correlate with actually engaging in communication (Elwood, 2007).

Touched on above, the idea of Willingness to Use Technology is simply a person's willingness to make use of technology when given the choice of a technological medium and a non-technological medium (e.g., using a computer for doing e-mail vs. using a paper and pencil for writing a memo or letter). WUT has a similar matrix structure: two media and ten tasks resulting in 20 possible permutations (e.g., taking a test on paper or by using a computer). The evolution of the Test of English as a Foreign Language (Educational Testing Service, 2007) illustrates this trend as it is now available in a paper form, a computer-based form, and an Internet-based form.

As is true for WTC, various factors influence WUT — such aspects likely include cognitive variables such as personality and anxiety (Heinssen, Glass, & Knight, 1987), and skills-oriented variables like technological proficiency. Earlier research has found support for the role that experience, both objective and subjective, plays in using computers (Igbaria & Chakrabarti, 1990; Igbaria & Iivari, 1995; Levine & Donitsa-Schmidt, 1998; Liaw, 2002a, 2002b; Thompson, Higgins, & Howell, 1994).

RESEARCH QUESTIONS

The nuts and bolts of this study emerged from several very simple questions. First, what do learners think about technology? A second question dealt with how comfortable and proficient students were using different kinds of technology. A third

question examined learners' preferences regarding technology. Finally, questions four and five addressed learners' responses in light of recent statistical advances in questionnaire analysis. 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 (e.g., computers) vs. non-technological media (e.g., pencils and paper)?
4. How does the WUT construct behave?
5. How do various factors correlate regarding attitudes toward technology, WUT, proficiency, and gender?

METHOD

Participants

301 learners participated in this study, representing eight majors in two general categories, physical sciences (n = 169, 56.15%) and humanities (n = 132, 43.85%). There were 124 males (49.04%), 125 females (49.80%), and 2 of unknown gender (.80%)[1]; the mean age was 18.95 (SD = .76).

Instrument

A questionnaire was the basis of the study. Based on the research questions, it evolved into a 53-item questionnaire that was administered by distributing a paper handout and having participants respond at their own pace using Interwrite PRS RF clickers. The so-called clickers are hand-held, mobile devices and are about the size of a standard TV remote control; data entered into a clicker are transmitted instantaneously through a USB hub into the computer. Each class (called a "session") is then saved as a CSV file that must be transferred into an Excel file. The transfer from a CSV file to Excel took about 20 minutes for each 32-person group, which is considerably faster than inputting data from 32 paper surveys.

The first 10 questions used a 5-point Likert scale and dealt with participants' abilities with a variety of technology tasks. The first task was touch-typing, a skill which few students seem to have been taught. The next four dealt with communication tasks in cyberspace, 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 downloading audio-visual files and software. Finally, we asked if participants could connect peripheral devices such as speakers and printers.

The second set of questions asked about students' perceived anxiety while doing technology tasks. These included touch-typing, net-surfing, and taking tests. The third set asked how useful technology was in learning certain school subjects: a foreign language, mathematics, science, and the student's native language (in nearly all cases, this was Japanese).

The next three questions dealt with the perceived future use of technology. As these were university students, the queries asked about use for study, use at work, and private use (e.g., surfing the Internet).

The questions that underpin the WUT construct were next. 11 items asked whether respondents would choose traditional means like paper or technology for different tasks. These included the following: writing a memo, taking a test, writing a 5-page report, communicating with your teacher, doing a budget for one's home or club/circle, picking up supplementary material or homework for your class, looking at class material (e.g., looking at paper handouts vs. viewing webpages), doing a presentation (OHP vs. using PowerPoint), dividing a restaurant check or bill, doing regular correspondence (writing a letter vs.

doing e-mail), and communicating with someone (face-to-face vs. Internet or video chatting).

The following section looked at where respondents had acquired knowledge about computer technology. The specific queries dealt with computer knowledge learned at school, cell phone technology learned at school, technology learned from friends, technology learned by oneself, and cell phone technology learned from friends.

Next was preference for cell phones vs. computers for certain tasks. The tasks included taking a test (Item 37), looking up a word in a dictionary (Item 38), viewing a webpage (Item 39), getting information about class cancellations (Item 40), sending a message to your teacher (Item 41), doing a money-related calculation (Item 42), paying a bill (Item 43), exchanging mail with a pen-pal (Item 44), and doing regular e-mail (Item 45).

Items 46-48 elicited further information about how knowledge is shared and the use of ubiquitous educational software. Item 46 inquired about teaching friends or colleagues about computers, while Item 47 asked the same about cell phones. Item 48 looked at the extent that participants had used educational software for learning languages.

Finally, Items 49 and 50 asked about the ease of understanding the survey and using the clickers, respectively. Item 51 was a holistic query about whether students viewed technology as useful in the future, while Items 52 and 53 were demographic (gender and age, respectively).

Pilot Study

As is prudent for a new instrument, the 51-item questionnaire was piloted in June and July, 2007 (N = 142). The resultant data were analyzed to check for reliability of the instrument. All items appeared well-behaved with reasonable mean, standard deviation, skewness, and kurtosis. Rasch analysis (WINSTEPS, 2006) was then used to check category function of the 26 Likert-scale items, and all items exhibited adequate fit statistics and well-ordered categories with sufficient separation.

Moreover, two subscales were subjected to Rasch analysis to check for dimensionality and to produce an interval scale for use in subsequent analyses. The computer proficiency subscale (Items 1-10) was analyzed and found to exhibit an adequate fit of the data to the model and unidimensionality through analysis of residuals. Item reliability was .87, and person separation of 2.57 indicated that respondents could be grouped into high and low-proficiency groups, which were used in subsequent analyses.

The second subscale to be analyzed was the WUT subscale. An exploratory factor analysis with varimax rotation (SPSS, 2004) yielded two satisfactory and logical solutions, one with two components and the second with three. Both suggested multi-dimensionality, which was corroborated by a WINSTEPS (2006) analysis of residuals, yielding two distinct dimensions. As such, the WUT measure is the average of the two subscale logit measures.

Main Study

The main study embraced a sample size of 301 university students, of whom 259 attend Tsukuba University, a large, 4-year national university near Tokyo, while 42 were from two nearby private universities. Tsukuba University is a well-known research university and admits students from throughout Japan as well as a small number of foreign students. Data were collected from September to December of 2007. The 11 classes surveyed were of necessity selected by convenience sampling. Data screening indicated that all 51 items exhibited adequate levels of skewness and kurtosis. They were screened with only one case deleted because of missing data. A detailed look for univariate and multivariate outliers surprisingly produced none. Of the 15853 possible responses[2], 132 values (0.84%) were missing, yet as these appeared randomly distributed, all cases were retained for further analyses.

Table 1. Subscale statistics for main study

Section	Item #s	Scale	Subscale Reliability	Item/Person Reliability	Item Separation
Proficiency	1-10	Likert	.99 (.99)	.99/.86	2.44
Anxiety	11-13	Likert	.99	-	-
Useful subjects	14-17	Likert	.99	-	-
Useful future	18-20, 51	Likert	.56	-	-
WUT	21-31	%	.60 (.62)	.99/.59	1.21
Where learned?	32-36	%	.35	-	-
Taught?	37-39	Likert	.62	-	
Cell vs. PC	40-48	%	.59 (.61)	.99/.62	1.27
Instrument Q	49-50	Likert	-	-	-
Demographic	52-53	Numeric	-	-	-

Note. Item separation is shown only for the three subscales for which we had hoped to look at groups (i.e., high-proficiency vs. low-proficiency). The parenthetical numbers indicate the revised reliability after the deletion of misfitting items. Subscale reliability is from SPSS, and item reliability is from WINSTEPS.

RESULTS

The descriptive statistics for the main study (N = 301) provide a variety of interesting information. Descriptive statistics of items appear in Appendix 2.

Technology Proficiency

The initial section dealt with students' assessment of their own competence with various types of technology. If Prensky's (2001) view that contemporary students are digital natives is correct, then the data should show strong negative skewness with means toward the high end of the scale (recall that a response of 5 indicates excellent proficiency, while the midpoint of the scale is 3). Students rated themselves competent at surfing the Internet by computer (3.60), but surfing by cell phone was rated lower (3.11). Students felt quite competent at e-mail, especially by cell phone (mean = 4.12); e-mail by computer had a mean value of 3.39. The only other point on which students rated themselves competent was doing word processing (e.g., with Microsoft Word), which had a mean of 3.36.

In the remaining five areas students reported lower competence, with mean values beneath the midpoint. Touch-typing, a skill seldom taught in Japan, was at 2.57. Using a spreadsheet program such as Microsoft Excel was similar with a mean of 2.63. Downloading material from the Internet, installing software, and installing peripheral hardware were areas at which students similarly felt only minimally proficient with mean values of 2.27, 2.41, and 2.42, respectively.

Data were converted to interval data using WINSTEPS. Analysis indicated two groups were again appropriate (person separation = 2.44), that nine of the ten items had adequate fit statistics, and item reliability was satisfactory at .86. Item 2, proficiency using a cell phone for e-mail, was slightly misfitting with an infit measure of 1.58 and an outfit measure of 1.52, but it was retained as these values were only slightly outside the recommended value of 1.5 (Linacre, 2002) and it is of crucial importance to the study. Furthermore, as suggested by an exploratory factor analysis

(SPSS, 2004) and verified by a WINSTEPS principal component analysis of residuals, the ten proficiency items formed a unidimensional scale, meaning the logit scores were used for subsequent analyses.

Comfort Level and Anxiety

A rather surprising finding was that students perceived little anxiety regarding technology. When surfing the Internet, for example, students felt little anxiety, as shown in the mean value of 2.15 (Item 12). Furthermore, even with limited proficiency in touch-typing (Item 1, mean = 2.57), students felt little cause for anxiety (Item 11, mean = 2.43). The final item asked about test-taking, about which students reported being only slightly anxious (Item 13, mean = 3.09). This finding should be viewed with caution, however, for test-taking using technology may be confounding test anxiety with technology anxiety, the latter of which appears to be minimal. This is corroborated by Stricker, Wilder, and Rock (2004), who found that test takers, in the United States as well as in other countries, have already adapted to computer-based testing. The overall picture is that students perceive little anxiety regarding the use of technology.

Perceptions of Technology

Whatever the relative merits and demerits of technology, perhaps more prominent is learner perceptions of technology. Eight items on the survey looked at this point, of which the most interesting were perceptions about the use of technology in specific school subjects. Learners were ambivalent about the use of technology for learning foreign languages (Q14: 3.03) and science (Q16: 2.97). Both responses were very close to the midpoint (3 on the 5-point Likert scale).

On the other hand, learners viewed technology as *not* useful for learning mathematics (Q15: 2.45) or their mother tongue (Japanese for most of the respondents; Q17: 2.56). However, in a more general sense, learners viewed technology as useful in the future, especially for private use (Q18: 4.28) and work (Q19: 4.04), and to a lesser extent for study (Q20: 3.75). Interestingly, Item 51 asked about how useful learners perceived their technology education received to date would be in the future in a holistic sense, to which the mean was a tepid 3.02, only slightly above the neutral midpoint. This may reflect a somewhat different parsing of the question, which asked about education received rather than the actual skills.

WUT (Willingness to Use Technology)

This section looks at the proposed construct of Willingness to Use Technology (WUT), which is essentially the preference for using technology vs. a non-technology medium (e.g., paper) when both media are available. The descriptive statistics yielded several interesting results regarding whether respondents preferred technological means or non-technological means for a number of tasks. First, non-technological means (e.g., paper) were preferred for taking memos (Q21: 75.35%), taking tests (Q22: 77.17%), and slightly preferred for checking reference material (Q26: 57.44%).

On the other hand, technology was preferred for writing a 5-page report (Q23: 71.24%), contacting teachers (Q24: 69.56%), getting information (Q27: 56.80%), doing presentations (Q28: 77.15%), dividing a restaurant check (Q29: 71.07%), and exchanging email (Q30: 73.79%).

Furthermore, respondents showed only a very slight preference regarding doing a budget for their family or a club, with 52.70% opting for technology over paper (Q25). Even closer to the midpoint was personal communication, with 49.20% (Q31) choosing face-to-face chatting instead of Internet chatting. Interestingly, however, one of the few statistically significant gender differences appeared here: females preferred face-to-face

Table 2. WUT Subscale statistics for main study

Subscale and items	Mean (*SD*)	Infit	Outfit
Non-technological subscale (α = .37)			
21. Taking a test	75.35 (21.59)	.96	1.15
22. Writing a memo	77.17 (24.01)	1.34	1.79
25. Doing a budget	47.30 (28.35)	.85	.92
26. Checking ref material	57.44 (25.89)	.77	.77
31. Personal communication	49.20 (31.72)	1.27	1.33
Technological subscale (α = .68)			
23. Writing report	28.76 (30.83)	1.22	1.19
24. Contacting teacher	30.44 (30.57)	1.05	1.02
27. Getting information	43.20 (21.70)	.53	.55
28. Doing presentation	22.85 (27.88)	1.14	1.05
29. Dividing check	28.93 (31.76)	1.35	1.35
30. Exchanging e-mail	26.21 (25.56)	.95	.97

Note. Subscale reliability (Cronbach's alpha) is shown in parentheses; the overall WUT reliability was .60. Mean and SD are in the original percentages (not logits) to facilitate understanding.

communication (56.20%), while males preferred Internet chatting (39.74% for face-to-face talk).

As was done with the pilot study data, these data were first examined using an exploratory factor analysis (SPSS, 2004) and then using WINSTEPS (2006). Analysis indicated just one group was appropriate (person separation = 1.11), 10 of the 11 items had adequate fit statistics, and item reliability was satisfactory at .99. Item 22, technology preference while taking a test, had an infit measure of 1.34 but an outfit measure of 1.79, indicating that it was a candidate for deletion. However, in the pilot study Item 22 functioned satisfactorily with infit and outfit values of 1.09 and 1.40, respectively. Moreover, WINSTEPS reported 15 unexpected responses for this item; when these were deleted, the item exhibited nearly ideal fit values of 1.03 and 1.04, respectively, which shows the item in fact functioned adequately. It was thus retained, so the WUT scale was composed of its original 11 items.

In an exploratory factor analysis (SPSS, 2004) that was subsequently corroborated by WINSTEPS analysis of residuals, the 11 items formed two distinct dimensions. One was oriented toward non-technological media for tasks and included Items 21-22, 25-26, and 31. The second was Items 23-24 and 27-30, which are oriented toward technology and its inherent convenience. The two subscales appear to form ends of a WUT continuum, and as such logit scores were averaged to arrive at an interval-scaled measure for the WUT subscale.

Sources of Knowledge on Technology

Eight items were used to question learners about where they were obtaining knowledge about technology. Of note is that formal education (i.e., schools) provides about half of what students know about computers (Item 32: 46.30%), whereas cell phone knowledge is a minor part (if it exists at all) in the school curriculum (Item 33: 14.59%). Peer learning was also a minor factor, with learners indicating they seldom showed friends about either

computers (Item 37: 2.19 on the 5-point Likert scale) or cell phones (Item 38: 1.91). This was rather surprising as it was expected that students share tips and knowledge about mobile technology, but these data indicated otherwise, and suggest that informal and autonomous learning should be further considered when examining how students are acquiring their technical knowledge.

A final query, Item 39, asked about the use of educational software, which is widely available and touted, at times with qualification (Devitt & Palmer, 1999), as an effective pedagogical tool. In Greenhalgh's (2001) characterization, "Access to the wide range of online options . . . must surely make learning more exciting, effective, and likely to be retained," yet she continues with the caveat that, "This assumption is potentially but by no means inevitably correct" (p. 40). However, students indicated they had used such software little (Item 39: 1.88). Given the availability of educational software, a prudent question would be why it is not used more extensively — which points toward investigating the actual availability of such software and whether teachers do make use of it when it is available.

Preference for Computers or Mobile Technology

This section[3] inquired about learners' preference for either computers or cell phones when doing various tasks. The strongest preference (Item 42: 80.81% for computers and the remainder of 19.19% in favor of cell phones) was for viewing homepages via computers, a quite predictable finding given the relative sizes of the respective devices. Learners also favored computers for taking tests (Item 40: 65.65%), consulting an on-line dictionary (Item 41: 58.25%), communicating with a teacher (Item 44: 56.27%), and retrieving information about classes (Item 43: class cancellations; 54.88%).

However, cell phones were the medium of choice for four tasks: calculating each person's share of a restaurant check (Item 72.95%), paying bills (Item 46: 67.30%), doing e-mail with a pen pal (Item 47: 73.61%), and doing regular e-mail (Item 48: 69.35%). The first two tasks underline the convenience of current cell phones, which function much as calculators and credit cards, whereas the latter two highlight the ubiquity of mail by cell phone.

For this subscale, data were converted to interval data using WINSTEPS. Analysis indicated just one group was appropriate (person separation = 1.27), eight of the nine items had adequate fit statistics, and item reliability was satisfactory at .99. Item 40, technology preference while taking a test, was misfitting with an infit measure of 1.51 and an outfit measure of 1.75, so it was deleted from further analysis. In an exploratory factor analysis (SPSS, 2004) that was subsequently corroborated by WINSTEPS analysis of residuals, the remaining eight items formed two distinct dimensions: Items 41-44 and Items 45-48. In the first component (Items 41-44), respondents showed a preference for using computers or were ambivalent. However, Items 45-48 comprised the second component, in which respondents showed a consistent and strong preference for mobile technology. The two subscales appear to form poles of a technology-medium preference continuum, and as such logit scores were averaged to arrive at an interval-scaled measure for the technology-medium preference subscale.

DIFFERENCES BY GROUP AND TIME

Differences by University Major

A series of t-tests was conducted to check for any differences related to major and specifically to science majors vs. humanities majors. With a total of 51 variables, a false discovery rate correction (FDR; Benjamini & Hochberg, 1995) was conducted to minimize the possibility of Type I

errors. Of the 51 t-tests, two were statistically significant; both dealt with perceived usefulness of technology. Perhaps not surprisingly, science majors felt technology was useful for learning science (3.15 vs. 2.74 for humanities majors). The second significant result, for Item 51, was similar: science majors, when asked about the holistic usefulness of technology in the future, felt technology would be somewhat useful (3.18), while humanities majors believed it would be less so (2.82).

Gender Differences

To check for any gender-related differences, a second series of t-tests was conducted. Of the 51 t-tests, six were statistically significant after an FDR correction. Three (Items 8-10) dealt with technological proficiency: males, although not so proficient, were more so than females at downloading movies and audio files, and installing software and hardware. The next significant difference was in doing a budget for a family or a club; females opted for paper (53.56%), while males preferred technology (60.31%). The strongest result was on Item 31, in which females preferred face-to-face communication (56.20%) to technological communication modes such as Internet chat, while males opted for technological means of communication (39.74% for face-to-face, thus 60.26% in favor of technological means). The final difference was on Item 35, which asked the extent to which respondents learned cell phone technology by themselves. Males indicated that 46.02% was learned alone, while females learned less by themselves (36.80%).

Longitudinal Differences

Differences over time were investigated on the basis of the temporal separation of the pilot study and the main study. The pilot study was conducted in June, early in the Japanese school year, which begins in April. The main study data were collected from September through November, which is much later in the school year. As such, results from the pilot study and the main study were compared to look for changes over that 3-5 month interval.

A total of nine statistically significant differences emerged using the FDR technique. An interesting one was Item 19, in which autumn respondents indicated a lower although still strong rate of agreement that technology would play an important role in future jobs (4.33 → 4.04, $p < .01$).

Of the 11 WUT items, only Item 25 changed: learners indicated that the preference for doing a budget changed significantly from a strong endorsement early in the school year of using technology (64.06% in the pilot study) to only a slight preference in the main study in the fall (52.70%). Counterintuitive as this seems, it may be that students, many of whom were first-year students and on their own for the first time, had gained some familiarity and appreciation of budgets in general.

Items 32-36, which dealt with where technological knowledge was learned, all showed significant changes. Knowledge acquired at school about both computers and mobile technology increased, as did that knowledge acquired from friends. On the other hand, the amount of cell phone knowledge learned alone decreased. These data point to the increasingly prominent roles played by technology in university environments as well as the increasing role of peers in obtaining technology knowledge. However, peer learning still accounted for a relatively small portion of overall knowledge.

In the main study, learners showed an increased preference for using cell phones to communicate with teachers (Item 44). This may reflect the increased distance from teachers (fewer class meetings than in high school), whereas in high school, learners could meet teachers every day and may have relied on parents for communication with teachers.

Finally, respondents indicated a lower mean on Item 50, which asked about the ease of using clickers for the survey. The presentation of the clicker technology had improved substantially, but the respondents indicated otherwise.

Proficiency-Gender Interaction

As previously mentioned, WINSTEPS was used to separate respondents into two proficiency groups based on a median-split procedure using logit measures (high proficiency mean = 50.78, low proficiency mean = 48.88). A two-by-two factor ANOVA used proficiency and gender as the independent variables and WUT as the dependent variable. Both main effects were non-significant with $F_{gender}(1, 245) = 2.593, p = .101$ and $F_{proficiency}(1, 245) = .403, p = .526$. The proficiency-gender action was also nonsignificant with $F(1, 245) = .302$, $p = .583$. Although these are all non-significant, the gender result ($p = .101$) suggests that further investigation in other contexts might yield results of significance and interest.

DISCUSSION

Of the research questions, the first dealt with Prensky's (2001) conceptualization of inhabitants of the digital world as native or immigrant. Results of this study suggest that students in general exhibit minimal proficiency with technological devices, with Internet surfing, e-mail, and word processing being the only areas of perceived competence. In such areas as installing either software or hardware, touch-typing, or using spreadsheets, respondents perceived themselves as not so competent. This correlates with recent research showing that contemporary students are not actually becoming digital natives, users in possession of fluent skills in the language of the cybersphere.

The current version of cyberspace, Web 2.0, seems to portend the creation, informally, of interactive cyberspace communities in which users interact with various software and other users. While generally viewed as a boon to education, it may be mediated by proficiency as well as affective variables such as motivation and anxiety, much as is the case in SLA and FLA. However, in the present study users indicated little anxiety concerning technology. This may indicate that users are "native" to the extent that they are accustomed to the presence of technology although they may or may not be proficient with it.

Indicative of that preference for technology vs. non-technological media was the WUT construct. As WINSTEPS revealed, the 11-item instrument performed well, and it yielded a bifurcate construct that can be conceptualized

Table 1. Gender by Proficiency ANOVA Results for WUT

Source	*SS*	*df*	*MS*	*F*	*p*	Power
Main effects						
Gender	.126	1	.126	2.593	.109	.361
Proficiency	.020	1	.020	.403	.526	.097
Interaction						
Gen x Prof	.015	1	.015	.302	.583	.085
Residual	11.881	245				
Total	619864.885	249				

Note. Computed using alpha = .05. R squared = .013 (adjusted R squared = .001).

along a continuum anchored by preference for technology and preference for non-technology. On the technology half of the continuum were such activities as writing a 5-page report, doing presentations, and communicating with peers or teachers. On the other side were checking reference material and taking memos and tests. Near the midpoint were doing a budget and real-time communication (face-to-face and Internet chat). These divisions reflect the convenience of technology (using Word and PowerPoint, for example) and the hold that traditional media still exercise (e.g., taking "paper tests"). These findings also likely reflect the onset and subsequent familiarity with new tools: much as the authors used hand calculators instead of slide rules in their secondary education, contemporary students use PowerPoint instead of overhead projectors.

An ancillary finding was that there was little correlation between computer proficiency and willingness to use technology, which echoes Garland and Noyes' (2004) finding that computer experience is a poor predictor of computer attitudes.

As noted above, cell phones are a nearly ubiquitous personal item in Japan. The sheer number of functions of these mobile devices is, in accordance with Moore's Law, increasing dramatically. Against this reality, respondents offered their choice of mobile phones vs. computers for several tasks: for viewing webpages, for example, computers with their much larger screens were the clear winner. The same thinking was likely true in the stated preference for using computers for taking tests, consulting online dictionaries, and corresponding about classes. On the other hand, the untethered and universal status of cell phones likely contributed to their being favored for handling money and doing e-mail.

IMPLICATIONS

One unexpected finding was that peer learning seemed to play only a minor albeit increasing role in acquiring knowledge about technology. As such, relying on peer learning may be somewhat risky.

Our respondents viewed technology as useful in their future, but it was perceived as only moderately useful in specific subject areas. The science majors naturally saw technology as being of use both currently in their major and in the future (Item 51). For non-science majors, however, technology received lower marks, which points to the need for care in contriving tasks.

Limitations

Tsukuba University, where the majority of this research took place, is one of the more competitive Japanese universities to enter. As such it might be argued that this study is based on a sample not representative of the wider student population in Japan. Nevertheless, results from the sample at other universities, although limited in size, were consistent with the results from Tsukuba University. The instrument performed well psychometrically, yet these should be replicated in other contexts.

CONCLUSION

Results from this study affirmed previous research in this area, while adding several noteworthy findings that support an emerging body of studies (Bennett, Maton & Kervin, in press; Kennedy, Krause, Judd, Churchward & Gray, 2006; Kvavik, 2005; Kvavik, Caruso & Morgan, 2004). Use of the term "Digital Native" should not be used as a blanket term for an entire generation. The Digital Native-Digital Immigrant paradigm is a prescient insight, and it is most useful for interpreting many aspects of the emerging Web 2.0 world. However, the population in this study is—if digital natives—generally in firm control of only a limited number of skills in the digital language. Nevertheless, respondents did not

indicate much anxiety about technology, suggesting that it has become firmly situated in their everyday reality.

Findings from this study also indicate that research from SLA and FLA education and research environments can play a leading role in situating research and providing the discourse framework for further discussion regarding those who are comfortable and proficient using technology (read Digital Natives), and the rest of the population (read Digital Immigrants). Areas that bear special consideration include previous SLA work in the fields of age differences (Long, 1990; Oyama, 1976; Patkowski, 1990), transfer (Odlin, 1989; Schachter, 1974; Sharwood-Smith & Kellerman, 1986), and interaction (Hatch, 1978; Long, 1981; Swain, 1985); as well as work concerning multiple intelligences (Gardner, 1989).

Web 2.0 offers considerable promise to support and perhaps enable the much-anticipated revolution in education, but it is subject to mediating variables. While anxiety appears to be playing a minor role with contemporary students, technological proficiency or the lack thereof may reduce the efficacy of technology in the classroom or outside it in the increasingly untethered cyberworld. Tradition continues to play a role as some learners exhibit preferences for non-technological media (witness the number of morning newspapers on public transportation). The promise of Web 2.0 is particularly evident in the domain of educational game software, which tantalizes yet remains underutilized, at least in the environment that this study considers. Mobile technology also remains a virtually untapped area of great potential for innovative use, and it merits further implementation in education based on the findings detailed above (see also Thornton & Houser, 2002, 2003, 2005; Thornton, Houser, Nakata, Kluge & Nishio, 2003). Finally, informal learning and autonomous learning and their implications for education should be further considered. Given the above findings and research to date, the concept of a Digital Native, and its implications for education in general, with specific reference to EFL learners in Japan, is therefore a work in progress that requires further investigation and documentation.

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KEY TERMS

Computer Anxiety: Feelings of frustration or unease related to the use of computers

Digital Technology: Entails the use of devices that enable access to cyberspace, the use of digital audio/video and information communications technology (ICT).

Digital Native: Is a person who is growing up, or has grown up with digital technology.

Digital Immigrant: Is an individual who grew up without digital technology and adopted it later.

Mobile Learning (m-learning): The use of devices that are small enough to fit comfortably in a pocket or purse for educational purposes

Technology Preference: Indicates a user's preferred device or medium, given a range of choices

Technological Experience: Indicates the extent of a user's self-reported experience using technology

WUT: Refers to Willingness to Use Technology. A person's willingness to make use of technology when given the choice of a technological medium or a non-technological medium

ENDNOTES

1 Due to a clerical oversight, demographic questions were omitted from 50 surveys, resulting in the demographic data representing a sample of n = 251.

2 The same clerical oversight resulted in the total number of possible responses being slightly lower than planned.

3 In three cases a substantial amount of data was missing, which reflects a slightly smaller sample size (n = 298).

APPENDIX 1

This survey is for research purposes, and all information you provide will be held in strict confidence. Thank your for your kind assistance!

A. How well can you do the following activities?
(1 = Not at all, 2 = A little, 3 = Enough so I have no problems, 4 = Well, 5 = Extremely well.)

1) Touch-typing	1 – 2 – 3 – 4 – 5
2) Net-surfing using a cell phone	1 – 2 – 3 – 4 – 5
3) Net-surfing using a computer	1 – 2 – 3 – 4 – 5
4) E-mail using a cell phone	1 – 2 – 3 – 4 – 5
5) E-mail using a computer (PC)	1 – 2 – 3 – 4 – 5
6) Writing a report on a computer (e.g., Microsoft Word)	1 – 2 – 3 – 4 – 5
7) Using a spreadsheet on a computer (e.g., Microsoft Excel)	1 – 2 – 3 – 4 – 5
8) Downloading movies and music	1 – 2 – 3 – 4 – 5
9) Downloading new software	1 – 2 – 3 – 4 – 5
10) Connecting peripheral devices (speakers, printer, etc.)	1 – 2 – 3 – 4 – 5

B. When doing the following activities, how much anxiety do you experience?
(1 = None at all, 2 = A little, 3 = Some anxiety, 4 = Much anxiety, 5 = Very, very much anxiety)

11) When touch-typing (blind-typing)	1 – 2 – 3 – 4 – 5
12) When net-surfing	1 – 2 – 3 – 4 – 5
13) When taking tests	1 – 2 – 3 – 4 – 5

C. How useful is technology like cell phones and computers for learning the following subjects?
(1 = Not at all, 2 = A little, 3 = Somewhat useful, 4 = Quite useful, 5 = Extremely useful)

14) Learning a foreign language	1 – 2 – 3 – 4 – 5
15) Learning math	1 – 2 – 3 – 4 – 5
16) Learning science	1 – 2 – 3 – 4 – 5
17) Learning your native language	1 – 2 – 3 – 4 – 5

D. In the future, how much do you think you will use technology for the following?
(1 = Not at all, 2 = A little, 3 = Some, 4 = Quite a bit, 5 = Constantly)

18) For private use (e.g.,, net-surfing)	1 – 2 – 3 – 4 – 5
19) For work	1 – 2 – 3 – 4 – 5
20) For study	1 – 2 – 3 – 4 – 5

E. Given the choice of paper or technology for the following tasks, which would you choose? (An answer of "20%" shows that you would choose paper 20% of the time.)

21) Writing a memo	Paper __%
22) Taking a test	Paper __%
23) Writing a 5-page report	Paper __%
24) Communicating with your teacher	Paper __%
25) Doing a budget for your home or club/circle	Paper __%
26) Picking up supplementary material for your class	Paper __%
27) Looking at class material	Paper __%
28) Doing a presentation (OHP vs. using PowerPoint)	Paper __%
29) Dividing a restaurant check / bill	Paper __%
30) Doing regular correspondence (writing a letter vs. doing e-mail)	Paper __%
31) Communicating with someone (face-to-face vs. Internet/video chatting)	Paper __%

F. Please indicate a percentage for the following questions.

32) How much have you learned about computer technology at school? (other than cell phones) ____ %

33) How much have you learned about cell phone technology at school? ____ %

34) How much have you learned about technology from friends? ____ %

35) How much have you learned about technology by yourself? ____ %

36) How much have you learned cell phone technology from friends? ____ %

G. Please indicate the extent to which you do or have done the following activities.
(1 = Not at all, 2 = A little, 3 = Some, 4 = Quite a bit, and 5 = Very much / always)

37) How much do you teach friends (or colleagues) about computers? 1 – 2 – 3 – 4 – 5

38) How much do you teach friends (or colleagues) about cell phones? 1 – 2 – 3 – 4 – 5

39) How much have you learned or used educational software for learning languages? 1 – 2 – 3 – 4 – 5

H. Given the choice of a computer (PC) or a cell phone for the following activities, how much would you choose to use a computer? (An answer of 20% indicates you would choose a computer 20% of the time.)

40) Taking a test ____ % PC

41) Looking up a word in a dictionary ____ % PC

42) Viewing a webpage ____ % PC

43) Getting information about class cancellations ____ % PC

44) Sending a message to your teacher ____ % PC

45) Doing a money-related calculation ____ % PC

46) Paying a bill ____ % PC

47) Exchanging mail with a pen-pal ____ % PC

48) Doing regular e-mail ____ % PC

H. Was this survey easy to understand?
(1 = Not at all, 2 = A little, 3 = Just OK, 4 = Understandable, 5 = Very understandable)

49) 1 – 2 – 3 – 4 – 5

I. Were the clickers used in this survey easy to use?
(1 = Not at all, 2 = A little, 3 = Just OK, 4 = Easy to use, 5 = Extremely easy to use)

50) 1 – 2 – 3 – 4 – 5

J. Of the education you have had about technology, do you think it could play a role in future activities?
(1 = Absolutely not, 2 = I doubt it, 3 = A little, 4 = Yes, 5 = Absolutely!)

51) 1 – 2 – 3 – 4 – 5

K. Demographic information

52) ____ Gender (female = 1, male = 2)

53) ____ Age

APPENDIX 2

Descriptive statistics for questionnaire items

Item	Mean	*SD*	Skew	Kurtosis	Item Description
					Proficiency at…
1	2.56	1.18	0.33	-0.63	Touch-typing
2	3.10	1.14	-0.03	-0.50	Internet surfing by cell phone
3	3.58	1.02	-0.21	-0.46	Internet surfing by computer
4	4.13	0.86	-0.46	-0.95	E-mail by cell phone
5	3.39	1.02	0.06	-0.59	E-mail by computer
6	3.36	0.88	0.15	-0.07	Writing report on a computer
7	2.63	0.87	0.29	0.09	Using computer spreadsheet
8	2.26	1.13	0.78	-0.11	Downloading movies and music
9	2.40	1.21	0.59	-0.51	Downloading new software
10	2.41	1.17	0.56	-0.48	Connecting peripheral devices
					Anxiety
11	2.45	1.29	0.58	-0.68	Typing
12	2.15	1.05	0.96	0.72	Internet surfing
13	3.08	1.25	0.04	-1.05	Test-taking while using tech
					Useful for…
14	3.02	1.03	0.17	-0.43	Learning a foreign language
15	2.48	1.15	0.52	-0.50	Learning math
16	3.00	1.11	0.02	-0.62	Learning science
17	2.54	1.05	0.39	-0.27	Learning native language
					In future will use for…
18	4.25	0.96	-1.34	1.51	Private use
19	4.04	1.11	-1.17	0.75	Work
20	3.79	1.00	-0.47	-0.53	Study
					(WUT) Prefer paper (%) for…
21	75.94	21.57	-1.00	0.44	Writing a memo
22	76.89	24.45	-1.44	1.60	Taking a test
23	29.98	31.10	0.95	-0.29	Writing a 5-page report
24	31.57	30.74	0.90	-0.42	Communicating with your teacher
25	47.23	28.40	0.06	-0.89	Doing a budget
26	56.87	26.50	-0.47	-0.37	Picking up extra material
27	42.82	22.10	0.05	-0.25	Looking at class material
28	23.68	27.92	1.42	1.08	Doing presentation (OHP vs. PowerPoint)
29	29.36	32.00	0.98	-0.29	Dividing a restaurant check / bill
30	26.51	26.02	1.11	0.53	Doing regular correspondence
31	49.44	31.32	-0.09	-1.21	Face-to-face communication

continued on the following page

Appendix 2. (continued)

					Extent that you…
32	46.64	25.06	0.16	-0.66	learned computer tech at school?
33	14.52	19.27	1.77	3.04	learned cell phone tech at school?
34	32.76	21.57	0.55	-0.26	learned tech from friends?
35	42.43	25.80	0.14	-0.96	learned about technology by yourself?
36	31.90	23.58	0.60	-0.44	learned cell phone technology from friends?
					Extent that you…
37	2.19	1.08	0.58	-0.50	teach friends about computers
38	1.91	0.97	0.99	0.70	teach friends about cell phones
39	1.90	0.99	1.00	0.54	learned or used ed. software for learning languages
					Prefer PC to cell phone for…
40	65.88	33.86	-0.67	-0.95	Taking a test
41	58.55	29.18	-0.23	-0.98	Using a dictionary
42	80.61	22.23	-1.57	2.40	Viewing a webpage
43	54.03	30.90	-0.05	-1.09	Getting info about class cancellations
44	56.34	28.48	-0.20	-0.83	Sending a message to your teacher
45	26.98	26.57	0.99	0.20	Doing a money-related calculation
46	32.90	30.24	0.64	-0.61	Paying a bill
47	27.02	27.76	1.25	0.69	Exchanging mail with a pen-pal
48	30.84	29.03	0.92	-0.29	Doing regular e-mail
49	2.53	1.06	0.48	-0.11	Survey easy to understand
50	3.02	1.33	-0.09	-1.12	Clickers easy to use
51	3.06	0.97	0.16	-0.25	Tech play role in future