

[学術論文]

Digital Divides among “Digital Natives”

Venecia Williams

Lecturer
Nagoya City University

Studies in Humanities and Cultures

No. 14

名古屋市立大学大学院人間文化研究科『人間文化研究』抜刷 14号
2011年2月

GRADUATE SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

NAGOYA CITY UNIVERSITY
NAGOYA JAPAN
FEBRUARY 2011

[学術論文]

Digital Divides among “*Digital Natives*”

Venecia Williams

Lecturer

Nagoya City University

Abstract

There is no doubt that we have entered a new technological age where at least one, and in most cases a combination of digital gadgets, media and spaces have become an indispensable part of our lives. This new technological era has also given birth to a generation of youth labelled ‘Digital Natives’, the Net Generation, Generation Y, and Millennial Generation among others. According to definitions of this new generation, having been raised with technology this generation is very familiar with computers, digital media and adjusts well to new digital technologies. The idea has been put forward that in order to teach this new Net Generation teachers have to become familiar with the students’ digital worlds and essentially change their approach to teaching to incorporate some of the technologies used by their students. To determine the validity of this claim a study using Computer Assisted Language Learning (CALL) was carried out. Initially this research set out to determine whether or not incorporating new technologies enhanced learning a foreign language. However, throughout the course of the research a more important issue came to light. It is assumed that ‘Digital Natives’ are adept at using computers and interacting with digital technologies but throughout this research it has been found that there is a distinction between these assumptions and the reality. The majority of the problems encountered during this research had more to do with computer use and knowledge and less to do with the computer as a tool for language learning itself. Consequently the focus of the research shifted towards re-examining the meaning of ‘Digital Natives’ in light of the evidence which presented itself during this research.

Definitions

It is essential to define two concepts/terms that are integral to this research and will be used constantly throughout this paper: those being CALL and Digital Natives. Computer Assisted Language Learning (CALL) is a form of learning that involves using computers and other digital media in language classes.

This area of language learning is by no means new and boasts its own journal JCAL¹ in publication from the 1960s and a substantial number of international conferences. CALL in its 40-year history has gone through several phases as computers and technology have improved significantly. Warschauer (1998) describes the three phases of CALL as “*behavioristic CALL*, *communicative CALL*, and *integrative CALL*.” These three distinct phases mark the evolution of computers in language learning. As CALL is not a particular method of teaching, rather materials used for learning, there are any number of ways to unitize CALL from cloze exercises to more advanced software created to simulate real life immersion activities such as Second Life². This flexibility of CALL is perhaps one of the reasons it has become quite popular among some instructors and the reason many instructors feel the need to do more research into CALL in order to better understand the potential of using this tool in multiple disciplines (Bennet et al: 2008).

In order to conduct an effective CALL class, it is essential that the students come with prior knowledge of basic computer skills. According to Prensky (2001), the author of the telling but somewhat controversial article “Digital Natives, Digital Immigrants” today’s students are Digital Natives having grown up around technology and are being forced to learn in an environment that has yet to catch up with them technologically. They are Digital Natives due to the fact that they ‘*speak the digital language*’ (2001:1-2) while their teachers are Digital Immigrants as they are just learning how to speak that language. Prensky calls for a reform of the education system to better cater to the needs of the Digital Natives who he argues ‘*think and process information fundamentally differently*’ (2001:1-2) from students before them. As suggested earlier Prensky’s argument has been met with some controversy. There are those who agree wholeheartedly with his assumptions while others suggest that more research needs to be undertaken before the education system is completely reformed to suit these ‘natives’. What most accept however, is that there distinctions between the current generation of students and previous students and a part of that distinction has to do with growing up in a digital world.

CALL: To use or not to use

Ultimately a teacher decides whether or not to use CALL based on the accessibility of the technology, comfort using the technology and the benefits the teacher believes the students can derive from interacting with said technology. In this case the decision to use CALL was inspired primarily by one particular

¹ JCAL- Journal of Computer Assisted Learning

² www.secondlife.com

incident involving my students’ unfamiliarity with an outdated piece of technology. As a key component of my Communication English course students have to do recordings and transcriptions. This involves recording a conversation with a partner and transcribing all or a part of that conversation for homework. The week leading up to the recording students were normally asked to buy a cassette tape. In almost all the seven classes of between eighteen to twenty four students, about a third would ask what a cassette tape was. On the actual day of the recording each student was given a tape recorder however they had to be taught how to use the tape recorder even though the functions of the recorder were clearly labelled in the native language of the students. Once the recording had been completed the students had to transcribe all or a part of the recording which required having access to a cassette tape player. In many cases, though not the majority, students were lent cassette players in order to complete their homework as some students commented that they did not have access to a cassette tape player. This sent the message clearly that this technology is outdated as in the first instance, many students were not even familiar with it, in addition, most including those who were familiar with the ‘technology’ did not know how to use it, and there was a small percentage who did not even have access to it. This experience led me to question not only the technology that I was using to achieve the particular goal of my class, but the method I was using as well.

Research informed my decision to experiment with CALL. The main subjects I teach, Communication English and Writing are foundation courses and are therefore compulsory for all first-year students. The students are from different departments with different language skills and different attitudes towards learning English. In essence students have different levels of motivation. The belief was that using a medium which they were already familiar with would motivate each student to some degree to become active participants rather than passive bystanders (Warchauser 1996). In addition using CALL would move the focus from a teacher-centred class to a student-centred one. Due to the nature of CALL it is easier to give students more control over the way they learn. For instance when students do listening activities, instead of playing the listening out loud in class, each student can use their own headphone and do the listening activity at their own pace (within an allotted time). In our post modern society the idea of a teacher has gone from being a learned scholar with empty vessels to fill, towards being a guide still providing information but with students participating more actively in their learning process. In this manner many teachers have taken a more ‘constructivist’ (Bain et al: 2006) approach towards teaching. CALL also provides a level of flexibility that is at times missing from using textbooks. When teachers ask students to buy a textbook for a language class, teachers are often compelled to use that textbook frequently. CALL offers the flexibility to create appropriate content for students that are sometimes difficult to find in one particular textbook and it gives the teacher the opportunity to add spontaneity

without worrying about the next unit in the textbook.

Armed with this information a CALL class was developed for first-year Writing and Communication English courses. The aim of the study was to determine whether there was any significant difference in student attitude and motivation using CALL. However as mentioned earlier this was difficult to ascertain as the more pressing issue of whether or not the students were Digital Natives was highlighted and this research shifted focus from addressing learners' attitudes and motivation to learners' interaction with the technology.

Case Study: Design and Procedure

This research was conducted among 173 first year students at Nagoya City University involved in two foundation English courses: Communication English and Writing. The students for Communication English came from the following departments: Economics, Medicine, Pharmacy and Humanities. The students for Writing were from the Economics and Design & Architecture Departments. The students were required to complete 15 weeks of English instruction and each class met once a week except for some Humanities classes which had two courses of Communication English per week, one with myself and another with a different instructor. The students in this group had varying overall language proficiency levels, from low intermediate to mid-advanced. In terms of students' attitudes and motivation, as mentioned previously, there were different levels of motivation due to the fact that these courses were foundation courses, and many attitudes varied based on prior experience with learning the language.

The Communication English class following the general trend in L2 acquisition focussed on communicability over accuracy. Most weeks the class had a general discussion topic, for instance Food or Culture, and from the general topic students could chose one of the sub topics provided by the teacher (*for example Healthy Eating*) the previous week or were encouraged to create their own topic and prepare notes for the following week. Most weeks the class practised a conversation strategy, followed by a listening activity and concluded with discussion of the prepared topic. In this manner the students could play a more active role in the class as they spent the majority of the class speaking in English with their classmates. The Writing class took a different approach due to the aim of the class which was to promote better writing in English. This skill has become increasing important as many students learning a foreign language have a greater chance of interacting with that language post university through writing. In light of the changing

nature of communication, a more practical approach was taken towards teaching writing. Students were introduced to essay writing, letter writing and creative writing. Though these classes required much more instruction than Communication English classes, an effort was nonetheless made to ensure that students got the chance to actively participate in their learning through activities involving pair work, peer interviews, writing frequent blog entries and doing presentations/performances.

The CALL course designed for these courses was a Computer-mediated communication (CMC) course which focused on using the computer as a tool rather than a tutor (Warschauer 2006:2). In this manner students had more interaction with each other and the computer served as facilitator. The hardware required for such a class was basic; it required a computer lab with enough computers for each student to have individual access, headphones for listening activities and computers with USB ports. All the computer labs at the university were already equipped with this hardware consequently the basic requirement in terms of hardware had already been met. In addition, to replace the cassette tape recorders previously used, the university provided 14 USB voice recorders, a technology which was assumed to be more familiar among the students. As it relates to software, a word processing software was integral to the implementation of this course and all the computers in the lab had Microsoft Office 2003 installed which included Microsoft Word. The final piece of software required was a website where students could access class files, upload their work and communicate with each other. Colostate Writing Studio³, an application run by Colorado State University in the United States was chosen as it allowed instructors to create and manage private classes with files and materials only accessible to students enrolled in those classes. Students also had the option of using other materials available on the website to improve their writing skills as the general aim of this website is to provide students with access to information and instructors to improve written English.

Though all classes used the same tools there were some distinctions. The students enrolled in the Communication English courses interacted less with the website than the students in the Writing courses. Communication English courses mainly used the website for retrieving files (for homework, class work and audio files) while in the Writing courses students were expected to use the draft tool on the website to write and save class work, and the blog tool to write and respond to other students’ work. The Communication English students used Microsoft Word much more than the Writing students as they had to download class work files made in Microsoft Word and interact with the text on the page to complete

³ <http://writing.colostate.edu/>

various exercises. Another significant difference was that although each student was required to have a USB memory device, the Communication English course students made more use of this device than students in the Writing course. In the Writing Course, due mainly to the nature of the course, students saved their work directly on the website while students in the Communication English class were expected to save their files on the USB memory device.

There was no misconception that this CMC course would run smoothly as there would always be problems that come to light during the actual implementation of any new course. However, there were a few problems which were recognized beforehand and measures were put in place to address said problems. One of the reasons CALL is not more widely used among instructors lies in hardware problems. In these particular courses the principal hardware problem in the particular labs used had to do with the age of the computers themselves which made the logging on process slow. As this was not a problem that could be solved without the university investing in new computers efforts were made on the part of the instructor to get to class at least twenty minutes early to turn on all the computers and make sure they were ready once the students arrived. In addition students were asked to make sure they were not late for class as they were required to log on to the computers, sign in to our class page on the internet and download the relevant documents before class could proceed. Another expected problem was that students would have problems remembering how to access the class page and navigating the Colostate site, therefore the first week of class students were given a handout with information describing how to access the class page and detailed information of where different files were located on the webpage. There were not many expected problems with using Microsoft Word as though the files that the students used were written in English the programme itself was in Japanese, therefore it should have been familiar to the students. There were other problems expected with using computers and the internet but most were linguistic problems which had to be dealt with once they surfaced.

The unexpected problems which arose from using CALL provided the grounds for this research into the concept of Digital Natives. These problems included hardware problems for instance students commenting that there was a problem with their computer when upon investigation, the computer had not been turned on. Other problems included students' complaint about not being able to hear the listening activities when in fact they had not increased the volume on the headphones or in the media programme. Another area where there were significant problems was with using Microsoft Word where some students were not able to use copy/paste functions, or students did not understand how to change the colour, size or font of text. The most abundant problem however was with using a USB memory: finding the device once it has been

plugged in and saving information on said device. As the original purpose of the research was to determine students’ interaction with using CALL the survey given to students at the beginning of the class focussed on past language experience, motivation and course expectations. In light of the problems which arose from using CALL a new survey was designed and administered to all students about their computer experience.

The data for this survey was collected electronically through a Google form and it was administered to each student on the last day of class. The questionnaire was written in English and students were given adequate time to answer all questions.

Results

Students were asked about their access to computers and prior knowledge of computers. Students were asked specifically about whether they had learnt about computers in junior and high schools, whether they had taken any course outside of junior or high school in Information Technology, whether they have access to computers and internet at home and whether they had prior experience of using a USB memory device before taking this class.

Figure 1: Computer Knowledge and Access prior to the course in %

Computer Knowledge and Access	Yes	No	Missing
Learnt about using a computer in high school or junior high school	79.10%	20.90%	
Taken a course in computers outside of school	22.50%	77.40%	
Have access to a computer at home	100%	0	
Have internet access at home	96.50%	2.89%	0.57%
Knew how to use a USB memory before taking this class	63%	36.90%	

Figure 1 shows that almost 80% of students acknowledge that they were taught about computers in junior and high schools. This is consistent with the mandate put forward by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in 2003 when the Information Technology course was introduced to cultivate graduates with adequate computer skills⁴. Three different Information Technology Programmes

⁴ 高等学校学習指導要領 (http://www.mext.go.jp/b_menu/shuppan/sonota/990301d/990301a.htm)

were introduced, A, B, C with schools recommended to choose and implement at least one (preferably A which focussed on basic computer skills) based on the available hardware and staff. High school students were required to complete two credits of Information Technology in order to graduate from high school. The number of students who responded that they had not learnt about computers is also consistent with the expectation of MEXT in the sense that while the ministry expected Information Technology to be taught in all high schools there was the general understanding that in some schools the preparation would take longer than in others. The results for computer access and internet access are also not surprising as Japan ranks among the top countries with computer owners and internet users in the world (internetworldstats.com). Surprisingly only 63% of the students answered that they had prior knowledge about using a USB memory before taking this class. USB storage devices are not regarded as new technology and have been around since before many of these students (age approximately 19) were in high school.

Figure 2: Main Computer Use in %

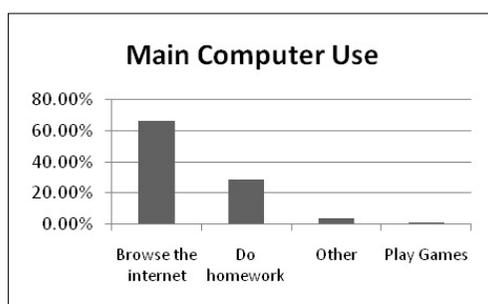
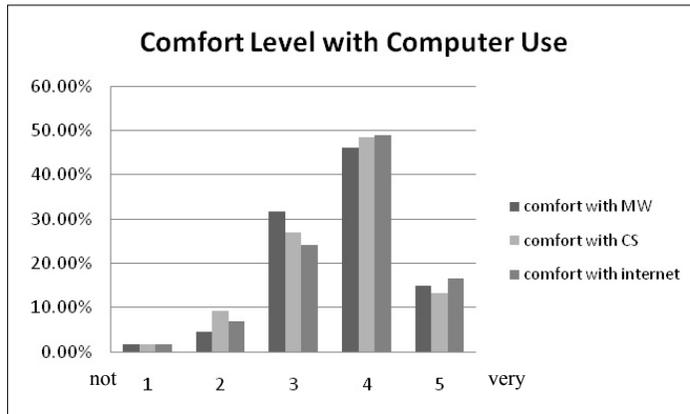


Figure 2 shows that most students, over 60%, mainly use the computer to browse the internet, while another 20% mainly use the internet to do homework. Among the students who chose ‘other’, some responded that they use the internet to watch TV or You Tube. This data partially explains why students had problems using word processing programmes like Microsoft Word as only 20% of the students mainly used the computer to do homework and within that number there is no clear indication whether those who use the computer to do homework use it for research or for word processing. As it relates to playing games, again few students use computers as students who do play video games more often than not use portable devices for instance PSP or mobile devices.

Figure 3 shows the results of students’ opinions on their comfort level using Microsoft Word (MS), the website Colostate Writing Studio (CS) and general comfort using the internet. Students were asked to rate

their comfort on a scale of one to five with one being ‘not comfortable’ to five being ‘very comfortable’. Most students rate their comfort level at three or four which is rather surprising considering the problems many students had using these different applications. The in- class

Figure 3: Computer use comfort level in %.



experience of the problems students had, in particular with using the word processing software is consistent with findings reported by Ohyama (大山2007) on the abilities of university students who had just graduated from high school in Information Technology. Two sets of research were done and in addition to not finding any significant difference in terms of ability between the 2002 and the 2007 studies, less than 50% of the students expressed confidence in their abilities to use word processing software.

Figure 4: Improved computer skills after taking this course in %.

	Improvement	Little Improvement	No Improvement
No computer class (20.90%)	15.7%	5.2%	0%
Computer Class (79.10%)	57.75%	20.2%	1.15%
TOTAL	73.45%	25.4%	1.15%

Figure 4 shows the students’ opinions regarding improvement in their computer skills after having taken this 15 weeks class. In general the opinions reflect improvement in computer skills both among those students who had taken computer classes in junior high or high schools and among those who had not. This perhaps may be attributed to the fact that the students had to use the computers every week to do a variety of tasks therefore, and this is true especially in the cases where students started with little computer

knowledge, there was bound to be some improvement no matter how minute. About a quarter of the students registered no significant improvement in their skills and 1.15% registered no improvement at all. It is important to note however that most of the group that registered little or no improvement at all fall among the category of students who had taken classes in Information Technology and should have already learnt at least the basics of using computers (Information Technology A).

Discussion

Prensky's definitions of digital natives as mentioned earlier was central to the implementation of this CALL course, however after close interaction with these *Digital Natives* two primary concerns have come to light about these so called natives:

- Do all natives speak the same language at the same level?
- Do all natives have fluency in the same technologies?

There is little doubt that students have grown up in a digital world with emailing, mobile phones, computers and video games however Prensky's assumption that they all speak this language has little empirical evidence and is mostly based on what is believed to be common sense. "*Our students are all 'native speakers' of the digital language of computers, video games and the Internet (all emphasis author).*" While one may argue that many students nowadays having grown up with computers are adept at using these technologies, that number in no way represents the majority of the students. Research has shown (Bennett et al 2007:778) that a significant number of students even within developed countries (Prensky's argument hardly applies to developing countries) have less access and less knowledge of some of these technologies. The analogy is made that growing up digital is akin to growing up speaking a language. Within any language community there are different levels of communicability. Foucault (Barker 2009:20) describes discourse, the way meaning is represented as speech, as not only the language itself but a combination of language and practises. Consequently knowing only the language does not provide the individual with the means with which to represent the world, but knowing the practises, meaning the social and cultural conditions coupled with the language allows the individual to represent meaning through speech. In this regard if one does not understand the cultural and social situations within which they speak, one can not said to be adept at that language. For this reason even within a language there are people who speak that language differently. While there may be basic levels of communication and understanding

among that particular language group, meaning becomes affected by the *situation* of that language. Among different countries where the same language is spoken and among different social groups, there are different levels of communication of that same language. All these people can be described as *native*, yet there are linguistic differences even among the natives. The same argument can be made for *digital natives*. Even though these students have grown up in the digital world, and in general may be considered to have knowledge of these different technologies, students may have had different levels of interactions with said technologies, some more adept than others. As Bennett concludes “... *there is as much variation within the digital natives as between the generations*” (2007:779).

In addition to having variations of skill level among *Digital Natives*, there also exists a significant difference in terms of the technologies used by these *natives*. In 2006, a survey was done among 2000 first year university students in Australia (Kennedy et al: 2008). The survey collected detailed data on how students used the computer, mobile devices and the internet. The general findings were that while many students had access to computers with internet, the way in which students used computers and the internet varied significantly. This was also the case with mobile phones. Students also showed preference for different types of technologies perhaps due to access and usability. This appears to be a general trend among the digital generation. By classifying digital natives as a group with knowledge of and access to computers and different techno-devices, Prensky and others who put forward a similar argument overlook the individuality of this generation. Individuality is based on race, ethnicity, culture, sub-cultures, language, gender, social status and a number of other factors which intertwine to form the ‘self’. Cooper (2006) reports for instance on the digital divide between gender when using CAL (Computer Assisted Learning). There are a multitude of factors which determine what kind of technology an individual uses. A recent study by the research firm TNS published on BBC reported that in this digital age of social networking Japanese have the fewest online friends (BBC News 2010). This by no means indicates that in Japan people use the internet less than in other countries: with Japan’s reputation as a *techno* country that would be far from correct. What this data represents is the fact that in different countries, among different groups and among different individuals technology is used differently, therefore different individuals may be better at using different technologies based on personal likes and dislikes. Not every member of the Net Generation plays video games and uses social networking sites frequently.

Conclusion and the future of CALL

The findings of this and other research offer important insight into using CALL. While it is true that many students nowadays have interacted with technology in ways previous students have not, it is important to get an accurate understanding of the technologies students have access to and their knowledge about these different technologies. In the case of this particular CALL course, if there had been previous knowledge that over 30% of the students had no experience using a USB memory time would have been spent giving general instruction in class about using USB memory devices. In addition, a general understanding of what technologies students have access to helps the teacher to determine whether or not to even implement CALL. Recently research has been conducted into using MALL (Mobile Assisted Language Learning) where teachers are experimenting with using mobile devices especially PDAs to incorporate technology into the teaching of languages (Chinnery:2006). New technologies prove promising in their abilities to motivate students and make classrooms more student-centred; however, in an attempt to 'keep up' with the digital generation, it is important to keep in mind that these students remain individuals shaped by their different environments. As for using CALL it is my belief that for the goals of my particular classes there have been significant benefits, however significant changes have been made between the design of the first and second semester CALL courses. Due to the nature of technology and constant innovation, there is little doubt that this CALL research will continue in a bid to better understand the divided digital natives and their technologies.

Works Cited and Consulted

- Bain, J. D., & McNaught, C. (2006). How academics use technology in teaching and learning: understanding the relationship between beliefs and practice. *Journal Of Computer Assisted Learning* , 99-113.
- Barker Chris, ed. (2008). *Cultural Studies: Theory and Practice*. London: Sage Publications.
- BBC News. (2010, October 10). *Japanese have fewest digital friends on social networks*. Retrieved October 10, 2010, from <http://www.bbc.co.uk/news/technology-11501625>
- Becker, H. J. (2000). Who's Wired and Who's Not: Children's Access to and Use of Computer Technology. *The Future of Children* , 44-75.
- Bennet, S. Maton, K. & Kervin L (2008) The 'digital natives' debate: A critical review of the evidence *British Journal of Educational Technology*, 775-786

Digital Divides among "Digital Natives"

- Chapelle, C. (1990). The Discourse of Computer-Assisted Language Learning: Toward a Context for Descriptive Research. *TESOL Quarterly*, 199-225.
- Chinnery, G. M. (2006). Emerging Technologies: Going to the MALL: Mobile Assisted Language Learning. *Language Learning & Technology*, 9-16.
- Cooper, J. (2006). The digital divide: the special case of gender. *Journal of Computer Assisted Learning* 320-334.
- Crook, C. & Joiner, R. (2010). 'CAL' – Past, present and beyond. *Journal of Computer Assisted Learning* 1-3.
- Hartley, R. (2010). The evolution and redefining of 'CAL': a reflection on the interplay of theory and practice. *Journal Of Computer Assisted Learning*, 4-17.
- Internet World Stats*. (2010). Retrieved October 17, 2010, from <http://www.internetworldstats.com/>
- Information Processing Society of Japan (2006, November 15). 高校教科「情報」未履修問題とわが国の将来に対する影響および対策. Retrieved October 15, 2010, from <http://www.ipsj.or.jp/12kyoiku/Highschool/credit.html>
- Kennedy, G. E., Judd, T. S., Churchward, A., Gray, K. & Krause, K. (2008) First year students' experiences with technology: Are they really natives? *Australian Journal of Educational Technology*, 108-122
- MEXT. (2010). *Japan's Education At a Glance 2006*. Retrieved October 15, 2010, from MEXT: <http://www.mext.go.jp/english/statist/07070310.htm>
- MEXT. (2010). 高等学校学習指導要領. Retrieved October 15, 2010, from http://www.mext.go.jp/b_menu/shuppan/sonota/990301d/990301a.htm
- Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon*, 1-15.
- Roman-Odio, C., & Hartlaub, B. A. (2003). Classroom Assessment of Computer-Assisted Language Learning: Developing a Strategy for College Faculty. *Hispanica*, 592-607.
- Segalowitz, N. (1995). Automaticity and Lexical Skills in Second Language Fluency: Implications for Computer Assisted Language Learning. *Computer Assisted Language Learning*, 129-149.
- Timucin, M. (2006). Implementing CALL in an EFL Context. *ELT Journal*, 262-271.
- Warschauer, M., & Healey, D. (1998). Computers and language learning: An overview. *Language Teaching*, 31, 57-71.
- Warschauer, M. (1996). Motivational Aspects of Using Computers for Writing and Communication. In M. W. ed, *Telecollaboration in foreign language learning: Proceeds of the Hawai'i symposium* (pp. 1-15). Hawai'i.
- 大山 ; 三好. (2007). *Present State and Issues of the subject "Information" in High School Curricula*. Research.