The Socio-Cultural Features of ICT Practice at Japanese Primary Schools: Comparison with ICT Practice in Primary Schools in the UK

Makiko Kishi
Meiji University, Japan
m_kishi@meiji.ac.jp

Loveless AVRIL
Brighton University
A.M.Loveless@brighton.ac.uk

Yoichi NONAKA
Yokohama National University
nonaka@ynu.ac.jp

Tatsuya HORITA
Tamagawa University
horita@horilab.info

Toshiyuki KIHARA
Osaka Kyouiku University
tkihara@mbk.ocn.ne.jp

Jun TAKAHASHI
University of Toyama
jun@takalab.net

Michitaka TOYODA
Wakayama University
toyoda@center.wakayama-u.ac.jp

Abstract: The purpose of this study is to clarify the features of Information and Communication Technology (ICT) utilization of Japanese primary schools by comparison with ICT practice in UK primary schools from socio-cultural viewpoints. The authors collected data from five Japanese researchers, who have studied ICT utilization of primary schools in the UK, through a structured interview including three questions; (1) "what do you see at primary schools in the UK?" (2) "Have you ever seen similar practices in Japan? If so, what?" and (3) "Do you think Japanese primary teachers have similar practices in their lessons? If so, why?" The data was analyzed in four phases based on the qualitative research method. First, the transcript was reduced to information relevant to the research questions. Second, the data was open coded. Third, the coded data was categorized. In conclusion, the features of ICT utilization of Japanese primary schools were explained relative to categories from socio-cultural viewpoints. As a result, six socio-cultural features were found: (a) ICT equipment available at schools, (b) digital content that fits conventional class format, (c) staff that support teachers using ICT, (d) class format mainly on conventional individual guidance, (e) the process of constructing meaningful use of ICT and (f) actual feeling of efficiency of using ICT.

Keywords: ICT, Socio-Cultural viewpoint, Primary School, UK

RESEARCH BACKGROUNDS and RESEARCH OBJECTIVE

The purpose of this research was to explore from cultural and social aspects how primary teachers use Information and Communication Technology (ICT). Since ICT, such as computers connected with the Internet, interactive white boards, digital textbooks, and mobile devices like iPads, have been rapidly introduced into primary schools, teachers have been seeking information on how to use ICT in teaching and learning processes. In Japan, projects that provide one computer for each student at schools fall under the policy named "learning innovation" and "future schools".

The ways in which digital learning tasks contribute to students' intrinsic motivation and learning outcomes have been examined (Loon et al. 2013). Loon et al. showed that a digital learning task that combined autonomy support and structure had a positive effect on both intrinsic motivation and learning outcomes in students. Also, Jackson et al. (2013) examined the effect that a relatively new Computer Supported Collaborative Learning (CSCL) device, specifically an interactive tabletop, has on elementary students' attitudes toward collaborative technologies, mathematical achievement, and the gender gap in mathematics.

Thus, prior reviews show positive results of ICT utilization in an educational setting. It is, however, clear that these positive results are deeply related to socio-cultural aspects of the classroom. From a sociocultural approach, the study of ICT in education must be studied within the broader context in which it is situated (Valsiner 2007). The prior reviews of ICT utilization in education tend to have a view that ICT can be studied in isolation. Even if we use the same tool that was effective in a certain context, it does not always have the same result in another context. For instance, Miyake (2013) introduced "thinking tools" as an ICT tool for promoting higher order thinking to Chinese teachers, but it was found that the goal, process and assessment of the lesson using thinking tools at Chinese schools were different from Japanese ones. Chinese teachers used the thinking tools according to their context. Therefore, the lessons must be understood as cultural phenomena (Yamamoto 2013). To clarify how ICT is used, we must shift our attention towards the whole configuration of practice including the rules, interpersonal relationships, activities, and shared repertoires that are taking place in the context in which ICT is used.

RESEARCH METHODOLOGY

The purpose of the research is to clarify the socio-cultural features of Japanese primary schools that ICT is used. Teachers in primary schools in Japan like as other countries are trying to employ ICT. To describe the socio-cultural features that ICT is used, the authors, compare it with practices in primary schools in UK. Comparing different cultures is one of the methods to clarify the features of a culture. The methods would reveal patterns of culture of human perception, learning, and development and the rhetoric that patterns must be true for people in the culture.

Data Collection

This research adopts an interpretive approach, in which we understand actions, thoughts, and feelings of those who live in certain situations (McEwan & Kieren 1995). The features were clarified based on the story told by five researchers that study ICT utilization in primary schools in Japan. The authors consider them belonging a same cultural group (Berry 2011) because of the following two reasons; (1) that they visit regularly primary schools in Japan and (2) that they visited UK primary schools several times as shown in table 1. Therefore, it is possible to describe how ICT is used in UK primary schools from their cultural bias.

The data was collected through the semi-structured interview including the questions (1)What do you find in UK Primary school you have visited, (2) Have you seen similar practices you saw in UK primary school in Japan? , and (3) Do you think Japanese teachers can apply the similar way in their lesson in Japan? Why?

Table 1: Interviewees

Target	Date of interview	Interview Duration	Research Experience of ICT utilization in primary schools	Experiences of visiting UK schools
A	4/15	2 hours	Work as a primary school teacher from 1983-1993 Researched from 1993 to present as a professional	Traveled 20 times from 2000 to 2012 Visited about 60 primary schools
B	4/25	1.5 hours	Researched from 1990 as a	Traveled 11 times from 1993 to

			professional	2012 Visited 30 primary schools
C	4/27	2 hours	Work as a secondary school teacher from 1997-2002 Researched from 2002 to present as a professional	Traveled 2 times on 2005 to 2012 Visited 8 primary schools
D	5/13	1.5 hours	Researched from 2002 to present as a professional	Traveled 21 times from 2000 to 2012 Visited 40 primary schools
E	7/11	1hour	Work as a primary school teacher from 1987-1992 Researched from 1994 to present as a professional	Traveled 20 times from 2000 to 2012 Visited 30 primary schools

Data Analysis

The data was analyzed in four phases. First, the transcript was reduced to information relevant to the research questions. Second, the authors did open coding. The interview data taken through semi-structured interviews were coded by meaningful sentences with using MAXqda software (Sato, 2008). Third, the coded data was categorized. In conclusion, the generated categories were explained with showing original interview data.

RESULT AND DISCUSSION

As a result of our analysis, six socio-cultural features were identified. The Table 2 indicates the numbers of code generated in open coding. For example, the total numbers of codes generated through analysis of interview data to A was 91, and number of code mentioning ICT equipped at schools was 17.

Table 2: Categories generated by data analysis and the rate of the applicable categories

Categories	A	B	C	D	E
ICT equipped at schools	19%	25%	12%	25%	13%
Digital contents that fit to conventional class form	8%	9%	5%	2%	6%
Staffs that support teachers to use ICT	9%	1%	4%	6%	6%
Class form mainly on the conventional individual guidance	14%	4%	7%	27%	25%
The process of constructing meaning of using ICT	19%	33%	35%	16%	30%
Actual feeling of efficiency of using ICT	32%	27%	36%	24%	20%
	100%	100%	100%	100%	100%

(a) ICT equipment at schools

Japanese primary schools do not equip ICT so that teachers can use it for daily lessons. There are several reasons for this. First, it takes time to prepare ICT when they use it. For example, using computers for a lesson requires a teacher to receive the key to a computer room from administrative staff and move the students to the computer room. By that time, 10 minutes will have passed since the lesson started. Second, there is insufficient ICT equipment provided for use in a classroom. A teacher often has to share a few projectors and computers with other teachers. Therefore, they are not able to use ICT whenever they need it. Although the national curriculum guidelines indicate when and how to use ICT in lessons, teachers feel that using ICT is inconvenient because they are uncertain if they can use ICT equipment when they need to and they feel that it takes too much time to prepare for using it.

On the other hand, UK primary schools have been equipped with ICT under the support of a huge number of budgets. UK teachers are able to use ICT as a teaching aid whenever they need. Needless to say, the reason why UK teachers use ICT daily for their lessons is not only due to well-equipped ICT environments but also to digital contents that fit the conventional class form, staff that support teachers using ICT, classes formed mainly on conventional individual guidance, the process of constructing meaningful use of ICT, and actual feeling of efficiency of using ICT.

(b) Digital content that is tailored to conventional class format

Digital content that fits the conventional class format helped UK primary teachers use ICT. UK primary

schools are equipped with digital content as well as ICT equipment. For example, when the UK government equipped UK primary schools with interactive black boards, they provided digital content that can be used with the black boards. A teacher downloads digital content in reference to the national curriculum and uses it for their class. Since the contents are developed according to the national curriculum, they fit the conventional class format of "introduction by mass teaching - individual work - conclusion by mass teaching". Also, UK primary schools have budgets to buy digital content that teachers need for their lessons.

Japanese primary teachers find it difficult to use ready-made content. They need digital content that fits their own lesson plan. In Japanese primary schools, class format and lesson plans are quite varied depending on the teacher. Japanese primary teachers make a detailed lesson plan based on a "unit" consisting of several lessons. The teachers first set up the goals of the unit and then design the details of the lesson plan in each lesson. To achieve the goals of the unit, respective teachers examine how to structure the lesson according to the learning situation of their students. Japanese primary teachers employ mass teaching formats and construct lessons based on their interaction with students. Therefore, it is important for Japanese primary teachers to be able to improvise according to the dynamic learning situation. Ready-made contents do not fit such dynamic lessons.

The UK primary teachers accumulate and reuse content for the next school year; they take charge of the same grade in the same classroom from year to year. Once they produce digital content, they are able to make use of it again by modifying and adding information. The digital content can be gradually elaborated year by year. In Japan, a teacher does not know what grade they will take charge of until the end of each school year; therefore, they have to search for digital content that fits the new grade and students every time from the beginning of the new school year.

(c) Staff that supports teachers using ICT

At UK primary schools, teachers take care of approximately 30 students with the support of multiple staff. Once a principal decides to focus on ICT for education, he/she employs ICT coordinators and/or ICT curriculum coordinators. UK primary teachers use ICT under the support of these staff members. For example, when teachers face any problems using ICT, ICT coordinators support them. When the teachers do not know how to use ICT related to a subject, an ICT curriculum coordinator will advise and suggest usable digital content. In addition, a teacher often has more than one teaching assistant who is always with him/her during lessons. Therefore, a few teachers with teaching assistants can carefully monitor and support approximately 30 students using ICT for individual learning.

In Japan, one teacher takes care of approximately 40 students. Teachers who are unfamiliar with ICT feel uneasy about using it because technical trouble such as computer breakdown or mishandling may occur. In addition, students do not become accustomed to using ICT equipment, so teachers are afraid of students breaking the equipment by mistake. However, there are some schools that encourage teachers to use ICT under the support of strong leadership by the principal, other teachers who are skillful in ICT, and a grant for ICT in education.

(d) Class format based mainly on conventional individual guidance

The way of using ICT is deeply related to the conventional instructional format. In the UK, primary teachers had emphasized individual learning before schools were equipped with ICT; the format did not change even after ICT was introduced. UK primary teachers instruct by mass teaching format, make individual or small groups for individual learning according to the students' academic level and interest and finally, gather students together and conclude the lesson by mass teaching again. The importance in the lesson is placed on individual activity. Teachers provide appropriate tasks and tools to the respective students according to their academic level and interest. For example, the teachers provide the task of movie production using an iPad to upper level students to nurture expressive and creative skills based on their knowledge and experience. Alternatively, they provide practice using paper worksheets to foster understanding of basic knowledge. During individual learning, teachers carefully monitor and support students' learning. Teachers record the details of the learning situation in a portfolio and think of subsequent tasks for students based on these details. Thus, the teachers use ICT as an alternative tool along with books, worksheet, references, drill-practice sheets and so on. Therefore, UK teachers experience no conflict using ICT instead of conventional teaching tools. An Interactive White Board is utilized instead of a white board to give instruction at the beginning of the lesson and to conclude at the end of the lesson. Thus, teachers started using ICT without a big change from the conventional instruction format applied in UK primary schools.

In the case of Japanese primary schools, teachers apply a mass teaching format. The mass teaching format is not only a teacher teaching students and/or constructing students' knowledge based on interaction between the teacher and students and among students themselves, but a teacher providing individual learning activities with the same contents or different activities aiming to achieve the same criteria. Although a teacher gives different learning

activities, the goals for all students are the same. In other words, the teachers support all students in achieving the same level simultaneously rather than focusing on individual learning. The important aspect in Japanese primary school is collaborative learning. Therefore, teachers take time to interact with students by asking questions to encourage them to think and collaborate. Teachers usually use ICT to promote interaction between a teacher and students, and among students, by sharing ideas and by visualizing one's own ideas to share with others.

The difference between UK and Japanese primary teachers relates to the teachers' beliefs. Both UK and Japanese teachers consider "fairness of education" to be important but interpret it differently. UK primary teachers consider it fair for students to be given individual tasks according to their academic level. Therefore, they carefully observe students' learning process and think of the most appropriate task and tools for students. They consider it a better teaching strategy to give advanced tasks to gifted students to enhance their capacity. Therefore, it is normal for UK primary teachers to provide students in the same class with different kinds and levels of tasks. To identify an appropriate task according to students' academic level, the teachers use ICT instead of conventional tools of observing and supporting.

Japanese primary teachers feel it is unfair to give different tasks aiming at different goals. A student works with a drill and practices according to his/her academic level and a teacher gradually provides different tasks on an individual basis. Primary teachers, however, consider it unfair to treat students differently or to assign different tasks based on the students' educational level in the same classroom. When a teacher wants to use an iPad, for example, they want to give opportunities to use the iPad equally to all students. This is happening not only within a classroom but across classrooms.

(e) The process of constructing meaningful use of ICT

Teachers use different processes to decide to use ICT for their lessons. UK primary teachers use ICT under strong leadership from principals. The principal discusses effective ways of using ICT with the teacher for his/her lesson. UK primary teachers basically have to follow the vision suggested by the principal. Therefore, once the principal decides to work on ICT utilization in education, all teachers must think of how to apply ICT to their lessons. The principal can employ necessary staff and provide the necessary equipment and digital content because of his/her authority over personnel matters and budget implementation. It can be called "top-down instruction".

Japanese primary schools can be said to use "bottom-up construction". The principal does not have authority over personnel matters and budget implementation like UK principals, so the principal cannot force teachers to use ICT in their lessons. In Japan, the process that teachers use to apply new technology and ideas is basically through "Lesson Study", the same process that is applied to introduce any new teaching practices or tools. Lesson Study is used to promote teachers' collaboration in an effort to improve teaching and learning in schools (Stigler and Hierbert, 1999; Cochran-Smith and Lytle, 1992). It has traditionally been employed in Japanese educational settings as a teacher professional development program. The teachers share the same objectives, for instance, to apply ICT to improve lessons through Lesson Study. By working with other teachers with different viewpoints and experiences, teachers can think critically and creatively about how to improve their lessons (Hitchcock and Hughes, 1995). The group of teachers can evolve naturally because of the teachers' common interest in a particular domain or common goal to gain knowledge related to their field. Through interaction with one another in Lesson Study, teachers collaboratively construct meaning for action. They find appropriate ways to use ICT that fit their own lessons. Of course, if the teachers agree that ICT is not effective for their lessons, they reject using it. Since the national curriculum does not force teachers to use ICT, teachers are able to select whether or not to use it.

(f) Actual feeling of efficiency of using ICT

The actual feeling of efficiency of using ICT is different between Japanese and UK primary teachers. Since UK primary schools place ICT as a subject in the national curriculum, skills nurtured by ICT practice such as expression and creativity are evaluated in activities such as cartoon making, music and movie production using ICT. Therefore, ICT can support nurturing such information literacy.

In contrast, the Japanese educational system has no requirement for ICT classes as a formal subject. The Japanese government promotes teachers using ICT relating to a given subject, such a simulation in geography, investigating in science, making stories in Japanese language and so on. The students in both UK and Japanese primary students enjoy learning with ICT and are motivated to learn. However, the achievement is evaluated conventionally, which cannot evaluate information literacy skills such as expression and creativity. In spite of this, young teachers who are experienced in using ICT have become primary teachers and use ICT for their lessons. However, they are first required to make lessons using mass teaching format in order to achieve the goal of a

teaching unit. The goals of the units are supposed to be achieved through conventional mass teaching format even without using ICT, and cannot be achieved through ICT alone. Of course, some teachers use ICT in effective ways to achieve the educational goal. For instance, the teacher can use an overhead projector to magnify small things in their hand and share individual outcomes of students with others. Most of these practices were conducted in well-equipped ICT environments. With limited equipment and digital content, teachers do not experience making lessons using ICT, so it then becomes difficult for Japanese primary teachers to have a clear expectation of how to design lessons using ICT.

CONCLUSION and FUTURE DIRECTION

In this research, the authors clarified the socio-cultural features of Japanese primary schools where ICT is used. By comparing these schools with primary schools in the UK, six socio-historical features that organize lessons utilizing ICT were found. The study indicates that the current situation of ICT utilization in Japanese primary schools is deeply related to political, historical, and cultural aspects. Therefore, it is necessary to consider socio-cultural aspects in order to promote ICT in Japanese education. For example, Japanese teachers conventionally apply mass teaching format so it is important to develop ways to improve this conventional format using ICT as well as innovating new formats.

Literature Reference
Toshiya Yamamoto(2013) Ambiguity and Substantiality as Essential Nature of Culture: Redefinition of Culture from the Perspectives of "Cultural Psychology of Difference".
Jaan Valsiner (2007)Culture in Minds and Societies: Foundations of Cultural Psychology SAGE Publications Pvt. Ltd;
Anne-Marieke van Loon, Anje Ros and Rob Martens (2013). Motivated learning with digital learning tasks: what about autonomy and structure?Educational Technology Research and Development, pp.1015-1032
Alexander T. Jackson, Bradley J. Brummel, Cody L. Pollet and David D. Greer（2013）. An evaluation of interactive tabletops in elementary mathematics education, pp311-332
John W. Berry, Ype H. Poortinga, Seger M. Breugelmans (2011). Cross-Cultural Psychology Cambridge University Press; 3rd edition
Hitchcock, G., & Hughes, D. (1995). Research and the teacher: A qualitative introduction to school-based research (2nd ed.). New York: Routledge.
Stigler, J. W., & Hierbert, J. (1999). The teaching gap: Best ideas from the world's teachers for improving education in the classroom. New York: The Free Press
Sato, I. (2008). Intoroduction for qualitative analysis using QDA software. (QDA soft wo katsuyousuru jissen shituteki data bunseki nyuumon). Tokyo. Shinyosha.
McEwan, H., & Kieren, E. (1995). Introduction. In McEwan, H. & Egan,K.(Eds.). Narrative in teaching, learning, and research (page: vii-xv), New York : Teachers College Press.