The passive usage of ICT by Japanese undergraduate students

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Abstract: The primary purpose of this study is to investigate the features of the Japanese undergraduate students' attitude towards a variety of information communication technology (ICT) in order to construct the effective learning environment at a Japanese university.   To pursue this purpose, a survey questionnaire was administered at the beginning of the first semester in 2011 at 6 different universities in Japan. The total of 862 data was collected. The basic descriptive data analysis shows that the usage of ICT by the freshmen is passive rather than active such as watching YouTube instead of watching TV and reading someone's blog instead of commenting due to the short length of the possession of own computer etc. Therefore, in this study, the interrelationships among the findings are investigated. Regarding the usage of the network in relation to their study, six factors were extracted and the t-tests revealed that the usage of ICT by female students are more careful than male students. In addition, confirmatory factor analysis was conducted and found that the frequent use of 'SNS' is not strongly affected by 'convenience.' Based on these finding, two approaches are suggested for freshmen to utilize ICT for academic learning.

Key words: ICT, SNS, freshmen, learning, questionnaire

1. Background of the Study and the Purpose

The primary purpose of this study is to investigate the features of the Japanese undergraduate students' attitude towards a variety of information communication technology (ICT). In Japan, taking the subject called "information" is mandatory at the upper secondary schools. Thus the high school students have a basic knowledge about the system of computer mediated communication, however the emphasis is on the acquisitions of the certain skills such as using power point for presentation and developing web page for self introduction rather than on the development of social usages of ICT. Therefore, the transition from the upper secondary schools to the higher education program is the key element to develop the effective learning environment by utilizing a variety of ICT. However there are not many studies that specifically focus on the current freshmen's attitude towards the usage of ICT.

Thus, in order to investigate the Japanese undergraduate students' attitude towards the usage of ICT, a survey questionnaire was administered at the beginning of the first semester in 2011 at 6 different universities in Japan. The total of 863 data was collected and the basic findings were already presented in the book (Kubota, 2013). Therefore, in this paper, as the further study, I will investigate the interrelations among the findings in order to propose the future direction for the freshmen to utilize ICT for their active learning. Especially, I will focus on the SNS users and try to find out the relationships between SNS users and their usage of the network for academic learning.

First, I will present the basic findings that are relevant to this purpose from the previous study, and secondly, I will present the results of the analyses that were conducted specifically for the present study, and finally, I will propose several suggestions for the future direction about utilizing ICT for learning.

2. Research Methods

1. Questionnaire

The administered survey questionnaire consists of the following 5 sections. Of a total of 70 question items, 68 items were closed-ended multiple choice questions and two were open-ended questions. Among the multiple choice questions, a 4-point Likert-type scale with response options ranging from strongly agree to strongly disagree was used for Section 3. The bold words in the question items used in section 3 indicate the names of the variables appeared in the following analysis.

Sections:
1. Survey participants profiles (k=13)
2. Information used for selecting a university to enter (k=15)
3. Usage of the network in relation to their study (k=20)
   1) An internet **search engine** is convenient.
   2) A **dictionary** on the internet is useful.

3) **Wikipedia** is convenient.

4) **Q & A sites**(Yahoo Chiebukuro etc)   is convenient.

5) Using Internet is **good for research**.

6) I compare the data from more than **two sites** when I write a report.

7) I will **first ask my friend** whenever I have a problem with my report.

8) I will **first search in Internet** whenever I have a problem with my report.

9) I care for **copyright**.

10) I care for **quotation** and try not to make any mistakes.

11) The **digital information** is valuable because it is easy to modify and process.

12) Using Internet is **indispensable**.

13) I often use the **public sites** such as Ministry of Education, Science and Culture.

14) I often use the **white paper** on the Internet.

15) I often use the **news sites** of Newspaper companies.

16) At the library, I use Inter**net** search engine rather **than** going to the **bookshelves**.

17) It is cumbersome to search the information because of **too many choices.**

18) It is not easy to use the information because **a source is ambiguous**.

19) It is fine to **get online help** when I need to solve the assigned problem.

20) It is **inconvenient** to use Internet when I study.

4. Usage of the web community site (k=10)

   1. blog,   2. micro blog,   3. Prof,   4. Q & A sites,   5. anonymous bulletin board,

   6. movie sites,   7. live broadcasting,   8. SNS,   9. online game,   10.imaginatibe space.

   (1) almost every day.   (2) 3~4 times a week,   (3) 1~2 times a week

   (4) less than onece a month   (5) never used   (6) only watching/ reading

5. Expected communication behaviors in 6 scenarios (k=12)

2   Research methods

A factor analysis on their ratings on questions in section 3 was conducted to elucidate the factors that show the characteristics of ICT usage by the freshmen for their leaning. Secondly, t-tests on the factor scores were conducted in order to see the gender differences. Thirdly, confirmatory factor analysis was conducted to find the interrelationships between SNS users and their usage of the network in relation to their learning.

3. Results and Discussion

1. Demographic information

Out of 873 students, 758 are freshmen and 112 are sophomore or above in addition to 3 missing values. The total numbers of freshmen 758 are used to analyze in this paper. Among 758, male are 274 (36.3%) and female 480 (63.7%) and 72.2% are from public high schools and 26.3% are from private high school, while 0.5% are from the international schools. Regarding the possession of the personal computers (PC), 95.3% of the freshmen have PC and out of them, 66.9% posses their own PC while 33.1% possess the shared one. Although 66.9% of the freshmen possess their own PC, 68.3% of them has just bought it one month ago. The ratio of the possessing PC for a half year, one year, two year, three years, more than three years are 9.1%, 3.6%, 3.0%, 4.6%, 11.3% respectively (exclude 56 missing values). Regarding the possession of mobile phone, all of them except three persons have the mobile phone, but, only 21.1% (n=159) use Smartphone at the time of collecting data in April, 2011.

In summary, the characteristics of this demographic data are, 1) it consists more female than male, 2) 68.3% (n=338) freshmen just bought their own computers one month ago, 3) Although the freshmen have mobile phone, only 21.1% use Smartphone in April, 2011.

2 Usage of the web community site

In the previous study, the usage of the web community site by freshmen was investigated by using the data from section 4, and found that even highest usage of **SNS** is used by only 57.7% of the freshmen at the time of 2011. The next highest usage is **movie site** (41.2%) and followed by **blog** (41.1%). It means that the ratio of "only watching/ reading" and "never used" are very high in this data. For example, the percentage of only watching/reading **movie site**, **Q & A site**s and **blog** are 53.4%, 49.9% and 42.5% respectively. Therefore it was summarized that the usage of ICT by the freshmen is passive rather than active such as watching YouTube instead of watching TV and reading someone's blog instead of commenting due to the short length of the possession of own computer etc. Based on these findings, it was decided to pick up SNS users only to investigate the interrelationships with the attitude of using network for academic learning.

3 The results of factor analysis and t-tests

In this study, a factor analysis was conducted in order to find the latent variables for using network in relation to the academic study. Table 1 shows the factor loading following varimax rotation. After the rotation, six factors were extracted. The cumulative contribution ratio of six factors is 39.13 % of the variance.

The first factor consists of four items such as **white paper**, **public sites**, **news sites** and **net than bookshelf**. Thus, the first factor was labeled as "**primary sources (primsources).**" The second factor consists of three items such as **copyright**, **quotation** and **two sites**. Thus, the second factor was labeled as "**consideration.**" The third factor consists of three items such as **Wikipedia**, **Q & A** and

dictionary. Thus, the third factor was labeled as "**dictionaries**." The forth factor consists of three items such as **many choices**, **ambiguous sources** and **inconvenient**. Thus the forth factor was labeled as "**negative sense of use**." The fifth factor consists of three items such as **first net**, **indispensable, digital information** and **get online help**. Thus, the fifth factor was labeled as "**convenience**." The sixth factor consists of three items such as **search engine**, **good for research** and **first ask friend**." Thus the sixth factor was labeled as "**utilization**."

Table 1　Factor analysis of the questions in section 3

	1	2	3	4	5	6	Commonality
white paper	**0.857**	0.106	0.071	0.126	0.065	0.021	0.770
public sites	**0.725**	0.194	−0.107	0.129	0.104	0.047	0.610
news sites	**0.528**	0.160	0.058	0.065	0.162	−0.067	0.340
net than book	**0.293**	0.182	−0.040	0.104	0.222	−0.014	0.180
copyright	0.168	**0.774**	0.040	0.103	−0.014	−0.045	0.640
quotation	0.154	**0.698**	0.080	0.075	−0.024	0.008	0.520
two sites	0.122	**0.423**	−0.019	−0.059	0.265	0.116	0.280
Wikipedia	−0.041	0.027	**0.684**	−0.027	0.110	−0.009	0.480
Q & A sites	−0.003	−0.034	**0.570**	0.062	0.090	0.102	0.350
Dictionary	0.059	0.093	**0.483**	−0.153	0.209	0.150	0.340
too many choices	0.067	0.071	−0.036	**0.727**	0.036	0.065	0.550
ambiguous sources	0.160	0.329	−0.082	**0.536**	0.099	−0.022	0.440
inconvenient	0.187	−0.069	−0.018	**0.476**	−0.208	0.002	0.310
use net first	0.108	0.051	0.175	−0.104	**0.520**	0.013	0.330
indispensable	0.155	0.003	0.162	0.017	**0.501**	−0.011	0.300
digital info	0.155	0.182	0.248	0.021	**0.314**	0.002	0.220
get online help	0.255	−0.146	0.206	0.211	**0.285**	−0.085	0.260
search engine	−0.031	0.081	0.295	−0.183	0.290	**0.408**	0.380
good for research	−0.017	0.010	0.361	−0.132	0.330	**0.368**	0.390
ask friend first	−0.007	−0.005	0.056	0.174	−0.122	**0.305**	0.140
Factor contribution	1.89	1.57	1.45	1.28	1.19	0.46	7.84
Accumulation contribution ratio	9.44	17.27	24.49	30.87	36.81	39.13	

Table 2　　Gender Differences

		Male		Female		t-value
Factor 1	primary source	.0810	(.9409)	-.0460	(.8732)	1.854
Factor 2	consideration	-.1240	(.9143)	.0704	(.8271)	-2.883[*]
Factor 3	Dictionaries	.1547	(.7973)	-.0878	(.7993)	3.979[***]
Factor 4	negative sense of use	-.1308	(.8616)	.0742	(.7854)	-3.301[***]
Factor 5	convenience	.0409	(.8198)	-.0232	(.6935)	1.082
Factor 6	utilization	-.0859	(.6478)	.0487	(.5807)	-2.912[**]

*P<0.05, ** p<0.01, *** P<0.001,　　(　) a standard deviation

Table 2 shows the results of t-tests by gender about 6 factors elucidated from factor analysis on Question 3 (male=269, female=474).

According to the results of t-tests, the female t-value of "**consideration**," "**negative sense of use**" and "**utilization**" are significantly higher than male while the male t-value of " **dictionaries**" is higher than female. Based on these results, it is summarized that the usage of ICT by female students are more careful than male students, because female students use ICT more than male students for their research and believe that the **search engine** is convenient, however at the same time they also **ask their friend** first whenever they have a problem with their reports instead of using **Internet first**. Since the female students use ICT actively for their research, they also concern about the **copyright** and **quotation**. Because of these behaviors, they have **negative sense of use** such as **too many choices, ambiguous sources** on the Internet. On the other hand, male students believe that dictionaries such as **Wikipedia** are convenient.

4 A path analysis

A path analysis based on covariance structure analysis (AMOS) was conducted to better understand the interrelationships among the six factors and SNS users.   It was hypothesized that SNS is used because of **convenience** and **convenience** is explained by several features such as **dictionaries**, **primary sources** and **utilization**. Figure 1 shows the final results of the path analysis. There were no statistically significant differences between male and female students for this model. All of the relationships among 14 observed variables and 4 construct variables are statistically significant, at the level of 0.1%. The hypothesized model showed a good fit with the given data: GFI (Goodness of Fit Index) =0.961, AGFI (Adjusted Goodness of Fit Index) =0.939, CFI (Comparative Fit Index)=0.925 and RMSEA (Root mean Square Error of Approximation) =0.057 (Toyota, 2007). According to Toyota (2007), if RMSEA is less than 0.05, then the model is good fit, while if it is more than 0.1, then it is not good. Between 0.05 and 0.1 is called "gray zone" and it is necessary to interpret carefully. Therefore, it can be said that the model goodness of fit in this study results quite satisfactory although the careful interpretations are needed. Latent variables, '**convenience**' strongly correlates with '**utilization**' (0.73) and '**utilization**' also has a strong correlation with '**dictionaries**' (0.72), while '**convenience**' has a moderate correlation with '**dictionaries**' (0.52). On the other hand, latent variables '**convenience**' has a little effects on observed variable, '**SNS**' (0.29) and '**primesources (Prime Sources)**' (0.22).

The model shows that freshmen believe that ICT is convenient because they believe ICT is **good for research** (0.60) and dictionaries such as **Wikipedia** (0.68) are convenient to use. By the way, '**Convenience**' has an effect to the attitude such as '**use net first**' (0.49), '**indispensable**' (0.55) and '**digital infor**' (0.51).   However, '**SNS**' is not strongly affected by '**convenience**' (0.29).   It means that SNS users are using SNS not because of just convenience but because of other reasons like "neo digital native" people show. According to Hashimoto (2011), "neo digital native" has four characteristics, 1)

using movie sites in order to communicate with friends, 2) on-time orientation, 3) emotional connection with friends, 4) mobile orientation. Therefore, it might to be useful to consider these characteristics in order to use SNS for academic learning.   In addition, although there are convenient prime sources such as '**white paper**', '**public sites**', and '**news sites**' on the Internet the freshmen do not use much for their study as compared with dictionaries.

Figure 1 The final results of the path analysis
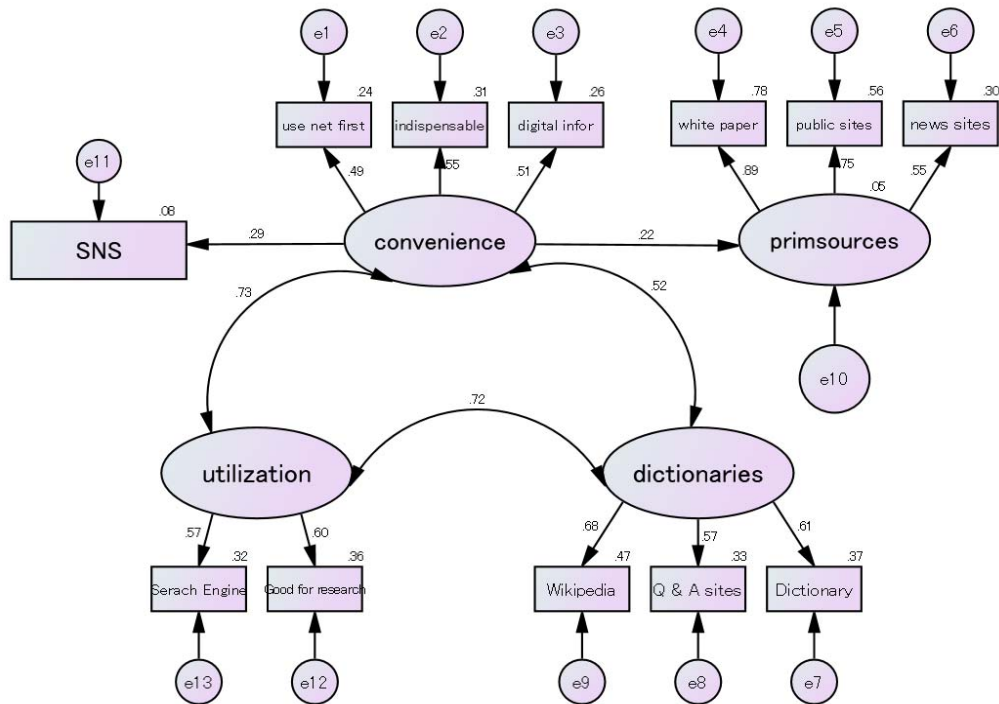
4. Conclusion

It was proved that convenience of using network for study strongly related to utilization and features of dictionaries. However, although prime sources such as white papers are valuable sources for academic study, the freshmen do not have the positive attitude towards the usage. In addition, convenience does not explain the frequent use of SNS. Based on these findings, I will suggest two approaches for academic use of ICT as follows. 1) It is necessary to teach intentionally where to find the prime sources and how to use them for academic study.   2) The word "convenience" is not the key word any more to explain the frequent use of SNS.   Therefore academic use of SNS should be advanced by emphasizing on making a network with friends, collaborate working, and sharing movie sites

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