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THE INFORMATION TECHNOLOGY LITERACY LEVEL OF NEWLY ENROLLED FEMALE COLLEGE STUDENTS IN JAPAN

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Abstract

Purpose: The objective of the study was to assess the self-assessment of information literacy among newly enrolled Japanese female college student in what concerns to the ability to operate office applications; namely, word processors, spreadsheets and presentation software. In addition, we investigated the time period when they started using them. Then, we examined (1) whether there is any difference in the utilization ability across the applications; and (2) whether there is any correlation between the skill level and the introduction time.

Methodology: A survey was performed on 272 junior college female students of humanities courses and 41 college students of nutrition science course in April 2018, right after their entrance ceremonies. Statistical free software R was used to process the data, which consisted of chi-square test of independence for a contingency table, and correspondence analysis. The parameters assessed were (1) self-evaluation of the ability to use office applications, and (2) the period of time the students started using time.

Main Findings: 'Upper intermediate' level students in word processors were correlated with the period around 'Class in elementary school' or 'Class in junior high school'. By contrast, 'Upper intermediate' level students in spreadsheeting were associated with the first contact in a 'Class in junior high school' or 'Class in high school'. Presentation software has been used frequently since elementary school up to high school and its club activities. Finally, the results suggest that 'Advanced' level students were taught how to use all these applications from family members.

Implications: These findings may help teachers to improve their academic curriculum in order to fill the gap between those who are skilled and those who are not. They also can give useful hints to explore new teaching methods on information literacy subjects in higher education.

Novelty: The results suggest that that the period of time that students had their first contact with the applications affects the awareness of their importance and the motivation to learn them.

Keywords: information literacy, computer literacy, Japanese college students, newly enrolled students, office applications

INTRODUCTION

Computers became an important and essential tool in every daily activity and situations of nowadays society, be it at school class, or workingplace at home. So much so that, lately, young people grow surrounded by many different digital devices and begin to utilize them from very early ages as pointed out in (Lockley, 2011).

Higher education institutions such as universities, colleges, and junior colleges in Japan have been offering introductory courses on information or computer literacy classes for several decades now. The objective of the information literacy classes is to promote the gathering, analysis and effective manipulation of a variety of data and information using ICT (MEXT, 2008a; Nishikawa &Izuta, 2016). Therefore, information literacy education is conducted not only by higher education but also by primary and secondary education institutions (MEXT, 2008b; MEXT, 2010).In addition, under the initiative of MEXT, efforts to fully build and equip the Japanese elementary and secondary education with an information infrastructure have been heavily pursued (MEXT, 2011). According to the survey on MEXT's present state ofinformatization of education in schools, the number of students per educational computer is 5.6as of March 2018 (MEXT, 2018).

As far as ICT skills of Japanese youth are concerned, OECD reported that about 25% of people aged 16 to 25 years lack basic computer skills (OECD, 2015).In fact, several studies have shown that Japanese college students do not have confidence in their computer skills (Murray & Blyth, 2011; Lockley &Promnitz-Hayashi, 2012; Cote & Milliner, 2016). In addition, there is a report on the assessment of anxiety and difficulty perceptions of Japanese female college student in relation to the information processing literacy learning (Nishikawa &Izuta, 2016).

By the way, Cote and Milliner pointed out that "One explanation is that schools are not responding to the MEXT mandate to implement ICT training. In fact, contemporary reviews of freshmen Japanese university students also noted that many students did not use ICT in high school" (2016, p.127). This observation comes amid the program launched in 2010 aimed to implement subjects related to information or computer literacy in high school classes before the entrance to the universities or colleges (MEXT, 2010). A possible explanation for this lack of confidence is due to the fact that, most of the classes are given in the first year of high school, and the mastering of skills is not assessed anywhere else as in the university entrance examination, leaving a blank of two years between the classes and the time they enter higher education.

Taking these into account and motivated by the literature, the goal of this work is to assess the Japanese female college students for their information processing skill awareness with respect to three office suite applications (word processors, spreadsheets, presentation software) and examine the relationship between these attitudes with the time they first used them.

METHODS

Participants

A total of 313 newly entered university students who took part in a freshman seminar regarding the use of the information processing system in April 2018 participated voluntarily in this study. Among them, 272 were female students from 2-year junior college and 41 (one male, 40 females) were from 4-year college. The students were all in the age range from 18 to 19 years old. Junior college students were enrolled in humanities courses; namely social sciences, English language, and literature, Japanese language and literature as well as Japanese history, whereas college students were in the department of health and nutrition science.

Procedures

All the students answered to the survey, which consisted in the self-assessment of their utilization ability of word processors(five items), spreadsheets (five items) and presentation software(four items), and report of the first time they used the applications, which were to be chosen from the following options: Inexperience, Kindergarten, Class in elementary school, Class in junior high school, Club activities in junior high school, Class in high school, Club activities in high school, After graduated from high school, Activity class outside of school, Taught by my family, Others. Here, the five items for the skill level for word processors are the following options: 'Inexperienced' which means they have no previous experience or can hardly use this application; 'Beginner' which expresses they can easily input texts and can do document formatting (fonts, colors, text alignments, etc.); 'Intermediate' which describes they can commonly use to the level they can create a document with letters and charts; 'Upper intermediate' which explains they can make somewhat advanced settings such as merge printing and review in addition to the writing of letters and charts; 'Advanced' which denotes they can use advanced functions such as collaborative editing work by sharing files. Next, the five items rating the level of ability in spreadsheets are the following: 'Inexperienced' which means they have no previous experience or can hardly use this application; 'Beginner' which expresses they can easily input data and can do cells formatting (fonts, colors, text alignments, etc.); 'Intermediate' which describes they can use up to functions or else tally a data; 'Upper intermediate' which explains they can use up to graph creation and pivot tables; 'Advanced' which denotes they can use advanced features such as collaborative editing work by sharing files. Finally, the four items for the level of ability in presentation software are the following: 'Inexperienced' which means they have no previous experience or can hardly use this application; 'Beginner' which expresses they can create simple slides with only text and charts; 'Intermediate' describes they can create slides with animation in addition to text and charts; 'Advanced' which denotes they can create files with advanced usage such as insertion of sounds or use a slide master. They completed the questionnaire within 15 minutes.

One male student was excluded from the respondents and only female respondents who answered correctly to the questionnaire were selected for the final data analyses, and the number was 297 respondents.

DATA PROCESSING

The data processing was carried out using R version 3.4.4, which is at once statistical analysis application and open source type software (R Core Team, 2018). A chi-square test was used to test independence for a contingency table. Correspondence analysis (CA) was used to analyze the data as well as characterize the response to the survey using the R package 'FactoMineR' version 1.41 (Sebastien Le, et al, 2008), and then the package 'facto extra' was used for visualizing the result of CA data (Kassambara&Mundt, 2017).

RESULTS

Word Processors

The contingency table shown in Table 1 presents the self-assessment of female college student's ability to utilize word processors and the first time they used this application. The largest number of the first time they used word processors was the 'Class in junior high school', the number was 123 respondents, in which 55 students were 'Beginner', 49 students were 'Intermediate'.The second largest number for the first time they used this application was 86 respondents who were in the 'Class in high school'. Among them, 'Beginner' and 'Intermediate' users were 38 and 36, respectively. Note also that of all of the respondents, the percentage of students who were 'Beginner' and 'Intermediate' were 40.1% and 41.1%, respectively. A chi-square test of independence was calculated comparing the frequency of the level of awareness of female college student's ability to use word processors and the first time they used this application. In this data set, the row and column variables are statistically significantly associated ($\chi^2(40) = 85.794$, $p < .05$).

Table 1: Contingency table with the first time female college students used word processors, with the self-assessment of ability to utilize this application.

The first time students used software	Self-assessment of utilization ability					Total
	Inexperienced	Beginner	Intermediate	Upper intermediate	Advanced	
Inexperience	2	0	1	0	0	3 (1.0%)
Kindergarten	0	0	1	0	0	1 (0.3%)
Class in elementary school	4	18	24	13	1	60 (20.2%)
Class in junior high school	9	55	49	10	0	123 (41.4%)
Club activities in junior high school	0	1	3	0	0	4 (1.3%)
Class in high school	10	38	36	1	1	86 (29.0%)
Club activities in high school	0	4	3	1	2	10 (3.4%)
After graduated from high school	1	0	0	0	0	1 (0.3%)
Activity class outside of school	0	1	0	0	0	1 (0.3%)
Taught by my family	0	1	5	0	1	7 (2.4%)
Others	0	1	0	0	0	1 (0.3%)
Total	26 (8.8%)	119 (40.1%)	122 (41.1%)	25 (8.4%)	5 (1.7%)	297 (100%)

Figure 1 shows the Scree Plot and the percentage of explained variances in theCA for the use of word processors. The proportions of variances in the CA for this application were 40.6%, 27.6%, and 22.2% for the dimensions 1 through 3, respectively. This is equivalent to a total cumulative variance of 90.4%,summing up total variance (inertia) retained by the 3 dimensions. According to Bendixen (1996), any axis contributing more than the maximum percentages of either the average value of the eigenvalue for each axis in terms of rows or columns should be regarded as significant and included in the solution.The Dimension 3 is below the maximum of average eigenvalue(25.0%). Thus, only Dimensions 1 and 2 is used in this work.

The results of the variables from CAfor word processorsare listed in Table 2.The row items, which are'Club activities in high school', 'Taught by my family', 'Inexperience', and 'After graduated from high school'and add up to 87.9%, were the most important contributors to the definition of the first dimension;the column items, which are'Advanced' and 'Inexperienced'and add up to 93.4%,were the most important contributors to the first dimension. As for the second dimension, the row items, whichare 'Inexperience', 'Club activities in high school', 'Class in elementary school', 'After graduated from high school', and 'Taught by my family', contributed to the most (total was 84.1%); the columns items, which are 'Advanced', 'Inexperienced', and 'Upper intermediate', were the most important contributors totalling 97.9%.

In regarding tothe quality of representationof the rows, all the introduction times to the application except four items, which are 'Kindergarten', 'Club activities in junior high school', 'Activity class outside of school', and 'Others', were well represented in two dimensions. Likewise, as for the quality of representationof the columns, three items, which are'Advanced', 'Inexperienced', and 'Upper intermediate', were well represented in the two dimensions.

Two-dimensional projection of the rows and columns variables coordinates on Dimension 1 (40.6% of explained variance) and Dimension 2 (27.6% of explained variance) illustrated in Figure 2 shows the following associations: 1) 'Advanced' skill level students were taught by their family how to use word processors; also they were using this application in high

school club activities; 2) 'Inexperienced' skill level students used this application for the first time at high school classes; 3) 'Upper intermediate' skill level students were using in elementary or junior high school classes.

Table 2: Result of the variables from CA for the use of word processors

Variables	Masses	% Inertia	Dimension 1 Coord	Dimension 1 % Contrib	Dimension 1 Cos^2	Dimension 2 Coord	Dimension 2 % Contrib	Dimension 2 Cos^2	Quality
The first time students used software									
Inexperience	0.010	4.391	-1.332	15.288	0.408	1.250	19.790	0.359	0.767
Kindergarten	0.003	0.483	0.131	0.050	0.012	0.019	0.002	0.000	0.012
Class in elementary school	0.202	4.830	0.158	4.299	0.104	-0.269	18.275	0.302	0.406
Class in junior high school	0.414	1.038	-0.076	2.038	0.230	-0.111	6.427	0.494	0.724
Club activities in junior high school	0.013	0.708	0.074	0.064	0.011	-0.043	0.031	0.003	0.014
Class in high school	0.290	2.257	-0.151	5.645	0.293	0.158	9.021	0.319	0.612
Club activities in high school	0.034	7.115	1.236	43.883	0.723	0.666	18.734	0.210	0.933
After graduated from high school	0.003	3.509	-2.064	12.232	0.409	1.865	14.696	0.334	0.743
Activity class outside of school	0.003	0.504	-0.097	0.027	0.006	-0.226	0.215	0.034	0.040
Taught by my family	0.024	3.548	0.905	16.447	0.544	0.653	12.596	0.283	0.827
Others	0.003	0.504	-0.097	0.027	0.006	-0.226	0.215	0.034	0.040
Self-assessment of utilization ability									
Inexperienced	0.088	8.251	-0.707	37.291	0.530	0.527	30.454	0.294	0.824
Beginner	0.401	2.602	-0.033	0.375	0.017	-0.064	2.039	0.063	0.080
Intermediate	0.411	1.746	0.045	0.709	0.048	0.005	0.014	0.001	0.049
Upper intermediate	0.084	6.548	0.278	5.544	0.099	-0.536	30.283	0.369	0.468
Advanced	0.017	9.740	1.976	56.081	0.675	1.327	37.210	0.305	0.980

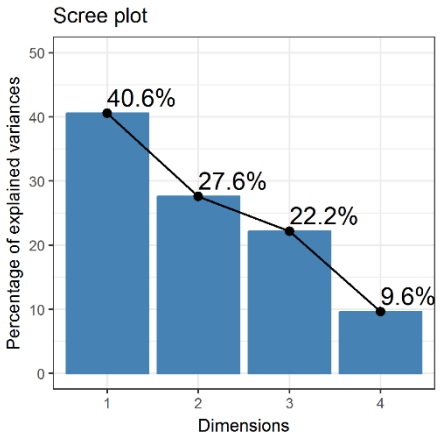

Figure. 1: The scree and percentage of explained variance plots for the use of word processors.

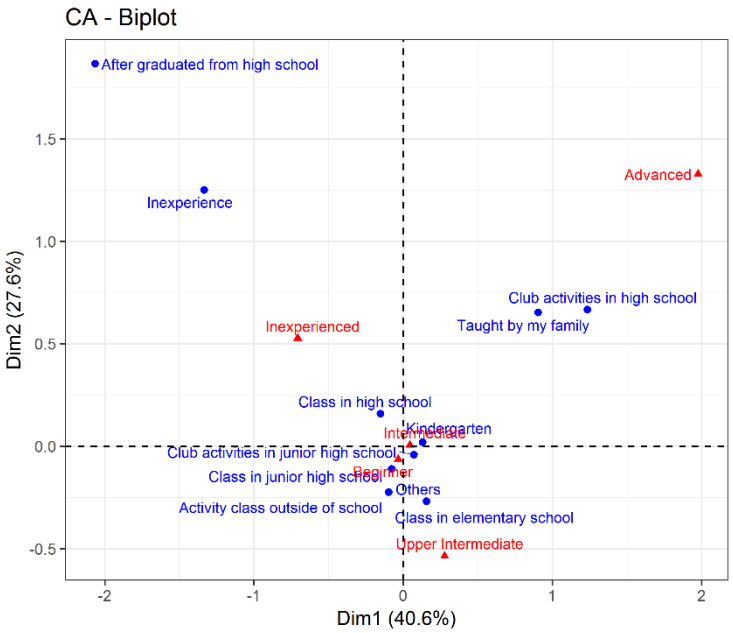

Figure. 2: Biplot in dimensions 1 and 2 of the use of word processor. The circles represent the rows. The triangles represent the columns.

SPREADSHEETS

The contingency table of the self-assessment of female college student's ability to utilizespreadsheets and the first time they used this applicationis presented in Table 3.The largest number of the first time they used the spreadsheet was the 'Class in high school' with 167 students. Of those who answered 'Class in high school', 78 students were 'Beginner', 39 students 'Inexperienced', 32 students'Intermediate', 17 students 'Upper intermediate', and one student 'Advanced'.The

second largest number for the first time was 88 respondents who were in the 'Class in junior high school', in which 'Beginner' and 'Intermediate' users were 48 and 20, respectively.Of all of therespondents, 47.5% were 'Beginner', 21.5% 'Inexperienced' and 'Intermediate', 8.4% 'Upper Intermediate', and 1.0% 'Advanced'.A chi-square test of independence was calculated comparing the frequency of the level of awareness of female college student's ability to use spreadsheets and the first time they used thisapplication. In this data set, the row and column variables are statistically significantly associated ($\chi^2(32) = 103.84$, $p < .05$).

The Scree Plot and the percentage of explained variances in the CA for the use of spreadsheets are pictured in Figure 3. The percentage of Dimension 2was slightly lesser than the maximum value (25.0%)of the average eigenvalue for each axis in terms of rows and columns, but it is reasonable to take the number of dimensions to be 2.Moreover, note that the cumulative percentage up to Dimension 2 took the value of 89.5%.

Table 4 shows the results of the variables from CA for spreadsheets.The row item 'Taught by my family' and the column item 'Advanced' were the most important contributors to the first dimension. With regard to the second dimension, the row items, which are'Inexperience' and 'Class in elementary school', contributed to the most (total of 83.5%); whereas the column 'Inexperienced' was the most important contributor. As far as the quality of representationof the rows are concerned, all the introduction times to the application except two items, which were 'Club activities in junior high school' and 'Club activities in high school', were well represented in two dimensions. In the same way, as for the quality of representationof the columns, all levels were well represented in the two dimensions.

Table 3: Contingency tablewith the first time female college students used spreadsheets,with the self-assessment of ability to utilize this application.

The first time students used software	Self-assessment of utilization ability					
	Inexperienced	Beginner	Intermediate	Upper intermediate	Advanced	Total
Inexperience	7	1	1	0	0	9 (3.0%)
Kindergarten	0	0	0	0	0	0 (0.0%)
Class in elementary school	0	9	7	2	0	18 (6.1%)
Class in junior high school	15	48	20	5	0	88 (29.6%)
Club activities in junior high school	0	0	1	0	0	1 (0.3%)
Class in high school	39	78	32	17	1	167 (56.2%)
Club activities in high school	1	3	0	0	0	4 (1.3%)
After graduated from high school	1	1	0	0	0	2 (0.7%)
Activity class outside of school	0	0	0	0	0	0 (0.0%)
Taught by my family	0	1	2	1	2	6 (2.0%)
Others	1	0	1	0	0	2 (0.7%)
Total	64 (21.5%)	141 (47.5%)	64 (21.5%)	25 (8.4%)	3 (1.0%)	297 (100.0%)

Table 4: Result of the variables from CA for the use of spreadsheets

Variables	Masses	% Inertia	Dimension 1 Coord	Dimension 1 % Contrib	Dimension 1 Cos^2	Dimension 2 Coord	Dimension 2 % Contrib	Dimension 2 Cos^2	Quality
The first time students used software									
Inexperience	0.030	0.057	-0.319	1.349	0.054	1.310	61.259	0.907	0.961
Class in elementary school	0.061	0.023	0.037	0.037	0.004	-0.559	22.306	0.832	0.836
Class in junior high school	0.296	0.012	-0.098	1.258	0.245	-0.132	6.091	0.441	0.686
Club activities in junior high school	0.003	0.012	0.225	0.074	0.014	-0.681	1.839	0.127	0.141
Class in high school	0.562	0.005	-0.044	0.482	0.203	0.039	0.987	0.154	0.357
Club activities in high school	0.013	0.006	-0.241	0.343	0.122	0.094	0.140	0.019	0.141
After graduated from high school	0.007	0.005	-0.299	0.264	0.130	0.680	3.667	0.673	0.803
Taught by my family	0.020	0.220	3.295	96.166	0.996	0.204	0.991	0.004	1.000
Others	0.007	0.009	-0.096	0.027	0.007	0.585	2.719	0.259	0.266
Self-assessment of utilization ability									
Inexperienced	0.215	7.137	-0.199	3.722	0.119	0.539	73.841	0.878	0.997
Beginner	0.475	2.270	-0.087	1.589	0.160	-0.143	11.485	0.429	0.589
Intermediate	0.215	2.947	0.107	1.087	0.084	-0.198	9.986	0.287	0.371
Upper intermediate	0.084	1.197	0.178	1.170	0.223	-0.126	1.577	0.112	0.335
Advanced	0.010	21.412	4.569	92.433	0.985	0.511	3.112	0.012	0.997

The biplot of the rows and columns variables is presented in Figure 4. Dimension 1 explains 65.2% whereas Dimension 2, 24.3%. Figure 4 shows that the following relationships are present: 1) 'Advanced' skill level students were taught by their family how to use spreadsheets; 2) 'Inexperienced' skill level students used this application for the first time after graduating from high school or have used this application on another opportunity; 3) 'Beginner', 'Intermediate', and 'Upper intermediate' skill level students were using in junior high school and high school classes.

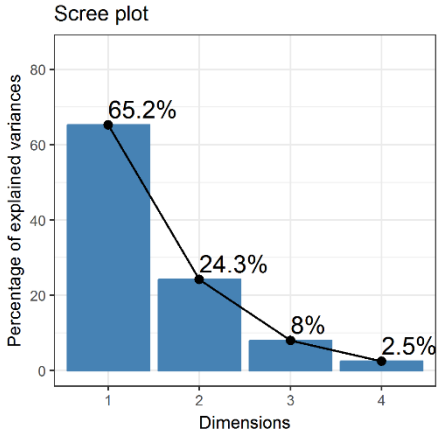

Figure. 3: The scree and percentage of explained variance plots for the use of spreadsheets.

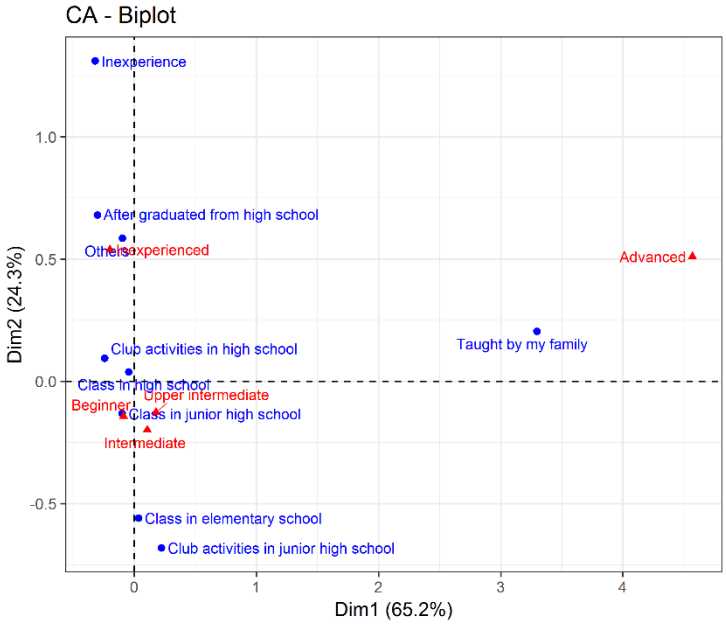

Figure. 4: Biplot in dimensions 1 and 2 of the use of spreadsheets. The circles represent the rows. The triangles represent the columns.

PRESENTATION SOFTWARE

Thecontingency table of the self-assessment of student's ability to utilize a presentation software and the first time they used this application is shown in Table 5.The largest number for the first time they used the presentation application was 114 respondents who were in the 'Class in junior high school', in which 'Beginner' and 'Intermediate' students were 59 and 43, respectively.The second largest number of the first time was the 'Class in high school', and the number was 105 students. Of those who answered 'Class in high school', 60 students were 'Beginner'', 30students 'Intermediate', and 15students 'Inexperienced'.Note that the 'Beginner' amounted to 50.5% and 'Intermediate' to 33.7% of the whole, which sum up to 84.2% of the respondents. A chi-square test of independence was calculated comparing thefrequency of the level of awareness of female student's ability to use the presentation softwareand the first time students used this application. In this data set, the row and column variables are statistically significantly associated ($\chi^2(27) = 105.55$, $p < .05$).

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The Scree Plot and the percentage of explained variances in the CA for the use of the presentation software are illustrated in Figure 5. The percentage of Dimension 2 was below the maximum value (33.3%) of the average eigenvalue for each axis in terms of rows and columns, though, it is acceptable to take the number of dimensions to be 2, which corresponds to a cumulative percentage at 94.6%.

Table 5: Contingency table with the first time female college students used the presentation software, with the self-assessment of ability to utilize this application.

The first time students used software	Self-assessment of utilization ability				
	Inexperienced	Beginner	Intermediate	Advanced	Total
Inexperience	9	0	0	0	9 (3.0%)
Kindergarten	0	0	0	0	0 (0.0%)
Class in elementary school	5	21	19	2	47 (15.8%)
Class in junior high school	8	59	43	4	114 (38.4%)
Club activities in junior high school	0	3	4	0	7 (2.4%)
Class in high school	15	60	30	0	105 (35.4%)
Club activities in high school	0	6	2	1	9 (3.0%)
After graduated from high school	1	0	0	0	1 (0.3%)
Activity class outside of school	0	1	0	0	1 (0.3%)
Taught by my family	0	0	1	1	2 (0.7%)
Others	1	0	1	0	2 (0.7%)
Total	39 (13.1%)	150 (50.5%)	100 (33.7%)	8 (2.7%)	297 (100.0%)

Table 6: Result of the variables from CA for the use of the presentation software

Variables	Masses	% Inertia	Dimension 1 Coord	Dimension 1 % Contrib	Dimension 1 Cos^2	Dimension 2 Coord	Dimension 2 % Contrib	Dimension 2 Cos^2	Quality
The first time students used software									
Inexperience	0.030	0.200	2.559	77.457	0.990	0.259	2.545	0.010	1.000
Class in elementary school	0.158	0.005	-0.085	0.445	0.212	0.121	2.900	0.431	0.643
Class in junior high school	0.384	0.014	-0.185	5.109	0.944	0.031	0.462	0.027	0.971
Club activities in junior high school	0.024	0.008	-0.373	1.283	0.418	-0.112	0.367	0.037	0.455
Class in high school	0.354	0.016	0.053	0.381	0.062	-0.190	15.935	0.813	0.875
Club activities in high school	0.030	0.015	-0.432	2.209	0.385	0.347	4.559	0.248	0.633
After graduated from high school	0.003	0.022	2.559	8.606	0.990	0.259	0.283	0.010	1.000
Activity class outside of school	0.003	0.003	-0.354	0.165	0.128	-0.479	0.966	0.234	0.362
Taught by my family	0.007	0.061	-0.689	1.249	0.053	2.917	71.607	0.943	0.996
Others	0.007	1.109	1.085	3.097	0.716	0.212	0.377	0.027	0.743
Self-assessment of utilization ability									
Inexperienced	0.131	22.090	1.295	85.968	0.997	0.073	0.883	0.003	1.000
Beginner	0.505	3.155	-0.179	6.320	0.513	-0.136	11.602	0.294	0.807
Intermediate	0.337	2.532	-0.196	5.069	0.513	0.046	0.908	0.029	0.542
Advanced	0.027	7.764	-0.501	2.643	0.087	1.604	86.608	0.893	0.980

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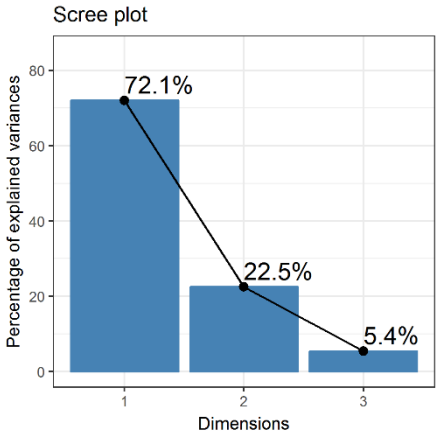

Figure. 5: The scree and percentage of explained variance plots for the use of presentation software.

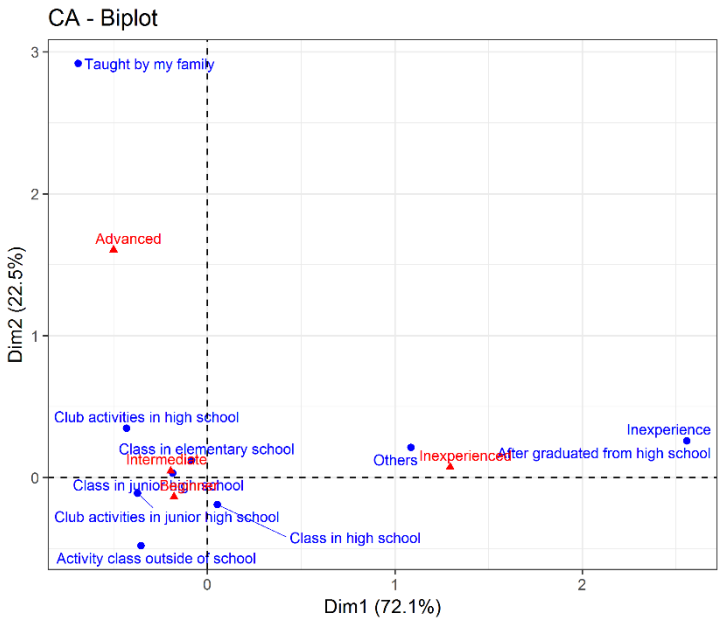

Figure. 6: Biplot in dimensions 1 and 2 of the use of presentation software. The circles represent the rows. The triangles represent the columns.

With regard to the second dimension, the row items, which were‘Taught by family’ and ‘Class in high school’, contributed the most (total of 87.5%); and the column ‘Advanced’ was the most important contributor. As far as the quality of representationof the rows is concerned, all the times were well represented in two dimensions. Likewise, in regardto the quality of representationof the columns, all levels were well represented in the two dimensions.

The projections of the rows and columns coordinate on Dimension 1 (72.1% of explained variance) and Dimension 2 (22.5% of explained variance) are displayed in the same map as shown in Figure 6. Furthermore, these shows the following associations: 1) ‘Advanced’ skill level students were taught by their family how to use the presentation software; 2) ‘Inexperienced’ skill level students have never used this application at all or used this application for the first time after graduating from high school or else they used the application on another opportunity; 3) ‘Beginner’ and ‘Intermediate’ skill level students were using in elementary school classes, junior high school classes as well as high school classes. They were using in Club activities in junior high school or high school as well. Moreover, note that they had used in activity class outside of school.

DISCUSSION

The results of this study showthatthe self-assessment of ability‘Beginner’ hiked from 40.1% (word processors) up to 47.5% (spreadsheets)to then reach50.5% (presentation software). Likewise,for the ability ‘Intermediate’, the figures read 41.1% (word processors), 21.5% (spreadsheets), and 33.7% (presentation software).The total values of these‘Beginner’ and ‘Intermediate’ percentages for each software were81.2% (word processors), 69.0% (spreadsheets), and 84.2% (presentation software).Therefore, for information literacy subjects targeted to female students in higher education, teachers need to consider the lesson plans and the progress of classes and keep in mind that about 80% of students are at beginner or intermediate levels.In particular, for the percentage of ‘Beginner’, the values are increasing in the order of word processors, spreadsheets, presentation software. Even in curriculum design, it is necessary to consider the composition order of the subjects handling this application, while at the same time considering the class composition (number of people, ability level of members) in the lesson.

With regard to word processors,‘Upper intermediate’ skill level students were associated with ‘Class in elementary’or ‘Class in junior high school’.Taking this relevance into account, using word processors in elementary and junior high school classes (in other words, compulsory education in Japan) implies improving the student’s awareness of the ability to use this application.Therefore, by using word processors stepwise and continuously under compulsory education, the difficulty of awareness of using word processors would probably decrease.

On the other hand, as for spreadsheets,‘Beginner’, ‘Intermediate’, and ‘Upper intermediate’ skill level students were associated with ‘Class in junior high school’ or ‘Class in high school’.It is clear that ‘Upper intermediate’ skill level students in spreadsheets are higher in grades than ‘Upper intermediate’ skill level students in word processors.Thus, the number of opportunitiesthat students have to handle spreadsheets in junior high school and high school classes should be

increased relative to those in elementary school. Meanwhile, restricting to the female case,previous studies have pointed out that femalecollege students feel difficulties towards handlingmathematical functions when using spreadsheets (Nishikawa &Izuta, 2016). Therefore, in a class dealing with spreadsheets, it is necessary to carefully explain the meanings of functions and how to use it. This would help students to deepen their understandings of how to handle spreadsheets and eliminate their concerns.

Considering presentation software, this application was used frequently from elementary school to high school and club activities. This may be used in every scenario of school life due to an easy-to-understand user interface and simple handling method.

Of particular interest is 'Advanced' students. As in the previous cases, it was taught by family members.The perception of students' ability to use the application is influenced not so much by school education but by interacting with family members. In this sense,families should understand the students go more deeply and take appropriate measures according to their interests. In order to analyze this, it is necessary to investigate information education for children at home.

FINAL COMMENTS

This work was concerned with the assessment of the ability perceptions of Japanese female college students towards the use of office suites. The findings of this study help teachers understand the awareness of ability levels that students have to cope with in information literacy classes during the higher education, which in turn allow teachers to improve the curriculum or explore teaching methods on information literacy subjects.

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