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Graphics Development for the Self-efficacy Scale: A Study of Validity and Reliability

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ABSTRACT Graphs are seen in various fields from engineering to education, they are used in many different kinds of areas for various aims. But in either learning or teaching and all the steps of education, graphs have to be structured properly according to various conditions. The objective of this study was to develop a reliable and valid scale to measure the competencies of graphics class students concerning their graphic developments. The draft scale was applied to students, who had taken graphics course. Primarily, it was conducted with a normal distrubiton analysis for reliability and validity of the scale. As a result of these processes, a valid and reliable measurement tool of three dimensions and forty-seven items were obtained. Since GDSES analyzes the graphic competencies of people who have received a graphics course and helps identify the shortcomings in this topic, the scale can be used in various studies.

INTRODUCTION

Given the current advances in communication technology, the ability to research information has developed rapidly. With the advent of the 20th century, the age of continuously renewing technology had begun. During this time, the computer spread throughout the field of education, as it did in every field (Gautam 2014). The use of computer and its technologies in the different fields presents availability (Abramauskienë 2015). One of the different fields is art and the experts from this field are aware of the technological developments that may be used in the arts field (Zor and Tepecik 2015). Computers are one of the most important resources that enable information technology (Schwalbe 2016). The need to educate new generations, who can make use of the possibilities, which are available now with the advancement in international platforms, who know how to access and use knowledge, and most important of all, to produce new knowledge, makes the use of this technology essential (Chong et al. 2015). The effectiveness of computers on learning is one of the subjects that many years and researchers study on different instructional approaches (Basoz and Tufekci Can 2016).

Instructors now have varied materials for use in educational environments, including many visual aids. In the 15th century, only books were used as an education tool. Today, however, visual aids have become an inevitable part of this process. By using items like photographs or videos, a more visual learning environment can be created (McLuhan 2011). In the meantime, graphics, texts and digital images have redounded emphasis in the lives and guide new structures in education is unavoidable (Celebi Erol 2015). Nowadays, computers are the most critical devices to provide this. One cannot create visual, auditory, or moving elements without having computer technology (Wright 2016). When an instructor uses visual aids, the ability to capture the attention of the listeners increases. Therefore, it can be observed that using graphs can make the lesson content more sophisticated. When reviewing the international literature from past to present, one can find this frequently and it can be seen as evidence for how important it is. In addition to this, many of the content models that were created by computers are used in education (Heller 2015). The graphic courses help learners assort ideas more effectively. Graphic tools are designed to make easy apperception of key conceptions by allowing learners to visually identify key points and ideas.

There are syllabuses, which were revised to produce an effective learning process and in order to get empirical and quick results (Ukpok odu 2010). This was done because papers with-

out graphs tend to cause learning problems, not only for the student but also can cause teaching problems for the instructor. Indeed, misconceptions occur for both the students and their instructor (Ozdilek et al. 2010). It is now very important to use visual aids in education to help students recall and use information. Materials used in education need to have some particular features, for example, to aid facilitating recall, being attractive, balancing between abstract and concrete topics, being suitable for the senses and being satisfactory for the student's demands (Biggs and Tang 2011). Developed technology opportunities provide huge advantages if they are preferred in educational areas, and since its efficiency is far bigger than expected, both visual and oral technologies are used (Akturk et al. 2013).

To be able to design a graph, a particular level of knowledge is needed. With this in view, students realize critical points with respect to their capacities (Meggs and Purvis 2012). Students have to determine important points with respect to their audience. Additionally, people who work in this area are educated and do not hesitate to produce practical solutions and to optimize their opportunities (Noble and Bestley 2011). When organizing graphs, the ability to use graphics improves since different kinds of items exist in the process (Secken and ZanYoruk 2012). These items are expressed as graphic interpretation, modeling and conversion. The basic purpose of this is to raise the quality to the highest level, both aesthetically and in terms of communication (Becer 2015).

Graphs are seen in various fields in the literature, from engineering to education, and they are used in many different kinds of areas for various aims. But in either learning or teaching and all the steps of education, graphs have to be structured properly according to various conditions. Graphs are used primarily as devices to illustrate the content of a text or piece of research. Nowadays, very good results can be achieved, thanks to the use of graphics software in many lessons.

Designing a graph is a presentation that visualizes the information using texts, images (Serafini 2011) and colors (Arntson 2012). Even though a graph designer is not as free as an artist, he/she applies various types of expressions and methods to do his/her job (Eczacibasi Art Encyclopedia 2012). In order to apply these methods, he/she has to display all the proficiencies, which is expected from him/her. Lots of processes can be carried out if proficiencies and experiences are used properly. For instance, slogans, advertising texts, webpages and posters are graphic artworks one always meets in daily life. The aim of this art is to inform people in a lot of areas from culture to education, from health to communication (Zande 2010). Because of its dynamic structure, subjects taught in graphic arts in higher education institutions are changed year by year. The work designed has to contain current content, which is why graphic designers always need to follow community development and changes. Otherwise, he/she cannot do his/her fundamental job. In graphics courses learners study how to draw, design and plan electronically with graphic programs. They create arcs, borders and shapes to perform objects that can be lithochromatic, manipulated, acted, duplicated, proportional, rolled, smoothed and scalable graphics for both print and the web. In classes first, the instructor, then class, after the group and the last, individual does it.

Design is a graphical description of thought. At the end of the particular process, aesthetic integrity emerges (Landa 2011). Results of globalization have been effective in almost every area. Graphic designers have also been affected, however, in the beginning, this effect was seen to be affirmative, but later unfavorable effects were observed for graphic designers. Sometimes they have even faced identity problems (Selamet 2010).

Objectives

Usually for academic studies, the relevant literature studies are searched related to the subject. However, for this study there were not enough sources, indeed, there were not of any kind of empirical dimensions. This study intends to give information to students who have taken a course related to the subject before. This emergent deficiency provides complementary knowledge for graphic designers. With respect to this view, this study aims to create a Graphics Development for Self-efficacy Scale (GDSES) and to seek variability and reliability of the scale.

METHODOLOGY

Participants

The study group of this research consisted of 105 students from the 2014-2015 academic year. In this respect, the study group comprised

105 volunteers who had been randomly selected, who had taken up the graphics course and wanted to improve their graphics development skills. The research study included 53 (50.5%) female and 52 (49.5%) male participants who wanted to improve their graphics development skills.

As it is observed in Table 1, there were 89.5 percent respondents in the 20-25 age range, 5.7 percent respondents in the 26-30 age range, and 4.8 percent respondents in the age range of 30 and over.

Table 1: Profile of the participants

Age	*Frequency*	*Percent (%)*
20-25 years	94	89.5
26-30 years	6	5.7
30 and above	5	4.8

Data Collection Instruments

The Graphics Development for the Self-efficacy Scale is made up of three parts, which are, "Image and Text Processing", "Basic Web Tools" and "Advanced Web Tools". These competencies were shown under these headings.

Graphics Development for Self-efficacy Scale

To diagnose the problems of graphic development studies in the literature and the content of chart courses at undergraduate level, many universities were searched and the aims were determined. Based on the relevant literature and course curriculum graphic material, a variety of objectives and targets of the graphic class have been converted to items. In another phase of the study, the views of the faculty members in higher education institutions were applied and they were required to write their opinions, aims and their targets for their lectures. The faculty members, who were consulted, shared their opinions about self-efficacy for graphics development by writing or consulting. In the third part of research, self-efficacy for graphics development was reviewed by taking their opinions into consideration and creating a storage pool that included the questionnaire items for graphics development. The questionnaire was developed and named the "Graphics Development for Self-efficacy Scale" by searching previous research and using a 4-point Likert type scale. This questionnaire was employed as a data collection device. A framework form was prepared using an item storage pool created for a data collection device, and 227 sufficiency items were created for developing a graph in a framework form. In order to evaluate items numerically and qualitatively according to how much they were appropriate for the desired aim, the views of the experts in graphic development, graphic designers and academics were applied. Their notions were N=7, N=4 and N=15, respectively. After expert negotiation results, 180 expressions were removed from subsuming of the scale because of not being suitable. Thereafter, the framework form was updated according to the specialist advice. In this manner, the content validity of the data device was provided. After the update process and the required adjustment of the data collection device with regard to confirmation of the graphic development, graphic designers and academics, some of the items were elected and, after all this, 47 items remained. These items were given to 105 students and a validity and reliability analysis was performed.

In the different studies concerning scale development tools, the cutpoint was claimed to take the factor load, varying from 0.30 to 0.40 (Coklar and Odabasi 2009; Gurbuzturk and Sad 2010; Johson and McClure 2004; Neale and Liebert 1980; Ozcinar 2006; Stevens 1996; Tuan et al. 2000). As a result of statistical analysis, items containing a factor load of equal to, or more than 46, were used. Moreover, the difference between the two loads being ten was also taken into consideration. In this way, an independency in the factors was achieved.

The Likert-style items were used to evaulate GDSES. These were scored as 4 for "I can do it completely", 3 for "I can partially do it", 2 for "I can slightly do it", and 1 for "I cannot do it at all".

Data Analysis

In the application, the necessary explanations about the scale were given to participants and the importance of answering questions honestly was explained. The data was analyzed using the SPSS 16.0 packet program. The 0.05 level estimated value was interpreted as meaningful. For the analysis of the validity and reliability of GDSES, primarily normal distribution analysis,

which contained the operations of mean, median, mode, standard deviation, variance, minimum and maximum values, range, skewness and kurtosis were used. As in many studies, Barlett's test of Sphericity (BTS) was applied and the Principal Component Analysis (PCA) and Varimax Rotation were calculated. The factor analysis, which is a flexible data analysis, is considered as the most powerful method for the application of structure validity (Buyukozturk 2006; Kahn 2006; Kerlinger 1973; Tavsancil 2006). While developing a scale, the size of the sample must be taken into consideration when doing a factor analysis with multiple variables (Preacher and MacCallum 2002; Sapnas 2004). Upon examining the literature review, the researchers observed that the minimum size of sample should be varied from 100 to 250 (Sapnas 2004). Therefore, the number of participants in the study group for the factor analysis in GDSES was 105.

RESULTS

When the researchers observed the results of the reliability and validity tests, there was the highest point of 4.00 and the lowest point of 1.00 for each factor in the analysis of normal distribution of the self-efficacy scale for graphics improvement. It can be accepted that the closer to point 4 it was, the better was the degree of students' self-efficacy scale for graphics improvement. Thus, the total points from the questionnaire form were at the lowest point, 47, and the highest point, 188, as measured by this scale. In this study, the lowest point recorded was 67, while 188 was the highest point. The range of the sequence was expected to be 141, including all scale scores from the most negative attitudes to the most positive attitudes. In this study, the range of the sequence recorded was 121. The scale can be seen to include a significant portion of the expected range. The mean value of 146.21, a median value of 150 and a standard deviation value of 40.31 were observed. Values calculated were a kurtosis value of -.53 and a skewness value of -.40 for the distribution.

Distribution of the Data Converged to a Normal Distribution

In order to determine the factoring status options on the scale and the factor load of the options, an exploratory factor analysis was conducted. Besides this, the content and structure validity of the scale was analyzed in a factor analysis. Before starting the exploratory factor analysis of the scale factorization to the appropriateness of the data structures and to collect data to state whether or not to represent the population, the researchers had to look at Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity test results given in Table 2.

The KMO test for overall graphics development for the self-efficiacy skills for students gave a score of 0.906. In order to determine the construct validity, the exploratory factor analysis, an options-total correlation coefficient and distinguishing features of the material crimination techniques were used. In the reliability analysis, the Cronbach's Alpha Reliability Coefficient was analyzed and was found to be 98. The Graphics Development For Self-efficacy Scale KMO had a value of 0.906 and Bartlett's test was found to be significant (χ^2= 5326.858, df= 1081, p <0.001). It was indicated that the minimum KMO index values must be 0.6 and it was proposed to be greater than 0.6 for a good factor analysis, as well as this, Bartlett's test must be significant (Tabachnick and Fidel 1996; Büyüköztürk 2006). The significance of the Bartlett test shows that the data was suitable for factor analysis. Therefore, the value obtained was regarded as an indication of the data obtained, and the sample size was sufficient and suitable for factor analysis. Common variance (communalities) of forty-seven options defined about GDSES options were observed to vary between 0.42 and 0.82. The Explained Total Variance values in Table 3 shows that the eigen values of the 47 options included several big ones grouped under three factors. The variance was explained by three factors related to the scale as 66.45 percent.

As it is observed in Table 3, the cumulative percentage for three factors was estimated as

Table 2: Correlation matrix for graphics development for the self-efficiacy (n=105)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.906
Bartlett's Test of Sphericity	Approx. Chi-square	5326.858
	df	1081
	sig.	0.000

Table 3: GDSES the results of factor analysis total variance explained

Component	*Initial Eigen values*			*Extraction sums of squared loadings loadings*			*Rotation sums of squared loadings*		
	Total	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*
1	24.316	51.737	51.737	24.316	51.737	51.737	14.319	30.465	
2	4.883	10.389	62.003	4.883	10.389	62.126	9.132	19.431	
3	2.034	4.327	66.453	2.034	4.327	66.453	7.782	16.558	
4	1.397	2.972	69.425						
5	1.155	2.458	71.883						

66.45 percent. The results obtained for the total and loadings percentages of variance are as follows, that is, the first factor was 24.316 and 51.737 percent. The second factor was 4.883 and 10.389 percent. The third factor was 2.034 and 4.327 percent. It was stated that in social sciences, the variances might differ from forty percent to sixty percent (Cokluk 2010; Dunteman 1989; Erdogan 2008; Gorsuch 2015; Hoe-Lau and Woods 2009; Kline 1994; Namlu and Odabasi 2007). The variance percentage of this study was above forty percent and is at an acceptable limit. As a result of Varimax rotation, the variance factor withthree factors and its distribution is stated as follows, that is, 30.465 percent for the first factor, 19.431 percent for the second and for the third factor is calculated as 16.558 percent.

The results of factor analysis were presented in Table 4. A three factors solution was explained.

Output has been derived from three components in Table 4. Each factor loading in Table 5 is a measure of the importance of the variable in measuring each factor. Factor one to measure graphic development for self-efficiacy of the image and text processing skills, with a total variance explained 51.737 percent. Factor two appeared to measure advanced web tools containing of considerable skills for example efficient software outcome and the process of developing web requirements with a total variance of 10.389 percent. Factor three is Basic Web Tools with a total variance of 4.327 percent.

In the analysis, the calculated mean for each scale item was between 2.41 and 3.54, whereas the standard deviations were between 0.69 and 1.06. The total correlations of the scale items were estimated between 0.31 and 0.83. The item-total correlations range changed between 0.42 and 0.83 for the dimension of Image and Text Processing. For the dimension of Basic Web Tools, the range size was 0.45 with 0.70, and for

Table 4: Results of rotated component matrix

Factor name	*Item No.*	*Component*		
		1	*2*	*3*
Image and Text Processing	17	0.808	0.192	0.086
	13	0.787	0.23	0.059
	8	0.782	0.169	0.182
	24	0.782	0.186	0.24
	16	0.773	0.314	0.127
	15	0.77	0.22	0.158
	12	0.747	0.2	0.025
	10	0.745	0.186	0.337
	5	0.741	0.146	0.271
	18	0.737	0.25	0.066
	11	0.733	0.121	0.319
	19	0.729	0.227	0.103
	9	0.729	0.102	0.207
	2	0.721	0.206	0.335
	3	0.701	0.1	0.432
	22	0.682	0.127	0.224
	1	0.68	0.18	0.4
	6	0.675	0.151	0.367
	25	0.659	0.296	0.408
	7	0.659	0.067	0.363
	14	0.657	0.356	0.263
	4	0.655	0.161	0.414
	21	0.613	0.325	0.351
	20	**0.586**	**0.328**	**0.291**
Advanced Web Tools	42	0.264	0.827	0.155
	37	0.229	0.82	0.114
	39	0.162	0.811	0.255
	41	0.153	0.809	0.287
	43	0.318	0.798	0.258
	40	0.214	0.79	0.197
	46	0.193	0.767	0.421
	45	0.301	0.736	0.429
	44	0.283	0.705	0.369
	38	0.357	0.701	0.247
	47	**0.147**	**0.68**	**0.481**
Basic Web Tools	30	0.22	0.351	0.745
	32	0.282	0.338	0.728
	33	0.367	0.275	0.713
	34	0.129	0.333	0.654
	27	0.369	0.294	0.654
	28	0.33	0.347	0.648
	29	0.407	0.349	0.622
	26	0.414	0.284	0.608
	31	0.402	0.351	0.582
	36	0.202	0.535	0.579
	23	0.493	0.248	0.558
	35	0.058	0.447	0.46
Percentage of variance explained		51.737%	10.389%	4.327%

the dimension of Advanced Web Tools, the range size changed from 0.62 to 0.81. As all the items' item-total test correlations of the scale were above 0.30, it was decided that all of the test substances indicated consistency with the whole (Balci 2001). In scientific research, the validity of the test is as important as its reliability. The reliability of a test is represented by the coefficient of reliability. A value that reflects the reliability of the scale criterion is the "internal consistency." The Cronbach's Alpha reliability coefficient was the most preferable to appraise the internal consistency (Firat 1996; Karasar 2008). In order to mention with a scale that internal consistency reliability, the scale of the measure must prove that it is the same feature of all dimensions (Gozum and Aksayan 2003). It carries measurement risks to use reliability coefficients of 0.60 or less. Overall, it is expected to exceed a 0.80 reliability coefficient, generally, it is used with 0.70 as the lower limit (Erefe 2004). The reliability of GDSES was calculated by the Cronbach's Alpha reliability formula. The total coefficient of Cronbach's Alpha reliability of the 47-item scale was calculated as 0.98.

As it is observed in Table 5, the reliability coefficient of the scale's three dimensions were for "Image and Text Processing" and calculated as 0.97, for "Basic Web Tools" it was calculated as 0.94 and for "Advanced Web Tools", calculated as 0.96. All the dimensions' reliability coefficients were over 0.70, and hene it means that they were reliable.

Table 5: Coefficient of Reliability of the Cronbach Alpha in accordance to the 3 sub-dimensions of GDSES

Sub-dimensions	*Coefficient of reliability*
Image and Text Processing	.97
Basic Web Tools	.94
Advanced Web Tools	.96

DISCUSSION

Upon reviewing the literature, the researchers also observed all factors of the self-efficacy scale. For instance, image and text processing involves competencies, software program entry settings, tool panels, settings of the created document, objects, filters, the use of colours, contours and styles, creating layers and pages, text processing and instructions and so on (Dogus University; Selcuk University; Istanbul Kultur University 2015; Gazi University; Sakarya University 2014). Besides this, it also requires that competencies be defined for exactly controlling the topic of image and text processing.

In graphic programs, the "Basic Web Tools" competencies show a user's equipment with tools adequacy. The person who uses all types of basic web skills in this with web-based tools can prepare several websites, within his own creativity (Antonenko and Thompson 2011). Many people have educational sources on their websites. In an active website, which was built by web tools, it is possible to encounter a lot of complicated content and this discourages individuals from learning (Khalifa and Shen 2004).

Different softwares are used for graphic courses and these will change in the departmant or program by the purpose. There are two softwares on graphic educations. These are pixel based or point based and object-oriented or vector based softwares. In pixel-based softwares, pixels combined together and make the graphics, and in vector-based softwares, it is defined by mathmetical equations while defining objects/graphics. These types of programs are used to change graphics. Graphics development self-efficacy was positively related to bitmap tools, exporting, .gif files, onion skin, opacity, polygon tool, properties panel, rectangle tool, repeating, scale tools, tweening and so on. Prior graphics development self-efficacy was the strongest predictor of graphics development self-efficacy. Experience may be required to achieve convenient self-efficacy end of the course or semester.

Graphics development for self-efficacy scale synthesises some experimential affirmation on the graphic program of use image and text processing with basic and advanced web tools in schooling and formats catchings in points related to communities of graphic developers especially in computer areas.

It was noted in this research that graphic development courses could also use the self-efficacy scale. None of the instruments in the literatueare developed to measure graphics development in courses. Thus, GDSES is an original instrument. When the factor structures in this study were examined, progress, growth, utilization emerged from first the sub-dimension to last one. There are also researches, which gave a lot of attention to graphics in education (Paek and Hoffman 2013; Yang et al. 2011) and the oth-

er applications like scientific areas (Schobel et al. 2013). Visual educational materials affect perception and comprehension skills of the student (Bulduk 2016). Today's graphic learners must know the latest and current technologies to develop educational visual area.

CONCLUSION

This study, which aimed at developing a graphic self-efficacy scale, consisted of forty-seven items. Following the results of the factor analysis, the scale was confined to three factors. The sub-factors of the scale were related to the literature and the curriculum and given in the following order of titles, that is, "Image and Text Processing", "Basic Web Tools" and "Advanced Web Tools." The whole scale's internal consistency was found to be (Cronbach α) 0.98. The scale total item was 47 and it had three factors. First factor had twenty-four items (α= 0.97). When the meanings, which contained these substances, were taken into account, this sector focused on the image and text processing for the application. Meaning that it contained these substances was considered of this factor for the application processing. Therefore, it can be named as "Image and Text Processing". For the second factor (α= 0.96), which consisted of eleven items, it can be said to be related to a common feature for higher level controlling and regulation of web tools used in the form. Therefore, it could be named as "Advanced Web Tools" for this factor. The third factor (α= 0.94) had twelve items. It was observed that a simple website prototype and the use of web tools items were collected on that factor. Hence, it is appropriate to call it "Basic Web Tools".

The properties concerning the entry settings of the program in which the "Image and Text Processing" dimension was used, contained explanations, which included usage competencies, such as working competency with generated pages, tool panel, work space, used the properties of vectorial objects and so on. All these expressions require people who had qualifications in image and text processing and could use applications in graphic software and work with image and/or text tools.

It can be said that the person who knows how to properly use the "Basic Web Tools" in graphics programs is able to both have knowledge of their previous competency and do better with their next competencies. So, the correct use of the competencies of this size is very important in the measurement of a person's implementation capacity. Basic Web Tools, which create a CSS-based dashboard for the web, as well as web image files, are often used nowadays. This varies according to the creativity of the users of web tools at exportation processes. Thus, the user can address more individuals creating a variety of tools. The tools being exported have the chance to be chosen more. The second dimension of the Graphics Development For Self-efficacy Scale consists of "Basic Web Tools", "developing bitmaps added on applications, vector objects and texts by live filters", "building web tools", "creating buttons and pop-ups", "creating effective image area", "creating dropdown menus", "creating CSS-based layouts", "making appropriate segment markings on the object being exported at the exportation process" and so on.

The last and third dimension consists of "Advanced Web Tools" of "creating slideshows", "making file exports", "using images on the web design editor", "creating Gif images", "optimization", "making appropriate edits supported by the web design editor" and so on. Advanced Web Tools are all about using created images on a web design editor, turning images into gifs and using them, optimization, comparing design and code-mode of the web editor. In order to be successful at this third dimension, it is necessary to have proficiency from previous dimensions. It can be stated that, one who has all the qualifications of "Advanced Web Tools" can create a website with all the details using her/his creativity.

In the scale, the item with the highest average (3.54) is "making color, outline and filling applications" and the one with the lowest average (2.41) is "creating a CSS-based website interface." Regarding the two items, it can be inferred that the users perceive and apply visual changes of colors easily and have difficulties understanding code-based studies, which are more technical topics. Yet, these results are for the students of the computer department. Thus, it is important to examine the results obtained from other departments. The results obtained from the study show that the scale is reliable and has a consistent structure considering all and the subdimensions.

RECOMMENDATIONS

GDSES comes into question since it helps students who are taking graphic lessons to analyze their proficiency in graphic development

and to determine their lack of experience. It is expected that GDSES, built by this study, will help educators, researchers, graphic developers and professionals determine the students' proficiency and preliminary and final information levels, as long as they use it as a preliminary and final test tool. The learning capacity of individuals gets higher if the foundations are strong. It can be expressed that an individual who has all the qualifications in the GDSES scale can bring out aesthetic studies in his/her designs using his/her entire background information gained from the course. However, supporting this study by different studies is recommended. Besides this, it is expected from the results that they can provide salutary evidence for the field of GDSES.

LIMITATIONS OF THE STUDY

The study has some limitations. Firstly, the contents are graphic course subjects. All the items created from graphic course topics. Secondly, the working group of the research was realized with students from computer department in various universities. Thirdly, the scale is limited to 105 students who participated in development. Following self-efficacy scale was assigned a final score of "I can do it completely", "I can partially do it", "I can slightly do it" and "I cannot do it at all".

FOR FUTURE STUDIES

In future studies, it is advised that GDSES should be applied to a larger sample group with more individuals. GDSES, applied to those who are taking this class, should also be applied to different grade level students and students from different departments. This study, which is done especially by those who took the course at undergraduate level and even by those who did not develop graphics in their business life, is important considering the results obtained. It is also important to compare the analysis performed and to determine validity of factor structure.

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