Effectiveness Of Assimilating Technology In Drafting

Ramelito R. Paler

Abstract: This study determined the effectiveness of assimilating technology in Drafting. The quasi- experimental particularly non-equivalent groups design was used in this study. Sixty-six (66) students were identified as participants, 31 in the group taught with Computer Aided Drafting (CAD) and 35 in the traditional strategy. Mean and t-test were used. Performance of the group without CAD resulted from satisfactory to very satisfactory in isometric and remain satisfactory in orthographic. Performance of the group with CAD moved to very satisfactory both in orthographic and isometric. No significant difference was manifested in the pre-tests between groups in orthographic and significant in shape in the isometric. A significant difference was manifested in the post-test between groups in shape and position in orthographic and position in isometric. Thus, the two strategies are effective in teaching orthographic and isometric. Teachers can use both strategies and should be at par in integrating technology in the classroom.

Index Terms: auto CAD, isometric drawing, orthographic drawing, technology as aid in learning, technology as aid in teaching, drafting, computer aided drafting

1. INTRODUCTION

Rapid technological advancement is how the 21st century is described. It is taking an important place in most aspects in our daily lives, and it applies to education. It provide a new way of teaching and learning. It also continues to bring opportunities as well as challenges for educators and students. An instructional technology that truly earned wide acceptance in schools is the computer assisted instruction (CAI). In an experiment conducted to determine the effects of CAI to Students with Dyscalculia, revealed that the students developed the desired skill in a faster rate [1]. Although many studies were conducted using auto CAD, the researcher aimed to conduct the study considering the uniqueness of the respondents' learning ability [2]. In school year 2013-2014, students taking the subject drawing had only 78 percent average mean rating in solving orthographic and isometric drawings. As observed by the researcher who taught the subject, the cause can be associated to the cognitive level required to perform the task. The students' interpretation of the figures presented to them affects the way they solve. This low performance in orthographic and isometric drawings can be improved through the use of computer-aided drafting (CAD). This study considered the legal basis as the CHED Memorandum ordered the role of the state in providing quality education to the citizens [3]. Another is the CHED Memorandum order which provided guidelines aimed for future teachers to develop learning skills needed for higher learning [4]. This study aims to contribute to the development of learning skills among teacher education students.

2 STATEMENT OF THE PROBLEM

This study determined the effectiveness of assimilating technology in Drafting at Eastern Visayas State University-Tanauan Campus, Tanauan, Leyte during Academic Year 2015-2016. Specifically, it sought to determine the tests results of the groups using computer-aided drafting (CAD) and without CAD in orthographic and isometric drawings considering the shape, position and proportion. Likewise, the difference between pre-tests of groups taught with CAD and without CAD in orthographic and isometric. And lastly, the difference between the post-tests of groups taught with CAD and without CAD in orthographic and isometric?

3 METHODS AND PROCEDURES

The researcher sought approval from the University President to conduct the dry run of the questionnaires in one of the external campuses and the study in another campus. The quasi- experimental particularly non-equivalent groups design was used in this study. There were sixty-six (66) freshmen students taking up teacher education program major in Technology and Livelihood Education identified as participants of this study. This was composed of two classes, the group with 35 students taught with orthographic and isometric drawing using the chalk and board for them to visualize and the experimental group with 31 students taught with orthographic and isometric using the CAD. Both classes were enrolled in the subject drafting. In performing the orthographic drawing using CAD, the files Rectangular block, L block, T block, H block and V block were opened and SE was clicked as intended by the researcher as the position of the object to be solved. In performing in isometric drawing, the files were opened and the top, front and right were clicked as the given views to be solved. To avoid having provided the concept on using the technology to the other group, the researcher seek assistance from the in charge of the computer laboratory by making only one drive to be available and disabling the flash drive port. In performing in isometric using CAD, the same blocks were used. However, the blocks were presented in another position. In performing in orthographic without the use of CAD, the five items were used as used in the group taught with CAD. In performing in isometric without the use of CAD, the five items were used as used in the group taught with the use of CAD. The students did not have the idea that they were observed of their performance in drawing in orthographic and isometric. The instrument in gathering the data was the questionnaire. It measured the students' ability to draw in orthographic and isometric specifically observing the criteria as correct shape, proportion and position. There were five items intended to measure the ability to solve in orthographic and isometric drawing. The first item was a drawing of an

- *Prof. Ramelito R. Paler is a graduate of Doctor of Philosophy in Technology Management and currently the head of the research and development office of Eastern Visayas State University – Tanauan Campus..*

object having one surface in every orthographic view (top, front and right side). The second item was a drawing of an object having two surfaces in one orthographic views (L-shaped block). The third item was an object with three surfaces in one of the orthographic views (T-shaped block). The fourth item was an object with three surfaces in one of the orthographic views and a hidden surface (H-shaped block). The fifth item was an object with two inclined surfaces in one of the orthographic views (V-shaped block). The mean was used for the ratings of the respondents in the two tests based on the criteria used (Rubrics). The t-test for independent sample group was used in determining the difference of scores in the two tests between the group taught with CAD and the group taught without the use of CAD. The analysis of the data was through the aid of an statistician.

4 RESULTS

TABLE 1

TESTS RESULTS OF THE RESPONDENTS TAUGHT WITHOUT CAD

	Pre-test		Post-test	
	Mean	Interpretation	Mean	Interpretation
Orthographic Drawing:	2.84	SP	3.54	VSP
Shape	2.33	FP	3.49	VSP
Proportion	2.79	SP	2.99	SP
Position	2.65	SP	3.34	SP
Average				
Isometric Drawing:				
Shape	3.29	SP	3.73	VSP
Proportion	3.26	SP	3.73	VSP
Position	2.13	FP	2.75	SP
Average	2.89	SP	3.40	VSP

Legend: 4.20 – 5.0 = Outstanding performance, 3.40 – 4.20 = Very Satisfactory, 2.60 – 3.40 = Satisfactory, 1.80 – 2.60 = Fair, 1.00 – 1.80 = Poor

TABLE 2

TESTS RESULTS OF THE RESPONDENTS TAUGHT WITH CAD

	Pre-test		Post-test	
	Mean	Interpretation	Mean	Interpretation
Orthographic Drawing:	2.73	SP	4.26	OP
Shape	2.16	FP	3.65	VSP
Proportion	2.98	SP	3.75	VSP
Position	2.62	SP	3.89	VSP
Average				
Isometric Drawing:				
Shape	2.70	SP	3.83	VSP
Proportion	2.81	SP	3.84	VSP
Position	2.10	FP	3.50	VSP
Average	2.54	FP	3.72	VSP

Legend: 4.20 – 5.0 = Outstanding performance, 3.40 – 4.20 = Very Satisfactory, 2.60 – 3.40 = Satisfactory, 1.80 – 2.60 = Fair, 1.00 – 1.80 = Poor

TABLE 3

INDEPENDENT SAMPLES TEST FOR THE DIFFERENCE OF PRE-TESTS BETWEEN THE GROUP TAUGHT WITHOUT THE USE OF CAD AND THE GROUP TAUGHT WITH USE OF CAD IN ORTHOGRAPHIC DRAWING

*significant at .01 alpha level

Dimensions	Pairs (Groups)	Mean	Mean Difference	t-value	p-value	Interpretation
Shape	Without CAD With CAD	2.8400 2.7290	.11097	.531	.598	Not Significant
Proportion	Without CAD With CAD	2.3259 2.1613	.16442	1.019	.312	Not Significant
Position	Without CAD With CAD	2.7886 2.9806	-.19207	-.966	.338	Not Significant

TABLE 4

DIFFERENCE OF PRE-TEST RESULTS BETWEEN TWO GROUPS IN ISOMETRIC DRAWING

Dimensions	Pairs (Groups)	Mean	Mean Difference	t-value	p-value	Interpretation
Shape	With the use of CAD Without the use of CAD	3.2914 2.6968	.59465	2.273*	.026	Significant
Proportion	With the use of CAD Without the use of CAD	3.2571 2.8065	.45069	1.728	.089	Not Significant
Position	With the use of CAD Without the use of CAD	2.1257 2.0968	.02894	.114	.909	Not Significant

*significant at .01 alpha level

TABLE 5

DIFFERENCE OF POST-TESTS BETWEEN THE GROUP TAUGHT WITHOUT THE USE OF CAD AND THE GROUP TAUGHT WITH THE USE OF CAD IN ORTHOGRAPHIC DRAWING

Dimensions	Pairs (Groups)	Mean	Mean Difference	t-value	p-value	Interpretation
Shape	With the use of CAD Without the use of CAD	3.5371 4.2645	-.72737	-3.722**	.000	Highly Significant
Proportion	With the use of CAD Without the use of CAD	3.4857 3.6156	-.16590	-.842	.403	Not Significant
Position	With the use of CAD Without the use of CAD	2.9886 3.7548	-.76627	-3.881**	.000	Highly Significant

**significant at .01 alpha level

TABLE 6

DIFFERENCE OF POST-TEST BETWEEN THE GROUP TAUGHT WITHOUT THE USE OF CAD AND THE GROUP TAUGHT WITH THE USE

OF CAD IN ISOMETRIC DRAWING

Dimensions	Pairs (Groups)	Mean	Mean Difference	t-value	p-value	Interpretation
Shape	With the use of CAD Without the use of CAD	3.7257 3.8258	-.10009	-.453	.652	Not Significant
Proportion	With the use of CAD Without the use of CAD	3.7314 3.8387	-.10728	-.502	.618	Not Significant
Position	With the use of CAD Without the use of CAD	2.7543 3.5032	-.74894	2.705**	.009	Highly Significant

**significant at .01 alpha level

5 DISCUSSIONS

The study revealed that the group taught without CAD resulted from satisfactory to very satisfactory in isometric and remain satisfactory in orthographic. Likewise, the results from the group with CAD moved to very satisfactory both orthographic and isometric. These findings can be attributed to the effectiveness of the technology used in presenting the lesson [5]. No significant difference was manifested in the pre-tests between groups in orthographic and significant in shape in the isometric. The results is due to both groups have comparable reasoning ability. The significant difference in the shape dimension in isometric can be attributed to the exposure of some students in playing with shapes during their childhood [6]. The difference of the post-test between groups was significant in shape and position in orthographic and position in isometric. This can be attributed to the effectiveness of using technology in teaching [7]. However, the difference between post-tests of the two groups in drawing in isometric on the shape dimension resulted to not significant. This implies that teaching isometric drawing can still be effective with the use of chalk and the board for illustrations [8].

6 CONCLUSIONS

Based from the interpretation of the results, this paper arrived at the conclusions that both using the CAD and without the use CAD are effective in teaching orthographic and isometric drawing. It is recommended that both the traditional and using technology will be used in teaching orthographic and isometric drawing. Likewise, the instructors in drawing and drafting need to update themselves about using technology in the classrooms by attending trainings and other opportunities for professional development.

ACKNOWLEDGMENT

The author wish to thank JASTEN KENETH D. TRECENE for the technical support extended in completing this academic work.

REFERENCES

[1] Yılmaz MUTLU and Levent AKGÜN. The Effects of Computer Assisted Instruction Materials on Approximate Number Skills of Students with Dyscalculia. available at http://www.tojet.net/articles/v16i2/16211.pdf

[2] Debacker, Teresa K., Nelson, R. Michael. Motivation to Learn Science: Differences Related to Gender, Class Type, and Ability. The Journal of Educational Research, volume 93, 2000- issue 4. Pages 245-254 | Published online: 01 Apr 2010. Available at https://doi.org/10.1080/00220670009598713

[3] CHED Memorandum no. 46 series 2012 available at https://ched.gov.ph/cmo-46-s-2012/

[4] CHED Memorandum no. 56 series 2007 available at https://ched.gov.ph/cmo-56-s-2007/

[5] Siskos, A., Antoniou P., Papaioannou, A., Laparidis, K. Effects of Multimedia Computer-Assisted Instruction (MCAI) on Educational Achievement in Physical Education of Greek primary Students. Interactive Educational Multimedia No. 10, pp. 61-77. Available at https://www.researchgate.net/publication/28083810_Effects_of_multimedia_computer-assisted_instruction_MCAI_on_academic_achievement_in_physical_education_of_Greek_primary_students

[6] Gravoso, Rotacio S., Pasa, Arturo E., Toshiaki Mori. Influence of students' prior learning experiences, learning conceptions and approaches on their learning outcomes. Available at https://www.herdsa.org.au

[7] Evelyn Eden. The effectiveness of technology based teaching methods as compared to traditional approaches available at https://www.mindstick.com/Articles/12625/the-effectiveness-of-technology-based-teaching-methods-as-compared-to-traditional-approaches

[8] Davis, Karen Cortina.The Effects of technology Instruction on the Academic Achievement of Fifth Grade Students. Available at https://www.semanticscholar.org/paper/The-effects-of-technology-instruction-on-the-of-Davis/79da3726ebc192a7396120c5cd833c6b427cfe21