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Effects of Technological Gadgets Utilization in Teaching College Algebra

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Abstract: This study investigated the effects of technological gadgets utilization in teaching College Algebra at Jose Rizal Memorial State University System, Philippines. Quasi – experimental design utilizing the Pretest – Posttest Nonequivalent Group Design was used in the study.The data collected were analyzed through arithmetic mean, t-test for independent samples and paired t-test.

Based on the findings, it is concluded that the knowledge students possessed in both the control and the experimental groups on the topics included in the experiment is equivalent or comparable before the intervention. The study also discloses that the experimental group performs significantly better than the control group after the intervention. It is deduced further that there is a significant variation between the performance of the students who were taught using the traditional method of teaching and those who were taught using the technological gadgets in teaching and learning College Algebra. In addition, the study concludes that both the interventions, traditional method of teaching and technological gadgets in teaching and learning College Algebra, made improvement in College Algebra performance of the students or that students performed better during the posttest than during the pretest. Moreover, the College Algebra performance of the students in the experimental group is greatly influenced by the technological gadgets used by teachers and students in College Algebra class which finally means that students in the experimental group perform better than their counterpart.

Keywords: Technological Gadgets, Effects, Utilization, College Algebra, Performance

Introduction

Technology plays a vital role in the changes of any society. The ease of its usage, as well as its improved presentational and interactive features such as the World Wide Web has largely contributed its application to almost every sector in the society such as medicine, warfare, navigation and transportation, business, economy including education.

The greatest player and decision maker is the teacher. On the teacher lies the moral responsibility and accountability to ensure that learners learn how to choose from the myriad of readily available data through multimedia carried out by various technological gadgets. To be able to do this, teachers should be flexible, creative, and innovative in the classroom so that learners become critical and creative thinkers (Libunao, et.al, 2003). This can be done through using technological gadgets in their activities which according to Tileston (2004) would add a new dimension to teaching and learning as technology is user friendly.

Since students respond to information differently, it is often to teachers' advantage to use many different formats and modes to teach the subject. This is one of the reasons why teachers utilize combinations of strategies and techniques ranging from lecture, text and hands-on activities for conveying information in the conventional teaching approach and recently employ technology.

In the light of the age-old issue that some students are poor in Mathematics, teachers are now provided with several new, challenging and exciting ways to present Mathematics lessons. The World Wide Web, it allows the incorporation of animation, moving pictures, and sound into lessons, which extend teachers' abilities to present materials that encourage student interaction with the subject matter. Pictures and animations help bring to life scientific principles, and multimedia allows students to take a more active role in learning. Learners watch lessons in action, see worksheets up close, and even manipulate technological gadgets at hand. One of the advantages offered is sending of information quickly and effectively to all students and keep them interested in learning (Ivanhoe, 2009).

The researchers, who are Mathematics educators believed that there is a need to shift from a traditional way of teaching Mathematics to a technologically–based instruction. Technological gadgets are viewed to improve students' performance. Hence, this research was designed to provide a university a research-based output and a view of the contribution of technological gadgets in teaching College Algebra.

Theoretical/Conceptual Framework of the Study

This study is anchored on the "Engagement Theory" of Kearsley and Shneiderman as cited by Drake (2010) which states that "students must be meaningfully engaged in learning activities through interaction with others and worthwhile tasks". In principle, engagement could occur without usingtechnology, however, many researches have revealed that technology facilitates engagement. By engaged learning, it means that all student activities involve active cognitive processes such as creating, problem-solving, reasoning, decision-making, and evaluation. The proponent of this theory added that students are intrinsically motivated to learn due to the meaningful nature of the learning environment and activities. Technology's influence on students' mathematical learning is either amplified or limited through the kinds of mathematical tasks and activities teachers provide. The newest generation of handheld technologies can provide unique opportunities for students to do mathematical tasks in new ways that have the potential to foster learning, develop understanding, and improve students' performance.

Along this context, this theory bridges a connection to the present investigation. The experiment of this study teaches Mathematics by allowing students to engage and employ hands – on activities involving the use of technological gadgets. Students learn Mathematics by doing Mathematics, engaging in tasks and activities, mediated by the teacher.

This study is also supported by Siemens' "Theory of Connectivism" (Siemens, 2005) which states that "knowledge exists in the world rather than in the head of an individual". The theory fosters the following principles: learning and knowledge rests in diversity of opinions, learning is a process of connecting specialized nodes or information sources, learning may reside in non-human appliances, capacity to know more is more critical than what is currently known, nurturing and maintaining connections is needed to facilitate continual learning, ability to see connections between fields, ideas, and concepts is a core skill, currency which is accurate and up-to-date knowledge is the intent of all connectivist learning activities, and decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer at present, it may be wrong the next day due to alterations in the information climate affecting the decision.

Darrow (2009) supported that the half-life of knowledge is shrinking, especially in the field of instructional technology. However, connectivism helps to ensure students remain current by facilitating the building of active connections, utilizing intelligent social networking and encouraging student generated curricula. In addition, connectivism allows the future of education to be viewed in an optimistic, almost worldwide perspective, as individuals co-create knowledge in a global, networked environment. Along this context, the theory is very closely connected to the present investigation. The present investigation employs technological gadgets in the teaching of College Algebra which connects its knowledge from the World Wide Web to the learners in Mathematics. Secondly, the present investigation looks into the significance of technological gadgets in the facilitation of College Algebra knowledge.

This study is also hinged on Mayer's Cognitive Theory of Multimedia Learning as cited by Sarita (2009) which emphasized that learner possesses visual information processing system and verbal information processing. The theory explains that during the process, the auditory narration goes into the verbal system while the animation goes into visual system. It explains further that a working memory includes independent auditory and visual working memories. The significance of technological gadgets utilization in classroom instruction is explained by the Multiple Representation Principle (Sarita, 2009). It states that it is better to represent an explanation in words and in pictures than solely in words. Video lessons are forms of multimedia representations. They build two different models, verbal and visual, and build connections between these models. The ongoing study focused on the utilization of these models to verbalize and visualize mathematical concepts through video lessons, graphics and slides to affect students' performance.

On the other hand, scores, ratings or grades could accurately convey a clear picture of the students' performance or achievement in a specific area. These would also indicate how well the teacher teaches the class. Based on the observations of behavioral scientists, some people have intense need to achieve but others, the majority, do not have the same concern as others about achievement. This phenomenon has fascinated McClelland (2008) who theorized and believed that the need for achievement is a distinct human motive that can be distinguished from other needs.

McClelland's theory is complemented by the Ornteins (2008) which affirmed that achievement motivates based on the need to achieve or succeed, and drives based on influencing others and pride on it. This present investigation is also anchored on these theories. The researchers find that in the classroom setting, performance or achievement is the result of every activity. Grades are determined to report and to compare students' performance.

More conservative schools of thought frowned upon the use of technological gadgets. They argued and believed that technological gadgets like calculators, computers, projectors and many others can provide mind – expanding support which students need to investigate and learn mathematical concepts (Acelajado, 2003). It is because of the aforementioned reasons that this study was conducted to establish support and strengthen research outputs involving the use of technological gadgets in Mathematics classroom.

The Study

The research aimed to investigate the effects of technological gadgets in teaching College Algebra among students in the College of Education of Jose Rizal Memorial State University System, Zamboanga del Norte, Philippines.

In this study, the researcher considered two teaching approaches such as technological gadgets utilization and the traditional Model in teaching Mathematics as independent variables and the dependent variables were the pretest and posttest Mathematics performance of the respondents.

Technological gadgets in this study included only those gadgets that were available in the university and those gadgets that the students and the researchers were able to provide. These technological gadgets included Television, VCD/DVD Player, Personal Computer, Laptop Computer, LCD Projector, Overhead Projector, Calculator, Cellular Phone with Calculator, Compact Disc with Mathematics Software, Flash Drive with Mathematics Software, Computers with Internet Access, Speakers, and Microphones.

Another important variable in the study is the traditional method of teaching Mathematics. In this model, purely the talk, chalk, board and eraser method of teaching Mathematics were employed.

The experimental and the control groups were exposed to the same lessons/subject matters in College Algebra: The Real Numbers System which included The Real Number System and the Fundamental Operations of the Real Numbers, The Laws and Properties of the Real Numbers, The Laws of Exponents, Definition of Algebraic Expressions and Polynomials, Evaluating Algebraic Expressions; Algebraic Expressions which included the Definition of Algebraic Expressions and Polynomials, Addition and Subtraction of Polynomials, Multiplication and Division of Polynomials, Special Products, Factoring: Common Factors and Special Products, Factoring by Grouping; Rational Algebraic Expressions which include Equivalent Fractions and the Fundamental Principles, Multiplication and Division of Fractions, Addition and Subtraction of Fractions, Complex Fractions; and Rational Exponents and Radicals which included Rational Exponents (Roots and Radicals), Rewriting Expressions with Rational Exponents into Radicals and Vice Versa, Simplification of Radicals, Addition and Subtraction of Radicals, Multiplication of Radicals, and Division of Radicals.

The study measured the students' Mathematics performance in two ways, the pretest and the posttest. The pretest was administered using the validated teacher – made test to the respondents in both the control and the experimental groups before the experiment commenced, after which the experiment followed. The posttest, on the other hand, was given, using the same teacher – made test as administered in the pretest in both the control and experimental groups after the experiment ended.

Arithmetic mean was employed to determine the pretest and the posttest Mathematics performance profile of the respondents in both the control and the experimental groups.

t - test for independent samples was utilized to test whether the pretest performance of the respondents in the control group differed significantly from the experimental group, and (b) posttest performance of the control group differed significantly from the experimental group.

t – test for correlated/paired samples was used to test whether there exists a significant difference between the pretest and posttest performances in the control group, and whether there exists a significant difference between the pretest and posttest performances in the experimental group.

To test the significant difference in the pretest – posttest mean gain between the control and the experimental groups, the t – test for independent samples was used.

To draw out the respondents' Mathematics performance in the pretest and posttest of the control and experimental groups, the five point Likert type scale format was employed with the indicated qualitative description as follows:

Range of Values 16 Points	Range of Values 24 Points	Range of Values 80 Points	Description
12.81 – 16.00	19.21 – 24.00	65 – 80	Excellent
9.61 – 12.80	14.41 – 19.20	49 – 64	Very Satisfactory
6.41 – 9.60	9.61 – 14.40	33 – 48	Satisfactory
3.21 – 6.40	4.81 – 9.60	17 – 32	Fair
0.00 – 3.20	0.00 – 4.80	0 – 16	Poor

Results and Discussions

Problem No. 1. What is the pretest performance in Mathematics of the respondents in the control and experimental groups?

Pre-Test Performance Profile of the Control Group

Table 1 presents the pretest College Algebra performance of the respondents in the control group. The level of expected performance was set based on the JRMSU grading system in which passing score is 50 percent of the total possible highest score in which case 8 items, 12 items, 8 items, and 12 items, respectively.

Table 1 discloses that the scores of the respondents in the control group are below the hypothetical mean during the pretest. Further, the respondents do not have stock knowledge on the topics in the pretest. This implies that the respondents have similar performance in the pretest. This implies further that the respondents need the necessary interventions to improve Mathematics performance.

Table 1 Pretest Performance in College Algebra in the Control Group

Topics	**No. of Items**	μ	$\overline{X}$	**Description**
The Real Number System	16	8	4.69	Fair
Algebraic Expressions	24	12	9.29	Fair
Rational Algebraic Expressions	16	8	4.76	Fair
Rational Exponents and Radicals	24	12	6.16	Fair
Total	**80**	**40**	**24.89**	**Fair**

$\mu =$ hypothetical mean based on the JRMSU standard , $\overline{X}$ = actual mean

Pre-Test Performance Profile of the Experimental Group

The pretest College Algebra performance of the respondents in the experimental group is shown in Table 2. The students in the experimental group, like those in the control group, were also given the pretest similar to the pretest administered to the control group. The JRMSU grading standard was also set at 50 percent of the total possible highest score.

The table shows that the scores of the respondents in the experimental group are below the hypothetical mean score during the pretest. Further, respondents do not have enough stock knowledge on the topics in the pretest. This implies that the respondents have similar performance in the pretest scores like those in the control group. This implies further that the respondents also need the necessary interventions to improve their College Algebra performance.

Table 2 Pretest Performance in College Algebra in the Experimental Group

Topics	**No. of Items**	μ	$\overline{X}$	**Description**
The Real Number System	16	8	5.64	Fair
Algebraic Expressions	24	12	8.60	Fair
Rational Algebraic Expressions	16	8	4.66	Fair
Rational Exponents and Radicals	24	12	5.85	Fair
Total	**80**	**40**	**24.75**	**Fair**

$\mu =$ hypothetical mean based on the JRMSU standard, $\overline{X}$ = actual mean

Problem No. 2. Is there a significant difference on the pretest performance in College Algebra between the control and experimental groups?

Table 3 Test of Difference on the Pretest Performance in College Algebra between the Control and Experimental Groups

Group	N	Mean	Mean Difference	Standard Deviation	Computed t	Critical t	Decision
Control	45	24.89	- 0.14	5.515	0.118^{ns}	1.960	Ho not rejected
Experim	47	24.75		6.173			

ns = not significant * = significant at $\alpha = .05$

Table 3 presents the independent t – test result comparing the pretest performance of the respondents in the control and experimental groups. The table shows that the control group obtained a slightly higher mean score of 24.89 than the experimental group which obtained a 24.75 mean score. It is safe to say that students in the control group performed better than those in the experimental group prior to the intervention. Likewise, scores in the control group were less dispersed which obtained a standard deviation of 5.515 than the scores in the experimental group which obtained a standard deviation of 6.173. The table presents further a mean difference of – 0.14, which when subjected to independent t – test, the computed t – value of 0.118 is less than the tabulated/critical value of 1.960at 0.05 level of significance with 90 degrees of freedom. This means that there is no significant difference in the pretest performance between the control and experimental groups. This means further that there is no significant difference in the performance between the two groups before the intervention. This implies that the control and experimental students' knowledge on the topics for this experiment are comparable.

Akour (2011) corroborated the present finding. His study revealed that there wasno significant difference on the mean pretest scores between the experimental and the control groups.

Problem No. 3.What is the posttest performance in College Algebra of the respondents in the control and experimental groups?

Post Test Performance Profile of the Control Group

Table 4 indicates that the actual mean was below the hypothetical mean. Result implies that the students learn on the mentioned topics during the conduct of the lesson employing the traditional method of teaching College Algebra. Though the table reflects that there was learning during the treatment but the control group only failed to reach the standard of the university.

Lavine (2006) emphasized that theory about cognition such as Bloom's taxonomy supporting the idea that learning takes place on many levels. According to Levy (2007) of the University of Chicago, as quoted in Peak Learning, "brains are built to be challenged. They operate at optimal levels only when cognitive processing requirements are of sufficient complexity" (Levine, 2006). However, if the brain is over-stimulated and presented with a problem which is too complex and too challenging, it will not operate at an optimal level either. The goal, then, is to find the balance.

Table 4 Posttest Performance in College Algebra in the Control Group

Topics	**No. of Items**	μ	$\overline{X}$	**Description**
The Real Number System	16	8	6.89	Satisfactory
Algebraic Expressions	24	12	13.51	Satisfactory
Rational Algebraic Expressions	16	8	5.42	Fair
Rational Exponents and Radicals	24	12	6.44	Fair
Total	**80**	**40**	**32.26**	**Fair**

$\mu =$ hypothetical mean based on the JRMSU standard, $\overline{X}$ = actual mean

Post Test Performance Profile of the Experimental Group

The posttest performance in College Algebra of the experimental group is presented in Table 5. The same standard was set in interpreting the posttest result of the subjects.

In totality, the students' College Algebra performance in the experimental group obtained an actual mean score of 54.61 which indicated "very satisfactory". This obtained actual mean was supported by the computed z – value of 7.57 which validated that the actual mean was above the hypothetical mean. This implies that technological gadgets which are used in teaching College Algebra in the experimental group helped the students in improving their performance.

Punie, et. al. (2006) corroborated the finding of the present study. The proponents found out that there was evidence that educational achievements were positively influenced by Information and Communication Technology or ICT. Jimoh (2009) averred that advances in technology have brought instructional materials especially the projected and electronic materials to the forefront as the most radical tools of globalization and social development which have affected the classroom teaching-learning situation positively.

Table 5 Posttest Performance in College Algebra in the Experimental Group

Topics	No. of Items	μ	$\overline{X}$	Description
The Real Number System	16	8	8.66	Satisfactory
Algebraic Expressions	24	12	14.70	Very Satisfactory
Rational Algebraic Expressions	16	8	12.72	Very Satisfactory
Rational Exponents and Radicals	24	12	18.53	Very Satisfactory
Total	**80**	**40**	**54.61**	**Very Satisfactory**

μ = hypothetical mean based on the JRMSU standard, $\overline{X}$ = actual mean

Problem No. 4. Is there a significant difference on the posttest performance in College Algebra between the control and experimental groups?

Table 6 Test of Difference on the Posttest Performance in College Algebra Between the Control and Experimental Groups

Group	N	Mean	Mean Difference	Standard Deviation	Computed t	Critica l t	Decision
Control	45	32.26	22.35	8.686	9.53*	1.960	Reject Ho
Experim	47	54.61		13.23			

ns = not significant * = significant at α=.05

Table 6 presents the test of difference on the posttest College Algebra performance between the control and experimental groups. It can be gleaned on the table that the experimental group obtained a higher actual mean score of 54.61 with standard deviation of 13.23 than the control group which obtained only 32.26 actual mean score with standard deviation of 8.686. This means that the experimental group performs better than the control group after the intervention.

The table further reveals a mean difference of 22.35, which when subjected toindependent t – test, the computed t of 9.53 exceeded the tabulated/critical value of 1.960at .05 level of significance with 90 degrees of freedom, the null hypothesis that there is no significant difference on the posttest Mathematics performance between the control and experimental groups is rejected. This indicates that there existed a significant difference in the College Algebra performance of the two groups after the intervention. This implies a significant variation in the performance of the students taught using the traditional method of teaching and those who were taught using the technological gadgets in teaching College Algebra.

The present finding is corroborated by Acelajado (2003) whose study found out that there were positive effects of using graphing calculators. Lin (2009) also found out a significant difference in the posttest mean scores in favor of the experimental group exposed to the web-based instruction.

Problem No. 5. Is there a significant difference between the pretest and posttest performance in College Algebra of the control group?

Table 7 Test of Difference between the Pretest and Posttest Performance in College Algebra of the Control Group

Control Group	N	Mean	Mean Difference	Standard Deviation	Computed t	Critical t	Decision
Pretest	45	24.89	7.37	5.515	6.386*	1.960	Reject Ho
Posttest	45	32.26		8.686			

ns = not significant * = significant at α=.05

Presented in Table 7 is the test of difference between the pretest and posttest College Algebra performance of the control group. The table discloses actual mean scores of 24.89 in the pretest and 32.26 in the posttest which obtained a mean difference of 7.37. This indicates that there was improvement in Mathematics performance after the intervention. When the mean difference was subject topaired t – test, the computed t which is 6.386 exceeded the tabulated/critical t – value of 1.960at .05 level of significance with 44 degrees of freedom.

This means that there exist a significant difference between the pretest and posttest performance in Mathematics of the control group. It implies that the intervention of using the traditional method of teaching Mathematics made improvement on students' performance in those lessons included in the experiment. The traditional methods are tried and true, and while they may not be the most exciting way to learn, they work well enough in the past (Public Agenda, 2005).

Problem No. 6 Is there a significant difference between the pretest and posttest performance in College Algebra of the experimental group?

Table 8 Test of Difference between the Pretest and Posttest Performance in College Algebra of the Experimental Group

Experi Group	N	Mean	Mean Difference	Standard Deviation	Computed t	Critical t	Decision
Pretest	47	24.74	29.87	6.173	13.19*	1.960	Reject Ho
Posttest	47	54.61		13.23			

ns = not significant * = significant at α= .05

It is shown in Table 8 the test of difference between the pretest and posttest College Algebra performance of the experimental group. A closer look at the table reveals that the students in the experimental group obtained an actual mean score of 24.74 in the pretest and 54.61 actual mean score in the posttest which provided a mean difference of 29.87. This means that there was an improvement in College Algebra performance of the students in the experimental group after exposing them to technological gadgets in teaching Mathematics. When the mean difference was subjected to pairedt – test, the computed t which is 13.19 is greater than the tabulated/critical t – value of 1.960at .05 level of significance with 46 degrees of freedom. This means that there exists a significant difference between the pretest and posttest performance in Mathematics of students in the experimental group. It implies that the technological gadgets applied in teaching College Algebra improve the performance in those lessons included in the experiment.

Finding is corroborated by Philip, et. al (2011) whose study indicated higher achievement and positive attitudes with CAI treatment groups. Bolick (2003) pointed out that "technological gadgets as instructional materials are integral components of teaching-learning situations; it is not just to supplement learning but to complement its process".

Problem No. 7. Is there a significant difference in the pretest and posttest mean gain on performance in College Algebra between the control and experimental groups?

Table 9 Test of Difference on the Pretest and Posttest Mean Gain on Performance in College Algebra between the Control and Experimental Groups

Group	N	Mean Gain	Mean Difference	Standard Deviation	Computed t	Critical t	Decision
Control	45	7.38	22.49	10.722	8.052*	1.960	Reject Ho
Experim	47	29.87		15.525			

ns = not significant * = significant at α=.05

Table 9 presents the test of difference on the pretest and posttest mean gain on performance in College algebra between the control and experimental groups. As revealed in the table, the mean gain score obtained by the control group was 7.38 while the mean gain score obtained by the experimental group was 29.87. These mean gain scores registered a mean gain score difference of 22.49. Gain scores, however, of the control group were less dispersed registering a standard deviation of 10.722 compared to the gain scores obtained by the experimental group obtaining a standard deviation of 15.525. When the mean gain score difference was subjected toindependent t – test, the computed t which is 8.052 is greater than the tabulated/critical t-value of 1.960 at .05 level of significance with 90 degrees of freedom. This means that there exists a significant difference in the mean gain scores obtained between the two groups after exposing them to the interventions. It means further that students in the experimental group perform better than the students in the control group. This implies that technological gadgets in teaching Mathematics provide better College Algebra performance of students than those who were exposed to the traditional method of teaching. This implies further that technological gadgets are better than the traditional method of teaching.

This finding is corroborated by Naresan (2001) who revealed that the increased level of academic achievement of experimental group was due to the teaching of Mathematical concept through video-cassette. Bhuvaneshwari (2004) also found out that there was significant difference among instructional strategies in relation to internet, intranet with feed back from teachers along with long term and short term in entrance coaching programme, and there was significant difference in the performance of the students under the different instructional strategies in achieving mastery in Mathematics, Physics and Chemistry. Meenu (2006) found also that the ETV lessons in Mathematics and EVS (SC and SS) taught to students of both Class III and V significantly improved their learning achievement as compared to their counterparts taught through traditional method. The present finding, however, was contradicted by Thillaka and Pramilla (2000) whose study revealed that there was no influence of computer-based multimedia programme on the achievement in Mathematics among high school students.

Findings

The following findings were revealed:

1. The pretest performance of the control and the experimental group was described as "fair". Pretest performance of the control group was 24.89 while in the experimental group was 24.75 in which both were far behind the JRMSU standard of 40 which is the 50 percent of the total items tested.

2. There was no significant difference in the pretest Mathematics performance between the control and experimental groups.
3. The posttest performance of the control group which was 32.26 was described as “fair” while the posttest performance of the experimental group which was 54.61 was described as “very satisfactory”.
4. There was a significant difference in the posttest Mathematics performance between the control and experimental groups.
5. There was a significant difference between the pretest and posttest Mathematics performance of the control group.
6. There was a significant difference between the pretest and posttest Mathematics performance of students in the experimental group.
7. There was a significant difference in the mean gain obtained between the control and experimental groups.

Conclusions

Based on the findings, the knowledge that the students possessed in both the control and the experimental groups on the topics included in this experiment is equivalent or comparable before the intervention. The study also concludes that the experimental group performs significantly better than the control group after the intervention. It can be deduced further that there is a significant variation between the performance of the students who were taught using the traditional method of teaching and those who were taught using the technological gadgets in teaching and learning Mathematics. In addition, the study concludes that both the interventions, traditional method of teaching and technological gadgets in teaching and learning Mathematics, make improvement in the Mathematics performance of the students which means that students perform better during the posttest than during the pretest. Moreover, Mathematics performance of the students in the experimental group is greatly influenced by the technological gadgets used by teachers and students in College Algebra class which finally means that students in the experimental group perform better than their counterpart.

References

Books

Libunao, Esperanza (2003). Creative and Innovative Presentations for Effective Teaching and Learning. Great Books Trading, Quezon City

Tileston, Donna W. (2004). Ten Best Teaching Practices. Corwin Press. California

Unpublished Materials

Acelajado, Maxima J. (2003).“ The Impact of Using Technology on Students Achievement, Attitude and Anxiety”, Research, De La Salle University, Manila

Sarita, Esperidion M. (2009). “Multimedia in Classroom Instruction.” Unpublished Ed. D. Dissertation, Jose Rizal Memorial State College, Dapitan City, Phillipines

Internet Sources

Darrow, Suzanne (2009). Connectivism Learning Theory: Instructional Tools for College Courses. https://www.zotero.org/adolan/items/itemKey/BNMKS9FT

Drake, Kayla (2010). Engagement Theory: A Framework for Technology-Based Teaching and Learning. http://www-rohan.sdsu.edu/~kdrake/assignments/Journal%20Article%20Summary.pdf

Ivanhoe, Newbie (2009). Effective Teaching with the Use of Technology.http://cpnhs.com/smf/index.php?topic=99.0

McClelland, David C. (2008). “Research into Achievement and Motivation”, Accel-Team.Research in Action.University of Massachusetts. http://www.accel-team.com

Ornteins, Allan C. (2008). “Achievement Theory”.http://sgpm.word.com

Siemens, George (2005). Connectivism: A Learning Theory for the Digital Age. http://www.itdl.org/Journal/Jan_05/article01.htm

Thillaka, S. and Pramilla, K.S. (2000).Use of Computer Multimedia Programme in Learning Trigonometry among High School Students.Journal of Educational Research and Extension, Vol. 37.No. 2. pp.1-10. http://www.ncert.nic.in/publication/journals/pdf_files/iea/july-06/IEA_July06.pdf