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Evaluation of the Effect of PowerPoint Presentation on the Learning Outcomes of Polytechnic Students in Technical Drawing.

Y.J. Musa

Mechanical Engineering Department,
Faculty of Air Engineering,
Air Force Institute of Technology, Kaduna.

U.E. Uche

Mechanical Engineering Department,
Faculty of Air Engineering,
Air Force Institute of Technology, Kaduna.

*Corresponding Author: eaumie@gmail.com, 0806 610 1408

Abstract

The study examined the learning outcome of PowerPoint presentation on students' academic performance and retention compared to conventional method of chalk and board in technical drawing in three Polytechnics. Quasi-experimental design of pretest-posttest non-equivalent nonrandomized control group design was adopted. The population consists of 308 ND II technical drawing students of three Polytechnics in Kaduna State with a sample size of 205 students drawn by purposive sampling technique. Technical Drawing Achievement Test was used to elicit data on learning outcome. ANCOVA results of mean performance scores of the students taught technical drawing using PowerPoint presentation and those taught using Chalk and Talk. indicated that the difference in the mean scores of the two groups is not statistically significant while the result of retentions scores of the students taught technical drawing using PowerPoint presentation and those taught using chalk and Talk *found significant difference in the mean retention score in favour of the experimental group.* Again, there is no significance difference in the mean academic performance scores of male and female students taught technical drawing using PowerPoint Presentation. with calculated p-values of 0.479 > 0.05 alpha level. The study also revealed that there is no significant difference in the retention scores of male and female students taught technical drawing using PowerPoint Presentation. The results imply that the effect of PowerPoint presentation on retention is not gender bias. It is

therefore apparent that there are educational advantages on retention in integrating PowerPoint in the teaching of technical drawing.

Keywords: Technical drawing; analysis of covariance; common coding theory; dual coding theory; PowerPoint.

Introduction

Education in schools is moving away from the chalkboard, traditional schools' television to a world where PowerPoint presentation (PPP) in the classroom complement desktop and Laptop computer at schools, homes and libraries. Efforts have been made by countries such as Singapore, Japan, America, Hong Kong, Britain and others to achieve technology that can enhance teaching and learning. Most Nigeria's classrooms remain dominated by chalkboards and marker-boards teaching aids whose limitations includes ineffectiveness for large group instruction; inability to allow information storage for future use; health hazard for teachers from chalk- board particles; inability to accommodate illustrations which supports the teaching learning process as well as rendering teaching uninteresting among others (Gambari *et al*., 2015). To improve learner's achievement in technology related subject in Nigeria, it therefore becomes imperative to join the developed world in embracing technologies that enhance teaching and learning process. The use of PowerPoint slides for teaching is one of the ways to achieve such shift (Uz *et al.*, 2010).

PowerPoint is a standard part of the Microsoft Office software package which is used for preparing a sequence of slides that are displayed to the audience on a computer-guided monitor. According to Asogwa (2011) the term PowerPoint presentation PPP was coined when Microsoft introduced its software program PowerPoint in 1987 to form part of the information and communication technology (ICT) presentation bundle in Microsoft office (El-Ikhan, 2010). Information prepared on a computer is better projected for large audience using a liquid crystal display (LCD) projector. Presentation developed with this type of software can be saved digitally and easily modified to facilitate future use. Microsoft PowerPoint allows teachers to include chart clip, art photographs, sound or video segments to demonstrate concepts (Effiong & Ekpo, 2016).; PowerPoint can be used in the classroom for supporting students learning by combining computer and projector to display slides for illustrating tables, pictures, graphs, drawing, sound effects, visual effect, clips among others. PowerPoint gives the user the opportunity to incorporate visual and auditory aspects to a presentation. It permits the removal of existing slides and addition of new slides so as to make lessons more organized and flexible. It also allows variety of manipulation by editing or text modification, PowerPoint increases

visual quality in the learning process, it takes less time to present a subject matter, thus allowing more materials to be covered in the classroom within a specified time limit. Supporters of PowerPoint believe that it helps to keep students' interest and attention on the lecturer which improves students learning ability and aids explanation of complex illustrations (Gambari *et al*., 2015). This technology, therefore, can be described as useful digital tool for courses that require detail illustration of the content being delivered. One of such courses is technical drawing.

Technical drawing is the art or skills of delineating objects in a precise way as employed in architecture or engineering. The teaching of the course required detail illustration of what is being taught through integration of technologies. The conventional ways of delivery the course through chalkboard limits lecturer to the use of 2-dimension illustration whereas there are digital technologies that enables lecturer to illustrate their learning in 3-dimension. These digital technologies enable lecturer to explain their ideas using multimedia. This implies that no learner is left behind as the senses of hearing, seeing and feeling are engaged using multimedia. The most available, accessible, affordable of these technologies and with simplified interface is PowerPoint. Over 500 million computers have PowerPoint installed in them and is most commonly used computer application by lecturer in high institutions (Gambari, 2010*)*.

The question being ask, is whether PowerPoint Presentation could not improve technical drawing students' learning outcomes when compared to conventional teaching method of chalk and talk. A lesson taught without the use of pictures results in knowledge that is mere words with the risk of being easily forgotten. Hence, what role can PowerPoint presentation play when integrated in the teaching of technical drawing?

Technical drawing is the art or skills of creating a plan such that a person can visualize and follow how it needs to be carried out. This is also known as draughting or drafting: the process of how something will be done, created or performed illustrated with drawing. Traditionally, drafting consists of technical drawing done manually with rules, T-squares, stencils, set squares, large drawing sheets, large workspace (Drawing surfaces) and much more. Contemporary drafting involves the use of computer aided design (CAD) that deploys computer software such as AutoCAD or Corel draw for technical drawing. CAD is generally more secured when there is proper backup (saving of document). With manual drafting, its security depends on how you can keep the drawing sheets stored. Also, you can be pretty accurate with a pencil but not as accurate as with computer.

Academic performance is one of the commonly used indexes for determining students' success in learning specified curriculum contents. It is a numerical rating based on continuous assessment and examination (Adediwura &Tayo, 2007). This measure is a vital tool in the hand of teachers that determines whether learning has taken place via teaching and learning activities. Importantly, it is these numerical values that the education industry commonly used to judge the effectiveness of any educational intervention geared toward facilitating teaching and enhancing performance (Yusuf *et al*., 2010). However, using students' academic performance alone as justification that learning has taken place have been variously criticized by educational stakeholders as inadequate (Gano-Phillips, 2015) because the durability of observed change in behavior is considered equally important. In this vein it becomes desirable that learnt content of technical drawing endures beyond classroom setting so as to be harnessed by industries. Technically, this is called "retention." Retention is the ability to remember experiences and things learnt (Adesoji *et al.,* 2017). Similarly, retention is a preservative factor of the mind (Tyson, 2018). Thus, retained content of technical Drawing is expected to be revived when stimulating agencies of the learners' environments call on it; one of which is PowerPoint presentation.

Finally, technical Drawing remains one of the males dominated technical courses in high institutions of the country. In order to effect a change in the belief that it is only male student that perform well in technical drawing, appropriate technology must be integrated. It is against this background that this study investigated the effect of PowerPoint presentation as teaching aid on male and female students learning outcome in technical drawing.

The theoretical basis of the study is derived from the common coding theory and the dual coding theory by (Peivio *et al*., 2005), in Kaddle, (2010). Pylyshyn, (2012), has it that the common coding theory looks at how things we see and hear are connected to our motor actions. Common coding theory is a cognitive psychology theory describing how perpetual representations (e.g. of things we can see and hear) and motor representations (e.g. of hand actions) are linked. The dual coding theory on the other hand, is an alternative to common coding theory. It is a theory of cognition, hypothesized by Paivio (1971) of the University of Western Ontario in 1971. In developing this theory, Paivio used the idea that the formation of mental images aids in learning according to Reed, (2010). For Kaddle (2010), the two systems (verbal and visual systems) have different functions whereby the verbal subsystem processes and stores linguistic information while the visual subsystem processes and stores images and pictorial information's. Because, the two subsystems can be activated dependently, the

interrelations and connections of the two systems allow the dual coding of information. It therefore follows according to Gallo (2009), that PowerPoint presentations is effective because it adds complementary, multisensory events design to spark an emotional response among its audience that helps in maintaining attention and to improve cognitive achievement as envisaged by the two coding theories. The most effective presentations are the ones that are informative, educational and entertaining. These theories and PowerPoint concept form the theoretical and conceptual framework of the study.

Methodology

Research Design:

This study used quasi-experimental design of pretest-post control group. This involved two intact classes: one experimental and the other control group. The design was used in determining the effect of teaching technical drawing using PowerPoint presentation on the academic performance and retention of male and female polytechnic students in technical drawing in Kaduna state. Obeka (2011) asserted that the most powerful and valid design which can be used to identify, within specified confident interval, the cause-and-effect relation of any given event is experimental study in which one or more independent variable(s) is/are manipulated by the researcher, under controlled condition and it/their effect(s) observed. The study therefore involved experimental or treatment group(s) and a control group. The experimental group received PowerPoint Presentation as treatment while control group was taught using lecture method enhanced by marker board. Figure .1 illustrates the experimental design.

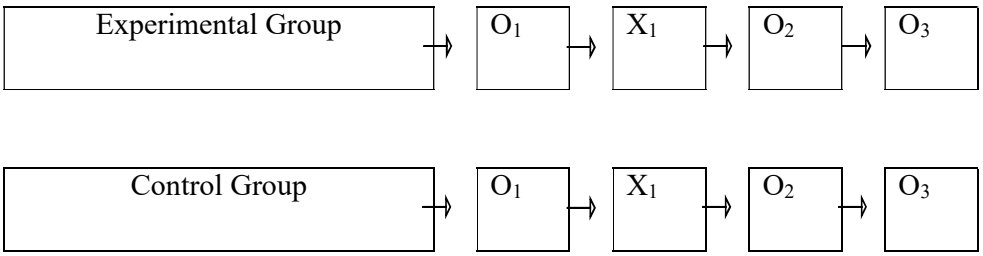

Figure.1: *Research Design*

Key: **O_1:** Pretesting; **X_1:** Treatment; **O_2:** Post Test; **O_3:** Retention Test

The schools selected had many things in common in terms of location and characteristics of students being of mixed ability. This is done to reduce the chances of bias or error variance with either group that may result to inaccurate measurement and evaluation.

Research Population

The population of this study consist of 308 ND II Technical Drawing students in three polytechnics in Kaduna State: Air-force Institute of Technology, Kaduna Polytechnic and Nuhu-Bamali Polytechnic with 81, 124 and 103 technical drawing students respectively. The three polytechnics are co-educational institutions; made up of both male and female technical drawing students. The detail of the study population is presented in Table 2.1.

Table 1: Population of the Study

Schools	Male	Female	Total
Air-force Institute of Technology	49	32	81
Kaduna Polytechnic	85	39	124
Nuhu-Bamali Polytechnic	61	42	103
Total	**195**	**113**	**308**

Source: HOD's of various polytechnics and departments offering technical drawing

Sample size

The study sample size was 205 ND II Technical drawing students from two of the three Polytechnics based on purposive sampling technique. Purposive sampling technique is a strategy in which particular settings, persons or events are selected deliberately in order to provide important information that cannot be obtained from other choices (Creswell, 2009). Criterion such as having adequate and functional facilities that support PowerPoint presentation was considered. Air-force Institute of Technology (experimental group) is having an intact class of ND II Technical drawing students of 49 males and 32 females (81 students) while Kaduna Polytechnic (control group) is having an intact class of 85 males and 39 females (124 students). The sample Polytechnics and size distribution is presented in Table 2.2.

Table 2: Sampled Size

Schools	Group	Male	Female	Total
Air-force Institute of Technology	Experimental	49	32	81
Kaduna Polytechnic	Control	85	39	124
Total		**134**	**71**	**205**

Research Instrument

Two instruments namely Technical Drawing Achievement Test (TDAT) and PowerPoint Presentation Package were used. TDAT is an objective test that comprised forty objective items designed by the researcher to measure the effect of PowerPoint presentation on the academic performance of technical drawing students. The objective test was based on angles, circle, quadrilaterals, polygons, and ellipse. The study also designed PowerPoint instructional package for angles, circle, quadrilaterals, polygons, ellipse. The package is made up slides that contains both static and motion graphics. The slides also feature GIF images demonstrating repeatedly the process of constructing different angles. In addition, feature texts that further explains the static and motion picture on each of the slide were included. The package was used by the Assistants while teaching selected topics for the study as designed using PowerPoint application.

Content construct and criterion validity test:

Further, a content construct and criterion related validity was conducted on TDAT and PowerPoint Presentation Package a chief technical instructor, language specialist and a statistician to ensure that questions are equalized to reflect all topics taught (eight questions per topic), question sequence for clarity and smoothly-moving, question formulation and wording, harmony in use of colour and links to all part of the presentation irrespective of the slide.

TDAT was Pilot tested in Nuhu Bamali Polytechnic using 35 ND II Technical drawing students. The study used test-retest method with an interval of two weeks. These students were visited in their lecture room. Permission was sought from the lecturer in charge and it was granted. The researcher therefore asked the participants to indicate their school registration numbers. Retest was conducted by the registration number provided to trace the previously participated students.

Reliability of study instrument

To establish reliability of the study instrument, the data elicited from the first and second administration of TDAT during pilot study was analyzed using Pearson Product Moment Correlation Coefficient (PPMCC) to obtain reliability co-efficient 0.82. According to Olayiwola *et a*l (2010), the closer the calculated reliability co-efficient is to one the more reliable is the instrument. This shows that the study instrument is reliable.

Data Collection

Data collection was by schedule using enumerators who were specially appointed for the purpose. Permission was sought from the school authority to use their students and the school timetable. Permission was granted for one-hour lesson period, twice a week for a period of four weeks in each of the institutions. Two enumerators were recruited and trained on the peculiarity of the research. This was followed by pre-testing of TDAT in the two institutions. The pretesting was followed by administration of treatment for both control and experimental groups. This lasted for four weeks. The experimental group was exposed to the treatment: learning with PowerPoint presentation package while the control group received their lecture in the conventional way using chalkboard. At the end of the treatment, the same instrument used for pretest was re-arranged and re-administered to the students to obtain a post-test scores. A month later, retention test was administered in both institutions using questionnaire. The treatment plan is depicted in Table 3 below.

Table 3. *Treatment Plan*

Weeks	**Group A: PowerPoint Presentation**	**Group B: Chalk and Talk**
W1	Pretest	Pretest
Day 1		
W2	Training Research Assistant	Training Research Assistant
Day1-3		
W3-Day1	Instructional Delivery on Angles	Instructional Delivery on Angles
W3-Day2	Instructional Delivery on Circle	Instructional Delivery on Circle
W4-Day1	Instructional Delivery on Quadrilaterals	Instructional Delivery on Quadrilaterals
W4-Day2	Instructional Delivery on Polygons	Instructional Delivery on Polygon
W5-Day1	Instructional Delivery on Ellipse	Instructional Delivery on Ellipse

W5-Day2	Completion of instructional delivery on Ellipse	Completion of instructional delivery on Ellipse
W6	Post-Test	Post-Test
W10	Retention Test	Retention Test

Data Analysis

Descriptive and inferential statistics were used in analyzing the data obtained in the study. The study's research questions were analyzed using descriptive statistics of mean, standard deviation and percentage. The null hypotheses were tested using Analysis of Covariance (ANCOVA) on the pre-test score of TDAT while independent sample t-test was also used in testing for non-confounding variable statistics. According to Pallant (2011), ANCOVA is commonly used for analysis of quasi-experimental studies, when the treatment groups are not randomly assigned and the researcher wishes to statistically "equate" groups on one or more variables that may differ across groups. All the study's hypotheses were tested at 0.05 level of significance using SPSS software.

Results, Summary and Discussion

Results

The hypothesis tested include:

Hypothesis one: There is no significant difference between the mean academic performance scores of Polytechnic students taught technical drawing using PowerPoint Presentation and those taught using Chalk and Talk in Kaduna State.

Hypothesis one was tested by running Analysis of Covariance on scores obtained by students in each of the two group. The pretest and post scores of the two groups were analyzed. The pretest score of the two-group served as covariance because the preliminary data analysis shows that there is significant difference in the entrance behavior of the two groups.

Table 4: *ANCOVA result of the Mean difference of academic performance scores between the two research groups.*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	4923.411[a]	2	2461.705	9503.141	.000	
Intercept	7.543	1	7.543	29.117	.000	
Pretest	4566.475	1	4566.475	17628.368	.000	

Group	.023	1	.023	.089	.765	Retained
Error	48.959	189	.259			
Total	118123.000	192				
Corrected Total	4972.370	191				

Table 3.1 shows ANCOVA results of mean performance scores of the students taught technical drawing using PowerPoint presentation and those taught using Chalk and Talk. From the table, the F (1,189) =.089, p>0.05. This indicated that the difference in the mean scores of the two groups is not statistically significant. Thus, the null hypothesis that says; there is no significant difference between the mean academic performance scores of Polytechnic students taught technical drawing using PowerPoint Presentation and those taught using Chalk and Talk in Kaduna State is retained. This implies that the observed 6.97% difference between mean performance scores of the two group is not statistically significant.

Hypothesis two: There is no significant difference between the retention scores of Polytechnic students taught technical drawing using PowerPoint Presentation and those taught using Chalk and Talk in Kaduna State. Hypothesis two was tested by running Analysis of Covariance on scores obtained by students in each of the two group in retention test. The pretest and retention test scores of the two groups were analyzed. The pretest score of the two-group served as covariance because the preliminary data analysis shows that there is significant difference in the entrance behavior of the two groups.

Table 5: ANCOVA showing mean difference in the retention scores of experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	4154.532[a]	2	2077.266	1562.834	.000	
Intercept	47.942	1	47.942	36.069	.000	
Pretest	3750.357	1	3750.357	2821.586	.000	
Group	9.073	1	9.073	6.826	.010	Rejected
Error	251.212	189	1.329			
Total	110767.000	192				
Corrected Total	4405.745	191				

Table 3.2 shows ANCOVA results of retentions scores of the students taught technical drawing using PowerPoint presentation and those taught using chalk and Talk. From the table, the F

(1,189) =6.826, p<0.05. This indicated that the difference in the mean scores of the two groups is statistically significant in favour of PowerPoint Presentation group. Thus, the null hypothesis that says; there is no significant difference between the retention scores of Polytechnic students taught technical drawing using PowerPoint Presentation and those taught using Chalk and Talk in Kaduna State is rejected. This implies that the observed 7.42% difference between mean retention scores of the two group is statistically significant.

Hypothesis Three

There is no significant difference between the mean academic performance scores of male and female Polytechnic students taught technical drawing using PowerPoint Presentation in Kaduna State

Hypothesis 3 was tested by running Independents Sample t-test on scores obtained by male and female students in Technical Drawing when taught using PowerPoint presentation. This was done in order to establish whether the difference between the two group is statistically significant

Table 6: *Independents Sample t-test showing mean difference in the academic performance scores male and female students in experimental group*

Gender	N	Mean	Sd.	f	t	Df	α	Sig.(2-tailed)	Decision
Male	47	26.38	6.67	.179	.712	74	0.05	.479	Retained
Female	29	25.28	6.45						

Table 3.3 shows that there is no significance difference in the mean academic performance scores of male and female students taught technical drawing using PowerPoint Presentation. This is deduced from table 6 that revealed calculated p-values (2tailed) of .479 > 0.05 alpha level. Thus, the null hypothesis that says; there is no significant difference in the mean performance scores of male and female students taught technical drawing using PowerPoint Presentation is retain. This implies that effect of PowerPoint presentation on academic performance is not gender bias.

Hypothesis four

There is no significant difference between the mean retention scores of male and female Polytechnic students taught technical drawing using PowerPoint Presentation in Kaduna State

Hypothesis four was tested by running Independents Sample t-test on scores obtained in retention test by male and female students in Technical Drawing when taught using PowerPoint

presentation. This was done to establish whether the difference between the two group is statistically significant.

Table 7: *Independents Sample t-test showing mean difference in the retention scores of male and female students in experimental group*

Gender	N	Mean	Sd.	f.	t.	Df	α	Sig.(2-tailed)	Decision
Male	47	25.57	5.93	.541	.448	74	0.05	.656	Retained
Female	29	24.93	6.32						

Table 3.4 shows that there is no significance difference in the retention scores of male and female students taught technical drawing using PowerPoint Presentation. This is deduced from Table 8 that revealed calculated p-values (2tailed) of .656 > 0.05 alpha level. Thus, the null hypothesis that says; there is no significant difference in the retention scores of male and female students taught technical drawing using PowerPoint Presentation is retain. This implies that the effect of PowerPoint presentation on retention is not gender bias.

Discussion of the Findings

The answer obtained from research question one and the testing of the corresponding hypothesis (hypothesis one) revealed that the difference between academic performance scores of students taught using PowerPoint presentation and those taught using Lecture method is not statistically significant. In other word, the difference observed between the two group is by chance. This finding agrees with the findings of Gambari *et al*., (2015). and Lari (2014), that PowerPoint Presentation does not significantly improve students' academic performance than lecture method. Furthermore, Aghaduino (2016), reported that academic performance of students taught using PowerPoint presentation is not significantly different from those taught using conventional teaching method. Research question two and the test of the corresponding hypothesis revealed that the difference between mean retention score of students taught using PowerPoint presentation and those taught using lecture method is statistically significant in favour of PowerPoint Presentation, which agrees with the findings of Gambari, Yusuf & Balogun (2015) who reported that PowerPoint Presentation enhances student's retention ability than lecture method. However, Lari (2014) reported that PowerPoint presentation is an extension of passive learning and does not therefore significantly improve students' retention. It is therefore posited that contradiction could be as a result of the subject understudy; the present study used technical drawing while the previous study Lari (2014) used mathematics. The research question three and the corresponding hypothesis reveal a slight difference in the

academic performance of male and female students in favour of male students but the observed difference is not statistically significant. This is in line with the report of Aghaduino (2016) that students learning outcomes when PowerPoint is deployed is not gender bias.

Conclusion

From the analysis and interpretation of the data obtained in the course of this study, the study sustained the following findings:

1. The observed 6.97% difference between mean performance scores of the experimental and control group is not statistically significant (p-value= 0.765>0.05).
2. The observed difference of 7.42% between mean retention scores of the experimental and control group is statistically significant (p-value =0.010<0.05).
3. Academic performance scores of males and females is not gender bias as there was no significant difference between male and female taught using PowerPoint Presentation (p-value=0.479>0.05).
4. Retention scores of males and females is not gender bias as there was no significant difference between male and female taught using PowerPoint Presentation ((p-value=0.656>0.05).

Inferring from the above findings therefore, it is apparent that there are educational advantages in integrating PowerPoint in the teaching of technical drawing. Apart from improving male and female students' academic performance, it significantly improves both male and female technical drawing students' retention more than conventional teaching method. This implies that when PowerPoint is integrated in teaching of technical drawing, technical drawing, students have greater chance of retaining much of what they have learnt for application in industries.

References

Adediwura, A., & Tayo, B. (2007). Perception of Teachers' knowledge, Attitude and Teaching Skills as Predictor of Academic Performance in Nigerian Secondary School. *Educational Research and Review*, 2(7), 165-171.

Adesoji O., Nwajiuba, C & Nwosu, N. (2017). "Influence of Teachers' Motivation on Teachers' Productivity in Nigerian Secondary Schools," Sociology and Social Work Review 2, 26 -36

Aghdiuno, I.G. (2016) Impact of Industrial Graphics on Secondary School Students Interest and Performance in Christian Religious Studies in Onisha, Nigeria – M.Ed. dissertation Ahmadu Bello University, Zaria.

Asogwa, U. D. (2011) Effect PowerPoint Presentation on Secondary School Students' Achievement in Christian Religion Knowledge. *International journal of education Research* ii(i).

Creswell, J.W. (2009). Research Design: Quantitative, Qualitative and Mixed Methods Approaches (3rd Ed Thousand Oaks, CA, Sage Publication.

Effiong, A. A. & Ekpo, O. E. (2016). Interactive Effect of PowerPoint Instructional Package and Academic Performance of Educational Technology Students in The University of Calabar. *Equatorial Journal of Education and Curriculum Studies.* Vol.1(1)2

El-I khan, K.K. (2010) The Advantages and Disadvantage of Teaching With PowerPoint retrieved from http://www.penalido.wordpress.com/theadvantage May 2024.

Gallo, C. (2009) Why PowerPoint Isn't Enough, *Business Week Online*. Retrieved from http://www.busniesswork.com/smallbiz/content/oct,2009/sb20091020228 161.htm in May 2024.

Gambari, A. I., Yusuf II T., Balogun, S.A. (2015). Effectiveness Of PowerPoint Presentation on Student Cognitive Achievement in Technical Drawing. *Malaysian online journal of education*. Technology v3 N4P1-12

Gambari, A.I (2010*).* Effects of Computer Supported Cooperative Learning Strategy on Performance of Senior Secondary Students in Physics In Minna Nigeria. Unpublished Ph.D. thesis, University of Ilorin.

Gano- Phillips, S. (2015) Affective Learning in General Education.GI Global, Hershey Google Scholar. 47

Kaddle, A. (2010). Digital Instructional Media Design 101-Graphics. www.upsidelearning.com

Lari, F.S. (2014), The Impact of Using PowerPoint Presentation on Students' Learning and Motivation in Secondary Schools. *Procedia journal on social and behavior Science. 2(1).*

Obeka, S. S. (2011). Panacea of Science Educational Research. Ahmadu Bello University press limited, Zaria Kaduna state, Nigeria.

Olayiwola, M. O., Gbolagade, A.W. & Adesanya, A. O. (2010). Pearson Product Moment Correlation.

Paivio, A. (1971). Imagery and Language Elsevier pp 7-32

Pallant, J. (2011). SPSS survival manual: A step-by-step guide to data analysis using the SPSS program. 4th Edition, Allen & Unwin, Berkshire.

Peivio, E. & Prinz. W. (2005). Experimental Approach to Action, in Roessler and N.E Island (Eds) Agency and self-awareness (pp 165-185) New Oxford University Press.

Pylyshyn, Z. W. (2012). What the Minds Eyes Tell the Mind's Brain. A Critique of Mental Imagery. Retrieved May 4, 2024, from Wikipedia.com

Reed, S. K. (2010). Cognitive Theories and Application (8th ed) Belmont, C.A.

Tyson Ang, Shuqin Wei, Nwamaka A. Anaza, (2018) The Power of Information on Customers' Social Withdrawal and Citizenship Behavior in A Crowded Service Environment.

Uz, C., Orhan, F. & Bajic, G. (2010). Perspective Teachers' Opinion on The Value of PowerPoint Presentations in Lecturing. *Procedia-social and Behavioral Science*, 2051-2059.

Yusuf, M. O. & Afolabi, A. O. (2010). Effects of Computer Assisted Instruction (Cai) On Secondary School Students Performance in Biology. *The Turkish online Journal of Educational Technology* 9(1).