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Perceived Effect Of 3D Graphics On Learners' Achievement In Physical Geography In Secondary Schools In Nyakach Sub-County, Kenya

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Abstract: ***Digitization of academic contents is considered as one of the greatest steps towards making learning easier as it simplifies complex concepts for easier understanding among learners. The use of digitized contents in learning among African countries is equally rising. In Kenya, the government's project on the introduction of laptops in primary schools confirms the government's effort towards ensuring content digitization in teaching as laptops are necessary tools for the success of digitization in teaching of subjects both in primary and secondary schools. in addition, the government agency projects the development in learning to commence from lower primary to upper classes in secondary schools are fully developed and ready to boost digitization in teaching, at the same time, digitized content such as: animations has already been rolled down to schools to be used in teaching and learning by KICD in the year 2010. This is coupled with the fact that over 80% of the public schools have been connected to electricity to facilitate the implementation of content digitization. Against all these efforts by the Kenyan government, still the performance in Physical Geography is wanting nationwide compared to human geography, for the past 5 years as it posts constantly low marks compared to human geography necessitating an investigation into the resources used to teach physical Geography. A descriptive survey design was employed to establish the Perceived Effect of 3D Graphics on Learners' Achievement in Physical Geography in Secondary Schools in Nyakach Sub-County. Study population were all 134 Geography teachers and 1826 Geography students in Form 4. Random sampling technique was used to select teachers and learners to take part in the study from 54 secondary schools. Israel (1999) formula was used to obtain the sample size of 24 teachers and 329 learners. Questionnaires were used in collecting data from students and teachers while teacher made test was used to test the retention levels of learners in the control and the experimental groups. Reliability was determined by the use of test-retest method at a coefficient level of 0.7, which was acceptable. Quantitative data was analyzed through mean, frequency counts, percentages, Pearson's r and multiple regressions. Qualitative data was categorized into themes and reported verbatim. The Pearson's correlation on 3D on learners' achievement was r=0.538 and r=0.722 respectively, which was significant. The research findings revealed that the 3D graphic with texts have a positive effect on learners' performance in physical geography. Furthermore, it was established that, the use of digitized content is still a major issue in Kenya secondary education system.***

Key terms: Perceived Effect, 3D, Achievement.

I. BACKGROUND OF THE STUDY

Information Communication Technology (ICT) has reformed each sector and it is currently in the promising phases of altering academia (Megha, 2013) by enhancing ways by which teachers and students access and create knowledge. Digitization of academic contents is considered as one of the greatest steps towards making learning easier as it simplifies

complex concepts for easier understanding among learners. Marek (2013) defines digitization as capturing of analog signal in digital form and he further states that digitization means conversion of a resource recorded in traditional medium into digital one and includes all added features and responsibilities that go with it (Megha,2013).

ICT tends to expand access to education as learning can occur anytime anywhere (Shan, 2013). Teleconferencing classrooms allow both learner and the teacher to interact simultaneously on with ease and convenience. Based on ICT, learning and teaching no longer depend exclusively on printed materials. Multiple resources are abundant in the internet and intranet and knowledge can be acquired through video clips, audio sounds and visual presentations. Current research has indicated that ICT assists in transferring the teaching environment into a leaner-centered type (Castro, Sánchez and Aleman, 2011) which allows the learners to make decisions and plans (Lu, Hou, Huang, 2010) in the process of building knowledge in the classroom

Holocha (2002), asserts that the use of digitized contents with the support of ICT infrastructure enables learners to work with live information through video conferencing, and very quick response times through the use of emails increases students' motivation. Storey (2002) reported that the use of digital photography allows learners to reflect on their work in the field after returning to the classroom. Photographs can be shared with learners in other localities to allow comparison of place. Digital photography has an advantage over conventional photography because it is cheaper, quicker and more flexible, allowing it to be an everyday aspect of teaching and learning. However, the study did not focus on the learners' achievement in a specific discipline, therefore the study will investigate the effect of digitized content on learners' achievement in physical Geography. Cox & Abbott (2003), report that using simulations and modelling tools which are part of digitized contents in conjunction with ICT can lead to enhanced understanding of geographical topics such as erosion and agriculture.

In Kenya, the government's project on the introduction of laptops in primary schools confirms the government's effort towards ensuring content digitization in teaching as laptops are some of the very necessary tools for the success of digitization in teaching of subjects both in primary and secondary schools. According to Kenya Institute of Curriculum Development [KICD], digital content is defined as computer resources designed for learning. These include computers, IPad designed for learning. The government agency projects the development in learning to commence from lower primary to upper classes in secondary schools are fully developed and ready to boost digitization in teaching, at the same time, digitized content such as: animations has already been rolled down to schools to be used in teaching and learning by KICD in the year 2010 (CEO, 2016). This is coupled with the fact that over 80% of the public schools have been connected to electricity to facilitate the implementation of content digitization (GOK 2015). Against all these efforts by the Kenyan government, still the performance in Physical Geography is wanting nationwide compared to human geography, for the past 5 years as it posts constantly low marks compared to human geography necessitating an investigation into the resources used to teach physical Geography.

According to the report by the Kenya national examination council, paper one of geography is poorly performed by most learners and therefore recommended for the integration of ICTs in teaching of concepts in physical geography to enhance performance, (KNEC, 2015, 2016, and 2017). In Nyakach Sub County the performance in geography is low as compared to the other humanity subjects, History and Government and Christian Religious Education as shown below.

Year	Geography	History	C.R. E	Number of Schools
2014	4.58	6.12	6.59	52
2015	4.93	5.76	6.42	52
2016	4.60	5.75	5.71	53
2017	4.76	5.01	6.20	53
Overall mean	**4.72**	**5.65**	**6.23**	

Source: Sub-County Director Office Nyakach Sub-County, Department of Examination and Statistics, (2017).

Table 2: KCSE humanities mean score for Nyakach sub county schools for the year 2014 to 2017

In Geography pedagogy, the use of electronic resources such as: animations, graphics, video contents, and images provide instructions and teaching aids for enhanced mastery of concepts. For Geography education, the ministry of education through the Kenya institute of education (KIE) rolled out the incorporation of ICTs such as illustrated notes on digital tools such as computers targeting five schools per constituency between 2010- 2012, (MOE,2012) the second phase of economic stimulus Programme was done in 2012 targeting one school per constituency with an aim of improving performance in schools and also producing students who were able to compete in the fast growing global market. According to Kenya National Examination Council report [KNEC] (2017) teachers especially those teaching sciences and geography are encouraged to embrace the use of ICTs in teaching to enhance performance of learners in the national examination. Trial cluster examination is an important tool that helps both the teacher and the learner to gauge the level of achievement and also to predict what to expect by the end of the four-year course as it is a true reflection of performance in KCSE examination. Poor performance has not been an exception among students in Nyakach Sub-County. Therefore, in light of the above therefore, the study will seek to investigate the effect of 3D in teaching of Physical Geography on learners' achievement in secondary schools in Nyakach Sub-County, Kenya.

Years	Physical Geography (Paper one)	Human Geography(Paper two)
2014	2.03	2.55
2015	1.96	2.97
2016	1.85	2.75
2017	1.78	2.98

Source; Sub-County Directors Office Nyakach District Statistics Department, 2017

Table 3: Geography Cluster results for Nyakach Sub-County secondary schools for the year 2014-2017

EFFECT OF 3D ON LEARNERS' ACADEMIC ACHIEVEMENT

Effective training and usage of ICT in teaching is important since poor or improper management of ICT in the classroom may result in underperformance in educational outcomes (Jaco Du Toit, 2015). With 3D animations students can change and improve their incomplete mental models (Wu and shah 2014). Dori Carlson (2011) in his report titled 3D in the classroom, describes a series of recommendations that can help schools use 3D technology in a way that enables students to thrive and learn more efficiently in many subjects; better preparing them for life and advancing career challenges ahead. He further states that 3D learning approaches can serve as a fulcrum for enhanced teaching and improved assurance of school readiness.

A study by Anne Bamford (2010) in the U.S demonstrated the beneficial impacts of 3D teaching by comparing the effects of 2D and 3D learning on students. The results showed that 3D increased pupil attention from 50% to 94%, the students using 3D remembered more in greater detail than pupils using 2D. Generally, 85% of children preferred to learn by seeing and doing with 3D technology tool to access the visual aids. Ann further states that, apart from improvement in test scores and memory, learning with 3D can lead to improved classroom interaction and deeper understanding of physical geography with more description on the formation of physical features. Karla Youngs (2014) states that the potential benefits of using 3D content in supporting students to understand difficult concepts has not yet been fully realized across all subject disciplines, although there are some which actively engaging their students in 3D content and it's certainly a growing interest area.

Another study on the impact of 3D visualization types in multimedia applications for teaching science in 12th grade students in science which had a total of 111 students participating in the research that utilized three different versions on interactive multimedia application called "Atomic orbitals". The findings were that 3DVE (Virtual Environment) have greater contribution to the learning process than the other two types of visualization (3D animation interface) and (3D static illustration interface). According to the study, the use of interactive 3D virtual environment in science addressed to 17-18 years old students is distinctly recommended.

A study by Liisa (2008) on the effect of the ICT on school teachers and students' perspective employed mixed methods approach; the results indicated that teacher's individual characteristics and pedagogical conceptions affected the use of ICTs in teaching. However, this study was specific as it will focus on Physical Geography and not all disciplines. Descriptive survey and Quasi-Experimental research design were used as compared to the mixed method approach.

Vera Quest (2012) conducted a survey on behalf of Joan Ganz Cooney Center. The survey was conducted among U.S.-8th grade classroom /specialists' teachers who used digital games. The findings were, teachers overall seem to have positive opinion on digital games in the classroom as it relates to the impact on the students. They cite benefits as more collaboration among students and the capacity of digital games to help students sustain attention on specific task, the students who have lower performance also improve levels of engagement and improved attendance.

Jo Shan (2013) also revealed that learners need capacity building, infrastructure, policy and government support to lower students' barriers and improve effectiveness of use in classroom. Student to be encouraged to acquire specific technical skill to facilitate learning in ICT environments.

Mudasiru et al, (2011), empirically examined student-teachers' competence and attitude towards information communication technology. Gender influence on their competence and attitude were also examined. Participants were 382 student-teachers from the faculty of education, university of Ilorin, Nigeria. The data collected through questionnaires were analyzed using percentages, means and chi-square statistics. Findings revealed that majority of the student-teachers have positive attitude towards the use of ICT and they are competent in the use of few basic ICT tools. The implication is that, the student-teachers lacked the necessary competence in the full integration of ICT in the curriculum. This underscores the need to improve the ICT contents of teacher education performance in universities on developing nations. Study by Jaco shan revealed that barriers such as low teacher expectations and lack of clear goals for ICT use in schools affects its effectiveness, a view that is in line with Al-Batainel et al (2008). Lack of teacher collaboration and pedagogical support, as well as lack of experience among cooperating teachers (Ertmer and Otternbreit-leftwich, 2010). Almekhafi and Almeqdadi (2010) asserts that time to master new software or to integrate ICT during class period. Hutchinson, Reinking and Tezci (2011) support the view that lack of recognition, encouragement and big classroom sizes affects the use of technology in teaching. In this study the researcher will focus on the availability of the digitized content, the application and effect on learners' achievement specifically in Physical Geography.

II. METHODOLOGY

RESEARCH DESIGN

This study employed descriptive survey and quasi experimental research design to collect original data from a population that is too large to be observed directly and can be used for comparison respectively. The aim of the design was to collect information primary data from the learners and teachers. The main advantage of using descriptive survey is that, it enables the researchers to assess the situation within the study area at the time of the study (Kothari, 2004). The researcher therefore employed the design to assess the use and perceived effects of 3D on learners' achievement in Physical Geography in secondary schools in the study area.

POPULATION AND SAMPLE

The researcher employed Yamane (1967) formula cited in Glenn Israel (1992) he provides a simplified formula to calculate sample size with a 95% confidence level and precision level of $\pm$5% was used to calculate the sample size for both teachers and students in Nyakach Sub-County.

According to Mugenda and Mugenda (2008), a sample should have ability to represent characteristics in a population. Unit of analysis for the study are teachers and learners. The target population constitutes respondents from the 54 public secondary schools in Nyakach sub-county. Random sampling was used to sample 329 students and 24 teachers from a total population of 1826 students and 134 teachers respectively from Nyakach Sub-County public secondary schools. The design was used to avoid collecting a biased data. For descriptive studies, 10% and above of the accessible population is enough for the entire study (Mugenda and Mugenda, 2003).

RESEARCH INSTRUMENTS

Questionnaires and teacher made tests were used to examine student learning abilities using 3D graphics. The abilities were measured in terms of performance in the teacher made tests on glaciation topical questions. Finally, key informant interview was conducted to find out the general perception of teachers on the use of 3D graphics on achievement.

DATA ANALYSIS

Quantitative data was coded and organized to translate question responses into specific categories and to reduce research data into manageable summaries. Data from the questionnaires was cleaned then analyzed using SPSS **(v25)**. Descriptive statistics such as Pearson's r, multiple regressions, frequencies, means and percentages was used to describe the data as per the objectives. The analyzed data was presented in form of tables, pie-charts and bar-graphs where applicable.

Qualitative data collected from teachers was analyzed using both content and narrative analysis. Each theme was developed by explaining, interpreting and commenting on the data, as well as advancing arguments on pertinent factors relating to the study objectives

III. RESULTS AND DISCUSSIONS

The objective of the study was to establish the effect of 3D graphics on learners' achievement in physical geography Nyakach Sub County. This section shows the responses of respondents on how teachers and students perceive effects of 3D graphics in physical geography.

	Statement	SA	A	UD	D	SD	M
		f %	f	f %	f %	f %	
1	Use of 3Ds makes understanding easy	182(55.3)	97(29.5)	23(7.5)	5(1.5)	22(6.7)	**4.25**
2	Use of 3Ds makes visualization more interesting and easier	164(49.8)	143(43.5)	10(3.0)	2(.6)	10(3.0)	**4.36**
3	Use of 3Ds improves efficiency of learning and productivity	131(39.8)	147(44.7)	29(8.8)	10(3.0)	12(3.6)	**3.83**
4	Use of 3Ds allows learners to keep in memory concept learnt in the previous lessons	174(52.9)	136(41.3)	11(3.3)	1(.3)	7(7.2)	**4.42**
5	Use of 3Ds sharpens the interpretation skills of a learner	151(45.9)	130(39.5)	26(7.9)	14(4.3)	8(2.4)	**4.22**
6	Use of 3Ds facilitates positive peer interaction including reviewing and using feedback	126(38.3)	138(41.9)	35(10.6)	16(4.9)	14(4.3)	**4.05**
7	Use of 3Ds enables students to understand the value of reflection and critical judgment in creative work	126(38.3)	157(47.7)	26(7.90	15(4.6)	5(1.5)	**4.16**
8	Use of 3Ds more often to make geography real	138(41.9)	135(41)	36(10.9)	14(4.3)	6(1.8)	**4.17**
	Overall						**4.18**

KEY: 1–1.4 Strongly Disagree (SD); Above 1.5 –2.4 Disagree; Above 2.5 – 3.4 Uncertain (UC); Above 3.5 – 4.4 Agree (A) ; Above 4.5 – 5.0 Strongly Agree (SA)

Table 10: Students Perceived Effects of 3D Graphics in Physical Geography (n=329)

The results from the Likert scale shows that 55.3% of the students strongly agreed that Use of 3Ds makes understanding easy while 75% of the teachers agreed on the same statement. 49.8% and 43.5% of the respondents agreed and strongly agreed that use of 3Ds makes visualization more interesting and easier. The general information from this objective is that students strongly agree on the effect of 3D graphics in learning glaciation as a topic in Geography which is in line with Rosel (2009) observation that 3D graphics has significant impact on performance in geography thus enhance understanding of concepts. The percentage of respondents who agreed to this objective is high across the table implying that students are positive about 3D graphics and the effects it has on achievement in physical geography.

On the other hand, teachers were also probed on their perception on this objective and the responses were recorded in the table below.

	Statement	SA	A	UC	D	SD	M
		f %	f %	f %	f %	f %	
1	Use of 3D makes learning interesting	18 (75)	3(12.5)	2(8.3)	1(4.2)		**4.58**
2	Use of 3D enhances content delivery	17(70.8)	6(25)	1(4.2)			**4.66**
3	Use of 3D enhances understanding of complex geographical concepts	17(70.8)	5(20.8)	2(8.3			**4.62**
4	Use of 3D enhances classroom concentration	19(79.2)	5(20)				**4.79**
5	Use of 3D makes concepts in physical geography easy	10(41.7)	12(50)	1(4.2)	1(4.2)		**4.25**
6	Use of 3D enhances faster syllabus coverage	8(33.3)	14(58.3)	2(8.3)			**4.25**
7	Use of 3D improves quality of classroom teaching and learning	14(58.3)	7(29.2)	3(12.5)			**4.04**
	Overall						**4.455**

KEY: 1–1.4 Strongly Disagree (SD); Above 1.5 –2.4 Disagree; Above 2.5 – 3.4 Uncertain (UC); Above 3.5 – 4.4 Agree (A) ; Above 4.5 – 5.0 Strongly Agree (SA)

Table 11: Teachers perceived Effects of 3D Graphics in Physical Geography (n=24)

From table 11 the researcher wanted to know whether use of 3D makes learning interesting, 75% of the respondents strongly agreed, 12.5% agreed to this statement. The second statement on this objective asked teacher whether the use of 3D enhances content delivery the teachers and 70.8% of the respondents strongly agreed on the statement, 25% of the respondents agreed to this statement. The results from the perception of teachers on the effect of 3D graphics on learner's achievement was positive across the table with many teachers agreeing to the fact that 3D graphics improves the learning ability of the students on the subject as indicated by Barmford (2010) who observed that 3D graphics make learning interesting, Bamford also asserts that 3D increases pupil attention from 50-94 percent as 3D made them remember more in greater detail than pupils using 2D.

TEACHER MADE TESTS

The teacher made tests on students' learning ability were administered in two groups at different times by different teachers using different resources because this is one of the effective ways of examining learners concurrently. The results from the first group (control) and the second group (experimental) differed significantly. The students in control group taught using Geography textbook, chalk and chalkboard performed poorly as they were not to identify various physical features in Geography. However, the second group of students were the experimental group taught using 3D graphics (DVD 3) on the topic of formation of glacial features. The tests were graded out of 30 marks. The students in the second group registered better performance with the majority scoring 20 marks and above out of a total of 30 marks. However, students in the first group (control group) registered poor performance with most of the student scoring below 20marks. This revealed that use of 3D is important in improving academic performance among physical geography students.

Serial Number	Control Group Scores	Serial	Experimental Group Scores
02	20	31	10
25	22	07	22
29	16	08	23
03	16	28	22
12	08	06	25
14	14	01	20
17	16	14	20
19	16	18	21
20	15	05	23
30	16	22	22
26	17	02	28
28	13	08	23
31	14	27	19
10	06	03	28
23	08	07	22
04	04	30	19
01	03	19	18
09	13	16	19
16	04	06	23

Table 12: performance variation between control and experimental groups

INFERENTIAL ANALYSIS

The study sought to establish whether the independent variables (IVs) are related to dependent variable (DV) by testing for existence of significant relationship between the IV and the DV using correctional analysis. The study therefore carried out a correlation analysis and multiple regressions on the study the variable using the indices obtained for the variable.

CORRELATION ANALYSIS

The study first carried out correlation analysis, using Pearson correlation to establish whether there was any relationship between the Independent variables and the Dependent variables. The results were recorded in Table 6

		Learners' achievement in Physical Geography.	2D graphics	3D graphics
Learners' achievement in Physical Geography.	Pearson Correlation	1	.538**	.722**
	Sig. (2-tailed)		.000	.000
	N	321	321	321
2D graphics	Pearson Correlation	.538**	1	.506**
	Sig. (2-tailed)	.000		.000
	N	321	321	321
3D graphics	Pearson Correlation	.722**	.506**	1
	Sig. (2-tailed)	.000	.000	
	N	321	321	321

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*
Source: Research Data (2022)

Table 13: Correlational analysis

The results of correlation analysis in (table 13) show that, under 5% level of significance, the IV,3D graphics (r = .722, p-value =.000) was significantly related to learners' achievement in Physical Geography since the p-value was less than 0.05. The result show that 3D graphics had the higher relationship (r = .722). From the results, the relationship between 3D graphics (r = .722), and learners' achievement in Physical Geography was high since the correlation coefficient (r) comparison was greater than 0.5. Since the Independent variable was found to have had significant relationship with the Dependent variable; learners' achievement in Physical Geography, the study proceeded to estimate a study model using multiple regression.

REGRESSION MODEL

Regression was then carried out on the Independent Variable (3D graphics) against the dependent variable (learners' achievement in Physical Geography) to estimate the model, since they had shown to have a significant relationship.

The Independent variable and Dependent Variable was then regressed to estimate the study model based on the model;

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + + e$……(ii)

Where:

Y = learners' achievement in Physical Geography

X_2 = 3D graphics

β_0 is a constant (which is the value of dependent variable when all the independent variables are 0).

β_{1-2} is the regression coefficients or change induced by X_1 andX_2,

e = error term

Coefficients[a]

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	.663	.286		2.316	.024
2D graphics	.194	.072	.249	2.691	.009
3D graphics	.476	.123	.472	3.865	.000

a. Dependent Variable: Learners' achievement in Physical Geography
Source: Research data (2022)

Table 15: Results of Regression of learners' achievement in Physical Geography

The study estimated the equation from table 9 as;

$Y = .663 + .194X_1 + .476X_2$……(ii)

The results show that the variable 3D graphics had positive coefficients, which showed that 3D was directly proportional to learners' achievement in Physical Geography. This means that an increase in use of 3D graphics leads to increase in learners' achievement in Physical Geography and any decrease in use of 3D graphics lead to decrease in learners' achievement in Physical Geography.

The study used the following hypotheses to test for 3D graphics;

H_0: 3D graphics does not significantly influence learners' achievement in Physical Geography.

H_1: 3D graphics significantly influences learners' achievement in Physical Geography.

From these results, T= 3.865 p-value= .000. Since p <.05 then the null hypothesis is rejected and the alternative hypothesis accepted. At the α = 0.05 level of significance, there exists enough evidence to conclude that the 3D graphics is not zero and, hence, that 3D graphics is useful as a predictor of learners' achievement in Physical Geography.

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.791[a]	.625	.890	.33345

Source: Research data (2022)

Table 16: Model Summary

The results in table 7 shows that coefficient of determination was .890, an indication that 89.000% of variation in learners' achievement in Physical Geography is explained by 3D graphics. In conclusion, 3D graphics could significantly predict the DV (learners' achievement in Physical Geography).

The study further found out that both students and teachers understand that use of 3D graphics with texts heightens the understanding of students. Out of the sampledteachers19of them strongly agreed that use of 3Ds in teaching physical geography glaciation related features improves efficiency of learning and productivity. This number accounted for 89.6% of the sampled respondents. The results prove that student's 3D graphics with text in geography class as this would allow them make observations and draw logical conclusion from physical geography. The results from the students shows that they would understand more with 3D graphics with text in learning physical geography as observed by Day (2012) observation that graphics improve understanding. The general information depicted from the Likert scale examining the digitized content among learners is that most of the learners agree to the statements that teachers use different ways in allowing them learn understand physical geography. These finding concurs with Karla Youngs (2014) states that the potential benefits of using 3D content in supporting students to understand difficult concepts.

IV. CONCLUSIONS

The study concludes that use of 3D among students in secondary schools in Nyakach Sub County has a positive impact on student performance on formation of physical features. However, there is a great challenge on the resources that support digital content in many secondary schools in Kenya. The poor performance in the topics of physical geography among students in secondary schools comes from the reduced ability to equip the schools with the required computer resources to support digitized teaching. The poor reduced performance in physical geography by the control group as shown from the teacher made tests can be associated with the limited ability of the students to have the visual picture in geography that would have a positive effect on their understanding of physical geography as a subject.

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The study further demonstrates that, teachers who frequently taught using 3D, learning outcomes improved. However, despite teachers having effective approaches that can be effective in teaching geography using the digital platforms, they lack the resources that should be enabling them to meet these objectives. Most of the teachers included in the study were employed in a digital age implying that they have effective skills that would enable them dispense and use the modern technology in teaching physical geography.

The study further found out that both students and teachers understand that use of 3D graphics with texts heightens the understanding of students. Out of the 24 sampled teachers 19 of them strongly agreed that use of 3Ds in teaching physical geography glaciation related features improves efficiency of learning and productivity. This number accounted for 89.6% of the sampled respondents. The results prove that students needed 3D graphics with text in geography class as this would allow them make observations and draw logical conclusion from physical geography. The results from the students shows that they would understand more with 3D graphics with text in learning physical geography as observed by Day (2012) observation that graphics improve understanding. The general information depicted from the Likert scale examining the digitized content among learners is that most of the learners agree to the statements that teachers use different ways in allowing them learn understand physical geography. These finding concurs with Masingila et al., (2019) which noted that teaching of practical skills on using the modern technology on animations affect the performance of students in geography.

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