



Attitude of clinical teachers towards the use of innovative technology in teaching and learning in the university of Port Harcourt medical school, South Nigeria

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Abstract

The 21st century has seen a rapid increase in the use of various innovative technologies in pedagogy. The attitude of the clinical teachers affects the use of these innovative technologies in teaching and learning. The aim of this research is to find out the attitude of clinical teachers using “The Tripartite Theory of Attitude” consisting of affective, cognitive, and behavioral domains, to the use of innovative technology. A descriptive survey research design with correlational studies was done with a purposive sampling method used. A 24 item Likert questionnaire was used and distributed using Google Form. The population of the study was made up of clinical teachers in the Faculty of Clinical Sciences University of Port Harcourt. A total of 90 clinical teachers took part in the study comprising of 48 males and 42 females. 23 were professors while 51 were senior lecturers. Analysis showed the overall attitude of clinical teachers to the use of innovative technology in teaching and learning was positive. No significant correlation was seen between gender, cadre, and years of service of the clinical teacher to the use of innovative technology. Thus, incorporation of innovative technology into the classroom should be encouraged as this would aid the clinical teachers in improving learning in the classroom.

Keywords: Attitudes, Clinical teachers, Innovative technology, Medical school.

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Contribution of this paper to the literature

This study adds to literature by examining the attitude of clinical teachers towards innovative technology in teaching and learning in the University of Port Harcourt Medical school. The results of this research will have the potential to aid clinical teachers to successfully integrate innovative technology into their classrooms.

1. Introduction

Today's university students are versatile in cutting-edge technology as seen when looking for a solution to an issue, the modern student is more likely to use the internet rather than printed material or books (Selwyn, 2009). They are said to be digital natives, this refers to a young person who has grown up in the digital age, having intimate and early contact with computers, the internet, and video game consoles, as well as mobile phones, social media, and tablets (Selwyn, 2009). They have therefore evolved cognitive thinking processes that are distinct from those of prior generations. On the other hand most of the clinical teachers of today were born in the pre-digital era or before 1980 and are known as digital immigrants as their introduction into the digital world of computers, the internet, email, social online platforms, video games and mobile phones occurred later in life most times as adults (Prensky, 2001). This pedagogical dilemma was summarized by Prensky (2001) who in his study noted that "Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population (digital natives) who speaks an entirely new language" therefore in order to teach today's learners, there must be a transformation in teaching patterns and attitude. The 21st century clinical teacher must be familiar with these technologies in order to properly employ them in pedagogy so as to stay up to date with the 21st century student and develop doctors with the necessary skills and knowledge to flourish in this digital era as a lifelong learner (Blackwell, Lauricella, & Wartella, 2014). These innovative technologies introduced into teaching and learning are both software and hardware, that mirror the use of computers, the internet, web 2.0 tools, various online and digital laboratories, Information Communication Technologies, educational gaming software in teaching and learning thus the 21st-century innovative technology is based on digital technologies and skills (OECD and Eurostat, 2005).

Attitude was defined by Ajzen (1988) as "complex mental processes that are thought to influence the way in which individuals' process information and to motivate behavior." The clinical teacher's attitudes about innovative technology usage and teacher confidence levels in using technology influence whether technology is integrated into classroom learning activities. Bohner and Dickel (2011) and Oppenheim (1992) proposing that attitude is composed of three aspects and explained that "attitudes are reinforced by beliefs (cognitive component) and often attract strong feels (the emotional component) which may lead to a particular behavioral intent (the action tendency component)". The attitude of clinical teachers to the use of innovative technologies in teaching and learning is important as this determines how, why, when, where, and what technologies are used.

1.1. Aim and Objectives of the Study

The study aimed to evaluate the attitude of clinical teachers towards the use of innovative technologies in teaching and learning in the University of Port Harcourt medical school while the objectives include the evaluation of the affective (feeling), behavioural (action) and cognitive (knowledge) attitude of clinical teachers towards the use of innovative technologies in teaching and learning and to evaluate the relationship of number of years of teaching, cadre and gender to the use of innovative technology in teaching and learning. For the purpose of this study, 'innovative technology' refers to "digital technologies" such as web 2.0 digital tools like YouTube videos, zoom, Google classroom, learning/ teaching videos (Maag, 2006).

2. Methodology

2.1. Research Design

A descriptive survey research design with correlational studies was done with a mixed design approach-qualitative and quantitative data was obtained.

2.2. Study Area

The study was conducted in the University of Port Harcourt Medical School located in the South region of Nigeria.

2.3. Study Population

The participants in the study were clinical teachers from the Faculty of Clinical sciences teaching MBBS medical students in the University of Port Harcourt medical school. That is, clinical teachers teaching students in their year 5th and 6th years of medical school.

2.4. Sample and Sampling Techniques

A purposive sampling method was used with study population being all Clinical teachers from the Faculty of Clinical Sciences teaching clinical students in years 4, 5 and 6.

2.5. Methods of Data Collection/Instrumentation

Using a Google Forms online questionnaire, both quantitative and qualitative data were collected. The instrument used is an adaptation of the instrument developed by Guillén-Gámez, Colomo-Magaña, Sánchez-Rivas, and Pérez (2020), which measured attitudes towards technology. The instrument used was a structured questionnaire with both open-ended and closed-ended questions. Utilized was the four-point Likert Scale, with response options of [1] Strongly Agree (SA), [2] Agree (A), [3] Disagree (D), and [4] Strongly Disagree (SD). Based on the ABCs (Affective, behavioral, and Cognitive) of attitudes, a scale containing 24 items pertaining to three dimensions was used to determine the attitudes of clinical instructors towards innovative technology in

teaching and learning. The cognitive dimension is comprised of items that express an individual's thoughts and knowledge. The affective dimension consists of items measuring an individual's emotional outlook (feelings, happiness, dread, anxiety, etc.). A mean value of 3 or greater indicated a moderate to high level of agreement (a positive score) with respect to the indicator.

2.6. Validity/Reliability of Instrument

The content validity of the instrument was ensured using a pilot study of the survey instrument which was given to 10 clinical teachers for clarity and face validation. The 10 clinical teachers were not part of the final study population. Corrections and changes due to ambiguity and unclear questions concerning the instrument were made based on the responses received. Cronbach's alpha coefficients for reliability analysis were measured as 0.825 for cognitive dimension, 0.802 for affective dimension and 0.795 for behavioral dimension while the overall scale was calculated as 0.819.

2.7. Methods of Data Analysis

The results were compiled and SPSS 22.0 (Inc., Chicago, USA) for Windows used for statistical analysis using frequency tables, charts and graphs. Mean and standard deviation values were calculated for the Likert scale. Correlation studies were used to compare teacher attitudes according to some individual characteristics with p-value less than 0.5 accepted as levels of statistical significance. ANOVA=Analysis of variance [F-test] (for comparing 3 or more means) and Student t-test was used to evaluate for association.

2.8. Ethical Approval

The University of Port Harcourt Research Ethical Committee granted ethical approval. Additionally, informed consent was acquired.

3. Results

Demographic characteristics of the study population:

A total of 90 clinical teachers took part in the study giving a response rate of 70%. The age of the clinical teachers ranged from 36 years to over 45 years. There was no teacher below 36 years and 63.3% were above 45% (Figure 1). The women were: 42 (46.7%) and the males 48 (53.3%) (Figure 2). The number of years of teaching were recorded with the 11-15 years having the highest group (Figure 3). The cadre of clinical teachers are represented in Figure 4.

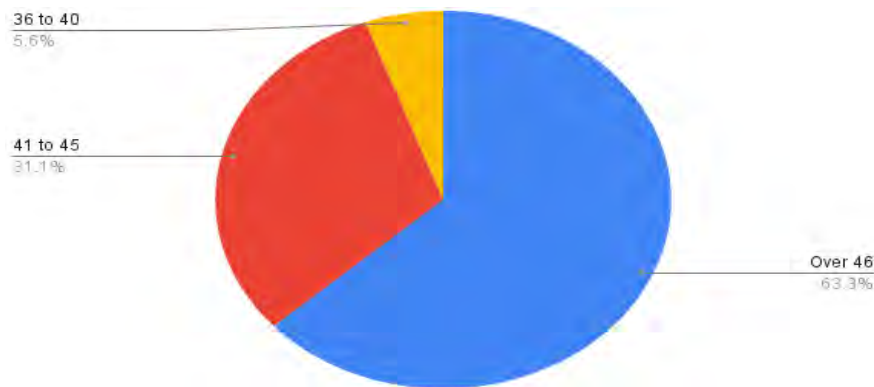


Figure 1. Pie chart showing the age range of the clinical teachers in years.

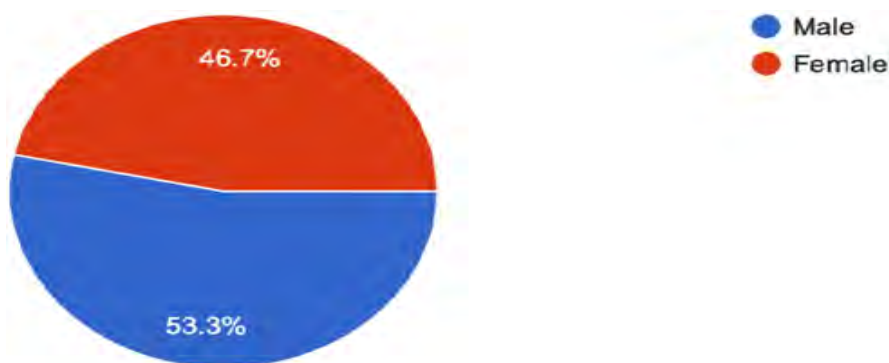


Figure 2. Pie chart showing the percentage of males to females of the clinical teachers.

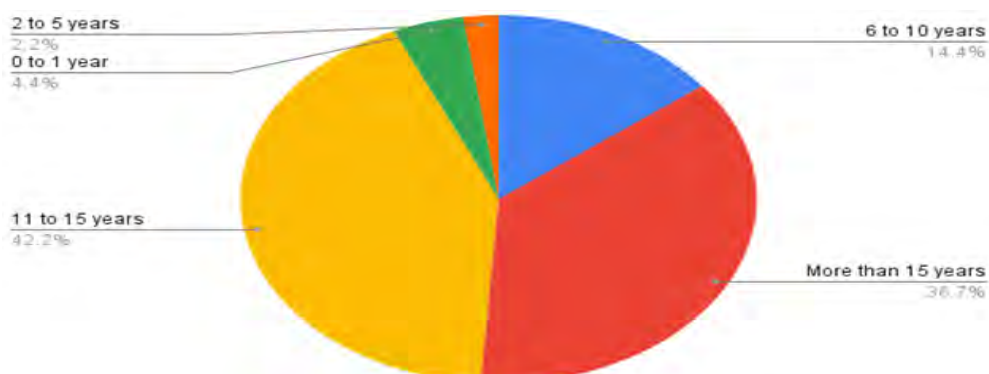


Figure 3. Pie chart showing number of years of teaching by the clinical teachers in the medical school.

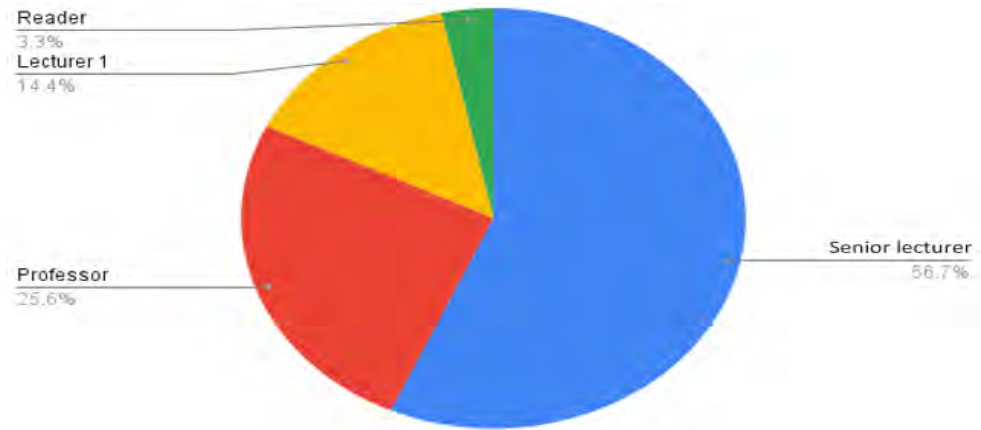


Figure 4. Pie chart showing the cadre of the clinical teachers.

Table 1. Affective attitude of clinical teachers to the use of innovative technology in teaching and learning.

Item statement	Minimum	Maximum	Mean	Mean estimate	Std. deviation
I feel confident using the digital technology to source for information to teach my clinical students	2.0	4.0	3.72	4	0.47
I feel using digital technology can prevent my students from being creative in their learning process.	1.0	4.0	1.89	2	0.83
I feel the use of digital technologies are necessary tools in both teaching and learning	3.0	4.0	3.93	4	0.25
I feel the traditional way of teaching (Didactic lectures, handouts etc.) is a better way of teaching than with the use of digital technology.	1.0	4.0	1.58	2	0.82
I feel digital technology increases my productivity as a teacher	2.0	4.0	3.72	4	0.56
The use of digital technology makes a teaching session more interesting	2.0	4.0	3.72	4	0.49
The use of digital technology in learning by my students is distractive	1.0	4.0	1.86	2	0.84
Digital technology (Computers) can help accommodate different learning styles thus enhancing learning.	3.0	4.0	3.83	4	0.37
Total affective attitude measured by the instrument (32)			24.28	26	4.67

Table 2. Breakdown assessment of the affective attitude of clinical teachers to the use of innovative technology in teaching and learning (N=90).

Variable	Frequency	Percent (%)
I feel confident using the digital technology to source for information to teach my clinical students		
Strongly disagree	0	0.0
Disagree	1	1.11
Agree	22	24.44
Strongly agree	67	74.44
I feel the traditional way of teaching (Didactic lectures, handouts etc) is a better way of teaching than with the use of digital technology.		
Strongly disagree	34	37.78
Disagree	36	40.00
Agree	17	18.89
Strongly agree	3	3.33
Using digital technology can prevent my students from being creative in their learning process		
Strongly disagree	0	0.0
Disagree	34	37.78
Agree	36	40.00
Strongly agree	17	18.89
Digital technology increases my productivity as a teacher		
Strongly disagree	0	0.0
Disagree	5	5.56
Agree	14	15.56
Strongly agree	71	78.89
I feel computers are necessary tools in both teaching and learning		
Strongly disagree	0	0.0
Disagree	0	0.0
Agree	7	7.78
Strongly agree	83	92.22
The use of digital technology makes a teaching session more interesting		
Strongly disagree	0	0.0
Disagree	2	2.22
Agree	20	22.22
Strongly agree	68	75.56
The use of digital technology in learning by my students is distractive		
Strongly disagree	3	3.33
Disagree	14	15.56
Agree	37	41.11
Strongly agree	36	40.00
Digital technology (Computers) can help accommodate different learning styles thus enhancing learning.		
Strongly disagree	0	0.0
Disagree	1	1.11
Agree	15	16.67
Strongly agree	74	82.22

Table 1 shows that clinical teachers have a positive predisposition towards the use of innovative technology in teaching and learning because a high mean score was noted. Low scores were seen as positive as it showed a positive agreement.

Table 2 presents the evaluation of the analysis of clinical teachers' affective attitudes towards teaching and learning. A large number of clinical teachers feel that the usage of digital technology would promote learning and is, therefore, a required teaching tool.

The behavioral attitudes of clinical teachers to the use of innovative technology in teaching and learning are seen in Table 3. It shows that clinical teachers have a positive predisposition towards innovative technology due to the fact that they all have a high average score. Low scores are however seen as positive as it shows a positive agreement.

Table 3. Behavioral attitude of clinical teachers to the use of innovative technology in teaching and learning.

Item statements	Minimum	Maximum	Mean	Std. deviation
I think my teaching skills could improve with the use of digital technology.	2.0	4.0	3.86	0.37
I encourage my students to use digital technology in their study time.	2.0	4.0	3.34	0.75
Use of digital technology in learning will lead to loss of reasoning skills by my students	1.0	4.0	1.78	0.77
The use of on -line learning platforms (Like google meet, Moodle, zoom) creates more interaction between my student and me as a teacher	1.0	4.0	2.85	1.00
I give my students assignments that involve the use of digital; technology	1.0	4.0	2.69	0.82
Use of digital technology makes my teaching of clinical students easier	1.0	4.0	3.50	0.71
Digital technology plays a huge role in planning my teaching outline	2.0	4.0	3.63	0.60
I use online learning platforms to share information with my students	1.0	4.0	2.81	0.94
Total behavioral attitude measured by the instrument			24.48	5.99

Table 4. Breakdown analysis of assessment of behavioural attitude of clinical teachers to the use of innovative technology in teaching and learning (N=90).

Variable	Frequency	Percent (%)
I think my teaching skills could improve with the use of digital technology		
Strongly disagree	0	0.0
Disagree	1	1.14
Agree	10	11.36
Strongly agree	77	87.50
I encourage my students to use digital technology in their study time		
Strongly disagree	0	0.0
Disagree	15	17.05
Agree	28	31.82
Strongly agree	45	51.14
Use of digital technology in learning will lead to loss of reasoning skills by my students		
Strongly disagree	2	2.27
Disagree	13	14.77
Agree	37	42.05
Strongly agree	36	40.91
The use of on -line learning platforms (Like google meet, moodle, zoom) creates more interaction between my student and me as a teacher		
Strongly disagree	9	10.34
Disagree	23	26.44
Agree	26	29.89
Strongly agree	29	33.33
I give my students assignments that involve the use of digital; technology		
Strongly disagree	4	4.55
Disagree	35	39.77
Agree	33	37.50
Strongly agree	16	18.18
Use of digital technology makes my teaching of clinical students easier		
Strongly disagree	1	1.14
Disagree	8	9.09
Agree	25	28.41
Strongly agree	54	61.36
Digital technology plays a huge role in planning my teaching outline		
Strongly disagree	0	0.0
Disagree	6	6.82
Agree	20	22.73
Strongly agree	62	70.45
I use online learning platforms to share information with my students		
Strongly disagree	5	5.68
Disagree	33	37.50
Agree	23	26.14
Strongly agree	27	30.68

Table 4 shows the analysis of assessment of behavioral attitude to teaching and learning. A high percentage of clinical teachers believe the use of digital technology would improve their teaching skills and used it in planning their lessons.

The cognitive attitudes of clinical teachers to the use of innovative technology in teaching and learning are seen in Table 5. It shows that clinical teachers have a positive predisposition towards the use of innovative technology in teaching and learning.

Table 5. Cognitive attitude of clinical teachers to the use of innovative technology in teaching and learning.

Item statements	Minimum	Maximum	Mean	Std. deviation
Students have a greater grasp of digital technology than I do.	1.0	4.0	3.29	0.92
Use of digital technology is important in the updating of the knowledge I need to teach clinical students.	2.0	4.0	3.80	0.42
The use of digital technology is too time consuming to be used in teaching of clinical students	1.0	4.0	2.03	0.85
Digital technology in teaching of clinical students is not necessary as it is more of a personalized skill to be passed on to the clinical student.	1.0	4.0	1.53	0.84
Learning using digital technology is a new field I would like to explore	1.0	4.0	3.60	0.75
Learning skills using digital technology is too expensive for the clinical students	1.0	4.0	2.26	0.75
Digital technology can improve my learning process as a teacher.	3.0	4.0	3.88	0.31
Digital technology can improve the learning process of the clinical student.	1.0	4.0	3.78	0.53
Total cognitive attitude measured by the instrument			24.20	5.39

Table 6 shows the breakdown analysis of assessment of cognitive attitude of clinical teachers to the use of innovative technology in teaching and learning with most in agreement that digital technology can improve the learning process.

Table 6. Analysis of assessment of cognitive attitude of clinical teachers to the use of innovative technology in teaching and learning (N=90).

Variable	Frequency	Percent (%)
Students have a greater grasp of digital technology than I do		
Strongly disagree	6	6.82
Disagree	10	11.36
Agree	24	27.27
Strongly agree	48	54.55
Use of digital technology is important in the updating of the knowledge I need to instruct clinical students		
Strongly disagree	0	0.0
Disagree	1	1.14
Agree	15	17.05
Strongly agree	72	81.82
Use of digital technology is important in the updating of the knowledge I need to instruct clinical students		
Strongly disagree	3	3.41
Disagree	24	27.27
Agree	34	38.64
Strongly agree	27	30.68
Technology in teaching of clinical students is not necessary as it is more of a personalized skill to be passed on to the clinical student		
Strongly disagree	5	5.68
Disagree	5	5.68
Agree	22	25.00
Strongly agree	56	63.64
Learning using digital technology is a new field I would like to explore		
Strongly disagree	2	2.27
Disagree	8	9.09
Agree	13	14.77
Strongly agree	65	73.86
Learning skills using digital technology is too expensive for the clinical students		
Strongly disagree	5	5.68
Disagree	24	27.27
Agree	48	54.55
Strongly agree	11	12.50
Learning skills using digital technology is too expensive for the clinical students		
Strongly disagree	0	0.0
Disagree	0	0.0
Agree	10	11.36
Strongly agree	78	88.64
Digital technology can improve the learning process of the clinical student		
Strongly disagree	1	1.14
Disagree	2	2.27
Agree	12	13.64
Strongly agree	73	82.95

Table 7 displays the total attitude. It can be noted that the cognitive attitudes ($M = 24.20 \pm 5.39$) has the lowest scores, followed by the emotional attitudes ($M = 24.28 \pm 4.66$), Behavioral attitude, on the other hand, has a mean total score of ($M = 24.48 \pm 5.98$). In terms of total attitude toward the use of new technology, it can be claimed that it is high ($M = 72.39 \pm 16.06$) when compared to the maximum 96 points that may be obtained.

Table 7. Description of the mean of each dimension of the instrument.

Dimensions of attitude	Mean	Mean estimate	Std. deviation
Affective attitudes (32 points)	24.29	26	4.67
Behavioral attitudes (32 points)	24.48	26	5.97
Cognitive attitudes (32 points)	24.20	25	5.39
Total attitude (96 points)	72.97	77	16.06

As shown in Table 8, affective, behavioural, cognitive and overall attitude of clinical teachers towards innovative technologies in teaching and learning were measured using the median scores, on a scale of 1-4, with numbers closer to “1” suggesting poor use of innovative technology in teaching and learning and numbers closer to “4” suggesting good use of innovative technology in teaching and learning. The median scores ranged between 3.5 to 4, suggesting good use of innovative technology in teaching and learning.

Table 8. Overall attitude of clinical teachers to the use of innovative technology in teaching and learning using the median (N=90).

Variables: Dimensions of attitude	Median (IQR)	Range: 1=Lowest, 4=Highest
Affective attitude	4	(3.5-4.0)
Behavioural attitude	3.5	(3.0-4.0)
Cognitive attitude	4	(3.5-4.0)
Overall attitude	4	(3.75-4.0)

Note: SD=Standard deviation=Inter-quartile range.

To find out the relationship between the gender, age and cadre of the clinical teacher and the use of innovative technology Pearson Product moment was calculated.

Table 9 presents the correlation of the various attributes. It showed that gender, cadre and age had no significant correlation with the use of innovative technology. This means there is no difference in the use of innovative technology by clinical teachers in teaching and learning in both genders, all cadre and age.

Table 9. Correlation of various attribute of clinical teachers and use of innovative technology.

Items	Correlation	Gender	Cadre	Years of teaching
Use of digital technology makes my teaching of clinical students easier	Pearson correlation	0.016	-0.215	-0.186
	Sig. (2-tailed)	0.882	0.075	0.083
	N	88	88	88
Digital technology plays a huge role in planning my teaching outline	Pearson correlation	0.034	-0.151	-0.152
	Sig. (2-tailed)	0.752	0.161	0.157
	N	88	88	88
I use online learning platforms to share information with my students	Pearson correlation	-0.062	0.144	0.007
	Sig. (2-tailed)	0.566	0.182	0.950
	N	88	88	88
Students have a greater grasp of digital technology than I do.	Pearson Correlation	0.047	-0.264	0.006
	Sig. (2-tailed)	0.665	0.063	0.978
	N	88	88	88
Use of digital technology is important in the updating of the knowledge I need to teach clinical students.	Pearson correlation	-0.004	-0.015	-0.062
	Sig. (2-tailed)	0.968	0.887	0.568
	N	88	88	88
The use of digital technology is too time consuming to be used in teaching of clinical students	Pearson correlation	0.043	-0.307	-0.092
	Sig. (2-tailed)	0.690	0.074	0.394
	N	88	88	88
Technology in teaching of clinical students is not necessary as it is more of a personalized skill to be passed on to the clinical student.	Pearson correlation	0.084	0.188	0.106
	Sig. (2-tailed)	0.435	0.080	0.328
	N	88	88	88

4. Discussion

The study showed that the attitude of clinical teachers in the University of Port Harcourt medical school to the use of innovative technology in teaching and learning was average in general terms and positive. This implies that there is a tendency to use innovative technology in teaching and learning. This was similar to findings by other researchers such as Howard and Gigliotti (2016); Masters, Ellaway, Topps, Archibald, and Hogue (2016) and Bennett, Agostinho, and Lockyer (2017).where their studies proposed that teachers, in general, had a positive attitude to the introduction and use of innovative technologies into the classroom for teaching and learning given the right environment and support This could be due to the rapid development of innovative technology which is being used in social media platforms outside the classroom by teachers so these technologies are not strange but familiar to the teachers, thus acceptable, so the overall attitude will be positive to support these new ideas. Bates (1995) suggested that “technologies are not inherently better than old ones and many of the lessons learned from the application of older technologies will still apply to any newer technology” thus the positive attitude to new technology may be due to a familiarity with the old ones or older versions.

The clinical teachers in this study had a relatively higher level of positive attitude in the behavioral dimension unlike studies done by Alshammari, Reyes Jr, and Parkes (2016) which showed a higher level in the cognitive dimension as it is expected for university teachers to be more knowledgeable. Furthermore Alshammari et al. (2016) and Ostrom (1969), stated in their studies that the participating teachers were found to have a higher level of self-perception in relation to cognitive attitudes effective and behavioral attitudes. On the other hand similar positive behavioral attitudes over cognitive and affective attitudes were seen in another study where teachers just acquired the basic skills but no integration into teaching and learning was noted ie the cognitive knowledge was missing (Guillén-Gámez & Mayorga-Fernández, 2020). This could be due to the observational /apprentice nature

of medicine were “doing” or skills are emphasized. It could also be explained by the Theory of diffusion due to social influence; where there is a social component to adoption of technology. In a social group or network no one wants to be left behind so there is the peer pressure to use whatever technology is being used by others in the group. When colleagues and friends are using a particular technology the others in the social circle use it also working through observation with little knowledge (Rogers, 1995). Affective component of attitude was in the middle and is positive. In this population, there is a positive affective attitude towards innovative technology. That means the clinical teachers have a good feeling about the use of innovative technology in teaching and learning.

There was no correlation between the male and female gender in the use of innovative technology in learning and teaching by the clinical teachers in this study. This was also observed by Olasoji, Mu’azu, and Garba (2019); Kpolovie and Awusaku (2016); Semerci and Aydin (2018) and Alkan and Erdem (2010) in their researches among university teachers. On the other hand, a study by Bakrys (2018) showed that women have a less favorable attitude towards technology and men showed more positive attitudes. The result in this study could be due to the exposure of both genders to these new technologies and the need to upgrade and keep up with current practices in presentations and teaching. There was no significant correlation between cadre and years of service with the use of innovative technology in the study. However this was not seen in studies done by Kpolovie and Awusaku (2016) and Semerci and Aydin (2018) where the opposite was noted. Consistent with the findings of Alshammari et al. (2016), this study revealed that less experienced teachers and younger clinical teachers with limited experience had more positive attitudes towards technology use. These outcomes may be the result of clinical instructors at the University of Port Harcourt having equal access to technology.

In conclusion, clinical instructors at the medical school of the University of Port Harcourt have a favorable view of the use of digital innovative technology in teaching and learning. Despite their practical experience with these technologies, their cognitive attitude is lower than their behavioral and emotional attitudes, indicating a lack of knowledge on how to use and integrate these technologies into the classroom. Furthermore, no statistically significant associations were found between gender, academic rank, and years of service among clinical teachers at the University of Port Harcourt Medical School and the use of innovative technology.

5. Imitations

Limitations of the study were the short timeframe of the study, and the questions were closed ended and more in-depth qualitative studies are needed. That is conducting in-depth interviews with the clinical teachers to find out their attitudes and thus to contrast the quantitative and qualitative data.

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