UNDERGRADUATE CHEMSTRY EDUCATION STUDENTS' ATTITUDE TOWARD USE OF COMPUTER AND INTERNET AND ITS INFLUENCE ON THEIR ACADEMIC ACHIEVEMENT IN KANO STATE

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Abstract

This study investigated the influence of students' attitudes towards the use of computer and internet resources on academic achievement among undergraduate chemistry students in Kano State. The study employed a correlational design, and a sample of 322 undergraduate chemistry students were selected using a proportionate stratified random sampling technique from four government-owned universities in Kano state, comprising 198 males and 124 females. The research instrument used was the Chemistry Undergraduates Attitude towards Computer and Internet Resources Questionnaire (CUATCIRQ). The reliability coefficients of the two sub-scales were 0.82 and 0.73 for items on utilization, and attitudes towards computer and internet resources, respectively, using Split Half method Cronbach Alpha was used to calculate the reliability index, for internal consistency. To measure academic achievement, students' first semester examinations GPAs were used. Frequency count, means, standard deviation, ppmc and point-biserial correlation were used to answer the research questions, while Point bi-serial and Pearson product-moment correlation were used to test the null hypotheses at the 0.05 level of significance using SPSS version 25. The findings showed that Undergraduate chemistry students in Kano state university have a positive attitude toward use of computer and internet, and also gender varies with attitude in opposite directions. Furthermore there was no significant relationship between undergraduate chemistry students' attitudes towards the use of computer 8and their academic achievement, as well as attitude towards internet resources and their academic achievement. Based on the study's findings, it is recommended that federal and state ministries of education should provide adequate provisions for computers, internet facilities, and overhead projectors, as well as a regular supply of electricity in schools. This will enhance attitudes towards the use of computer system and also internet resources and improve the academic achievement of undergraduate chemistry students.

Keywords: Attitude, Computer, Internet, Academic Achievement.

Introduction

Computer and internet played a vital role in enhancing teaching and learning in many courses in addition to chemistry. It was observed that computer and internet resources have a great impact on teaching and learning of chemistry in higher institutions. Computer and internet resources have been identified as potentially viable to impact academic performance (Olorukooba, Sani, & Kazeem, 2016).

Computer and internet resources are the main components of information and communication technology (ICT) (Inyang & Effiong, 2016). According to Barineme (2014), computer is an electronic device that accepts data as input, process the data in the processing unit saves the processed data as RAM or ROM or give out result of the processed data as information through an output device like screen or printer. While, internet can be defined as a global system of networked computers that allow user-to-user communication and transfer of data files from one machine to any other on the network (Ikediugwu, 2015). The role of these computer and internet resources facilities such as computer and the internet enables the teacher to deliver his/her lecture in such way as to achieve the stated specific objectives of the lesson, such as the cognitive, affective and psychomotor domains without findings it difficult (Fashina& Akanji, 2016). The introduction of computers in all levels of education in Nigeria helps tutors impact programmed knowledge to their students (Inyang & Effiong, 2016). Additionally, the availability of high speed internet in the 21st century has pushed learning beyond the confines of physical classrooms. For instance, a student at home can participate in regular classes using interactive technology. E-learning has become a common place as modern education is no longer restricted to sitting in a classroom and taking notes. As a matter of fact, students are empowered to draw on the richness of the internet to research any subject matter ranging from historical events to stimulations of challenging chemistry problems (Olorukooba& Kazeem, 2016).

More so, Attitude can be defined as the way in which a person views and evaluates something or someone, a8 predisposition or a tendency to respond positively or negatively toward a certain idea, object, person, or situation (Vargas-Sánchez, Plaza-Mejía, Porras-Bueno, 2016). It can be attributed to a person's tendency to form his/her feelings, thoughts and behaviors about another person or an object and attitude can equally be shaped and learned with experience (Kağıtçıbaşı, 2016). A person's attitude towards computer, therefore affects his use of computer. That is, attitude of a student triggers his behavior (Okuonghae, Igbinovia, & Adebayo, 2022).

Attitudes are antecedents which serve as inputs or stimuli that trigger actions and the more one has experience in using computers, the more he or she has positive attitudes towards computers (Lehimler, 2016; Seo & Ray, 2019). Those who don't have enough experience in computers might develop negative attitudes towards using them. Mitzner, Bonvin, Bosman &Menjo (2016) opined that one's attitude and positive experience in computer and internet resources is highly related to her view of computer and internet resources in terms of its usefulness and ease of use. Teo, Milutinović & Zhou, (2016) found in their recent study that attitudes towards computers are highly related to perceived usefulness, perceived ease of use, and technological complexity. How proficient one sees himself in using computers is highly related to his attitudes towards computers (Mumcu&Usta, 2014). In the samevein, perceptions about the proficiency in computer use are seen positively effective in teachers' attitudes towards computers (Ahmed, Qasem, & Pawar, 2020).

In spite of the vital roles of computer and internet resources in national technological progress, many tertiary institutions in the country still do not seem not to be using computer and internet resources that might bring about innovation in the learning habits and consequently boast positive attitudes of students (Eze, Chinedu-Eze, Okike, & Bello, 2020). Ibiyengibo&Nenalebari (2022) reported cases of

poor performance of chemistry students in Nigerian universities and that the situation seems to have affected students' enrolment in chemistry departments. It is against this backdrop that this study is out to assess attitudes towards the use of computer and internet resources and their influence on male and female students' academic achievement.

Gender factor in academic attainments has been the concern of educational researchers and administrators over the years (Casad et al 2021). Different researchers have offered varying hypotheses to explain their observed gender differences in academic attainment. According to World Health Organization (2023), gender refers to the characteristics of women, men, girls and boys that are socially constructed. This includes norms, behaviours and roles associated with being a woman, man, girl or boy, as well as relationships with each other. As a social construct, gender varies from society to society and can change over time. Gender can also be referred to the social meanings associated with being a male or a female, including the construction of identities, expectations, behaviors 8and power relationships that are derived from social interactions (Iwuchukwu 2018).

Statement of the Problem

 Many factors might be responsible for the poor performance of undergraduate chemistry students which in turn may affect their enrolment in the Nigerian Universities, some of these problems are; lack of appropriate knowledge, accessibility to computer and internet materials, students' poor attitude toward the use of computer and internet resources, and lack of confidence in using computer and internet facilities (Oni, Adeuni&Oguntokun, 2013). The Federal government of Nigeria recognizes the need for computer and internet resources in education in her various policies (Federal Republic of Nigeria, 2013). However, the state of infrastructure on ground is not commensurate to the media attention generated and therefore the availability, adequacy, accessibility and usability of computer and internet resources have been issues of research (Olatokun, 2017). Research studies have pointed out cases of poor performance of chemistry students in Nigerian universities and the situation seems to have affected students' enrolment in chemistry departments (Olotoye, 2014;Aina& Ayodele, 2018). The general performance of undergraduate chemistry students has not been impressive and one case of such trend is found in the study of Ali and Musa (2018) as shown in Table 1.

Table 1.1 Academic Achievements of Undergraduate Chemistry Students in Kano State

Number of Students		No. of Students passed with CGPA below 1.5	No. of Students that passed with CGPA below 1.5 (%)	No. of Students passed with CGPA of 1.5 and above	No. of Students passed with CGPA of 1.5 and above (%)
2017	894	520	58.2	374	41.8

2018	1120	465	41.6	655	58.4
2019	962	551	57.6	411	42.7
2020	946	561	59.3	385	40.7
2021	1100	636	57.8	464	42.2

Source: Data obtained from Exam Officers, Bayero University Kano & Kano State University and technology Wudil (2021)

Table 1.1 revealed the students poor performance with the percentage pass of CGPA below 1.5 as above 50% in 2017, 2019, 2020 and 2021, meanwhile it is only in 2018 the percentage is less than 50%.
 Based o8n the available studies such as Oyekola and Owolabi (2015), Ebimgbo, Okafor and Igwe (2021), Adedeji, Adegoke and Fehintola. (2021), there seems to be a few studies on the attitude of students towards use of computer and internet facilities and the actual impact of computer and |internet resources in instructional delivery in the public universities within this study location. It is therefore, imperative to assess the influence of attitudes towards the use of computer and internet resources on academic achievement among chemistry education undergraduate students as part of effort to improve science education, and sustain science and technology development in the nation at large.

Purpose of the study

I.Find out the students' attitudes towards use of computer and internet resources

II. Determine the influence of undergraduate students' attitudes towards the use of computer and internet resources on academic achievement in chemistry

iii.Find out the influence of students' gender in their attitude toward use of computer and internet resources on academic achievement in chemistry

Research Questions

1. What are students' attitudes towards the use of computer and internet resources in the University?
2. What is the relationship between undergraduate students' attitudes towards the use of computer and internet resources and academic achievement in chemistry?
3. What is the influence of students' gender in their attitude toward use of computer and internet resources?

Hypotheses

HO_1: There is no significant relationship between attitude towards the use of computer &internet resources and students' on academic achievement.

HO_3: There is no significant relationship between students' gender and attitude towards the use of computer & internet resources.

Methods

The study employed a correlational design, and a sample of 322 undergraduate chemistry students was selected from the total population of 1711 recommended by research advisors 2006, using a proportionate stratified random sampling technique from four government-owned universities in Kano state, comprising 198 males and 124 females. The research instrument used was the Chemistry Underg8raduates Attitude towards Computer and Internet Resources Questionnaire (CUATCIRQ), which consisted of two sub-scales. The instrument was validated by senior lecturers from the Department of Science and Technology Education with Chemistry as an area of specialization. The reliability coefficients of the two sub-scales were 0.82, and 0.73 for items on utilization, and attitudes towards use of computer and internet resources, respectively, using Split Half method Cronbach Alpha was used to calculate the reliability index, for internal consistency. To measure academic achievement, students' first semester examinations GPAs were used. Means, and standard deviation, Pearson product-moment correlation and point bi-serial were used to answer the research questions, while Point biserial and Pearson product-moment correlation were used to test the null hypotheses at the 0.05 level of significance using SPSS version 25.

Results

Research Question 1: What are students' mean attitude ratings towards the use of computer and internet resources in the University?

Table 2: Summated Mean Attitude rating by individual undergraduate chemistry student in the universities.

Attitude	*N*	*M*	*SD*
Positive	302	66.27	7.83
Negative	20	47.15	3.22
Total	322	65.08	8.91

The result from the Table 2, majority of the respondents shows a positive attitude with a mean rating of 66.27 since it is between the summated ranges of 60-100, while twenty respondents showed a negative attitude as indicated by the attitude mean rating of 47.15 which is between the ranges 20-60. There are 20 items in the five point Likert scale questionnaire on attitude. The total possible score is 100(5x20). Summated score between the ranges of 60-100 is regarded as "Positive

Attitude" while a summated score between 20-60, was labeled, "Negative Attitude".

Research Question 2

What is the relationship between students' attitudes towards the use of computer and internet resources and their academic achievement in chemistry?

Table 3: **PPMCC Analysis between students' attitude to computer & internet resources and their academic achievement in chemistry**

Variables	N	M	SD	R	P	Remark
Attitude		65.08	8.91			
	322			0.10	0.07	Weak correlation
GPA		3.15	0.87			

The Pearson product moment correlation analysis result in Table 3 revealed a positive but low correlation (r =0.10, $p<0.05$).Therefore, this indicates that there is a relationship between students attitude towards computer and internet resources and students' academic performance. However, the relationship is weak.

Research Question 3: Does student's gender influence their attitude toward use of computer and internet resources?

Table 4: Point bi-serial correlation analysis between students' gender and their attitude towards computer & internet resources

Variables	N	M	SD	R	P	Remark
Gender		1.38	0.49			
	322			-0.19	0.61	Negative and weak correlation
Attitude		65.08	8.91			

The result from the Table 4 showed the result of Point bi-tserial correlation between students' gender and their attitude towards the use of computer and internet resources. The relationship is negative and weak ($r_{(320)}$= -0.19, p >0.05). This implies that gender varies with attitude in opposite direction. It indicates that there is a small negative relationship between gender and attitude towards use of computer and internet resources, but the correlation is not strong enough to be considered meaningful or significant.

Hypotheses
HO_1: There is no significant relationship between attitude towards the use of computer & internet resources and students' academic achievement in chemistry.

Table 5: PPMCC analysis on attitude towards the use of computer & internet resources and students' academic performance

Variables	N	Mean	SD	Df	R	P	Remark
Attitude		**65.08**	**8.91**				

	322			**320**	**0.10**	**0.07**	Not significant
GPA		3.15	0.87				

The result of the PPMCC between attitude towards the use of computer and internet resources and students' academic performance from Table 5 revealed a weak positive relationship(r=0.10).The p-value was found to be 0.07 at p ≤ 0.05 level of significance, since the p-value is greater than the set level of significance, the null hypothesis is therefore retained. This implies that there is no significant relationship between attitude towards the use of computer & internet resources and students' academic performance in universities under study.

HO₃: There is no significant relationship between students' gender and attitude towards the use of computer & internet resources.

Table 6: Point bi-serial analysis between students' gender and their attitude towards computer & internet resources

Variable	*N*	*Mean*	*SD*	*Df*	*R*	*P*	**Remark**
Gender		1.38	0.49				
	322			320	-0.19	0.61	Not Significant
Attitude		65.08	8.91				

Table 6 showed the result of point bi-serial correlation that was used to determine the relationship between gender of undergraduate chemistry students in Kano universities and their attitude towards the use of computer and internet resources. The relationship was weak and negative and not statistically significant ($r_{(320)}$= -0.19,p >0.05 since the p-value is greater than the alpha value set for this hypothesis (p≤0.05). Therefore, the null hypothesis that, there is no significant relationship between students' gender and attitude towards the use of computer & internet resources is hereby retained.

Discussion

The analysis of data further revealed that the students had a positive attitude towards the use of computer in studying chemistry despite the fact that they occasionally used computer and internet resources. This positive attitude which was a result of the data collected from the students responses look misleading but could be attributed to the interest and engaging nature of young people when it comes to the use of computer and internet resources especially for casual or informal purposes. This is in consonance with Al-Mahmud (2015) who found out that students had positive attitudes toward using the Internet as a learning tool, adequate basic knowledge of the Internet, viewed Internet is a fastest way to reach knowledge, and Internet has a potential to be an effective training tool. AlMahmud also reiterated that students need to concentrate more to learn how they can get great benefit more from the use of internet in their studies and also adapt to contemporary trends. Similarly, Isreal (2017) found out that undergraduates of library schools in Delta and Edo states have positive attitudes towards educational usage of the internet and suggested that more research on students' attitude towards educational usage

of the internet should be done in order to eliminate negative perceptions on their attitude towards the usage of the internet. In their study, Fančovičová& Prokop (2018) they equally revealed that attitude towards computer were positive.

This study further found that there is no significant relationship between undergraduate chemistry students' attitude towards the use of computer and internet resources and students' academic achievement in universities in Kano. This implies that academic performance does not relate strongly with one's attitude towards computer and internet resources. It could also mean that an interactive effect of several factors not just attitude towards computer may be responsible for improved students' academic performance. This finding is in concordance with Kareem (2015) who found that there is no significant difference between students' academic achievement and their attitude towards computer assisted instruction. However, this is in contrast with Emeka and Nyche (2016) who found that attitude towards computer and internet resources impact positively on students skills and performance it beneficial roles in this information technology era. Similarly, this finding is in disagreement with Rojweski (2014) studies which showed that the bivariate correlation between the availability of Computer and internet resources and students' performance is strongly and significantly positive. In addition, Attwell and Battle (2019) examined the relationship between having a home computer and school performance, their findings suggest that students who have access to a computer at home for educational purposes, have improved scores in reading and math. Furthermore, this study found that there is no significant and negative relationship between gender of the undergraduate chemistry students in Kano Universities in their attitude towards the use of computer and internet resources. This suggests that the increase in male attitude towards the use of computer and internet resources is associated with a decrease in the attitude of their female counterpart significantly. This is in disagreement with the finding of Sarfo (2015), who found that is no significant difference between male and female from the geographical settings in their perception regarding computer and internet resources for advancement. Sarfo also recommended that more research studies should be conducted owing the fact that gender and attitudes towards computer and internet resources use is a very complicated issues. In the same vein, Fančovičová and Prokop (2018) found out that the gender difference towards the use of computer was weak. This indicated that more studies need to be conducted on gender to certain the attitude of both male and female undergraduate chemistry and other science students toward the judicious use of computer and internet resources at their disposal. On the contrary, Samarkandi (2015) found out that females were more anxious about computer usage than males. This may be attributed to the unique characteristics or some personal factors of the population used in the study.

Conclusion

Based on the findings from this study, below are the conclusions;

This study indicated that undergraduate students in Kano state have positive attitude towards the use of computer system and internet resources. However, the students' attitude toward the use of computer system and internet resources was not significantly related with their academic achievement. Though,

the gender does not influence students' attitude towards the use of computer system and internets resources.

Recommendations

Based on these findings, the following recommendations are made:

1. Universities in Kano State should improve the utilization of computer and internet resources among undergraduate chemistry students through awareness campaigns and training programs.
2. Universities should consider implementing policies that require students to regularly utilize computer and internet resources for academic purposes such as e-teaching and e-learning
3. Further research should be conducted to investigate the impact of other factors, such as socioeconomic status and prior experience, on students' attitudes towards the use of computer and internet resources.
4. It is recommended that universities in Kano State should invest in the provision of adequate computer and internet resources to enhance their usage among students.
5. Academic institutions should consider providing more gender inclusive policies and practices in the usage of computer system and internet resources to promote diversity and inclusion.

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