

UNDERGRADUATES' ACCESSIBILITY AND UTILIZATION OF ELECTRONIC COMMUNICATION AND COLLABORATION TOOLS FOR PEDAGOGICAL EXPERIENCE IN OYO STATE, NIGERIA

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Abstract

This study investigated the university undergraduates' accessibility and utilisation of electronic communication and collaboration (Facebook, LinkedIn, Google +, 2go, Friendster, Twitter, Myspace, YouTube, Blogger.com WhatsApp and Slideshare) tools for pedagogical experiences. The study was descriptive of a survey type; which purposively sampled respondents from seven (7) universities in Oyo State, Nigeria. A total of 876 out of 900 respondents participated in the study, which comprised 442 males and 434 females. Researcher-designed questionnaire was used for the collection of data. Research questions that guided the study were analysed using frequency counts, percentages and mean scores; while independent t-test and Analysis of Variance were used to test the research hypotheses on undergraduates' gender and course of study. The results indicated that the frequently utilized electronic communication and collaboration tools for pedagogic experiences by the students include: WhatsApp, Facebook, Slideshare, Myspace and Blogger.com. The study revealed no significant difference on the access and use of electronic communication and collaboration tools for learning based on undergraduates' gender and course of study. It was recommended among others that university students should be encouraged to use electronic communication and collaboration tools for pedagogic experiences irrespective of their gender and course of study.

Keywords: Pedagogic Experience, Course of Study, Tertiary Students, Gender, Online Communication Tools.

Introduction

The world is experiencing a quantum leap in communication revolution through myriads of technological advancement to redefined how learners acquire pedagogical experience in the 21st century. Online education has gained increasing popularity and relevance due to its convenience and flexibility (Bates & Sangra, 2011; Waugh & Su, 2016) in their usage and applications on social media like WhatsApp, Facebook, Imo app, Twitter, YouTube etc. Online collaborative learning has proved its effective flexibility for pedagogical design, learning scenario, learning content, online tutoring. In collaborative learning the emphasis is placed on the interactions where common ideas are brought up for discussion and are developed through the participants' differences of knowledge, skills and positions (Ogunleye, 2014). The use of social media, mendeley, and virtual environments have provided additional areas of current research, exploring how students interact, whether student academic performance is improved, and how or whether tools support students in online collaborative learning (Ogunleye & Apata, 2018; Vuopala, Hyvönen & Järvelä, 2016; Al-Rahmi, Othman & Yusuf, 2015; Khwaja & Eddy, 2015). Onasanya, Samuel and Akingbemisilu (2012) attested that electronic communication media and collaboration tools facilitate equality in accessing information (irrespective of gender, course of study, tribe and nationality), retention and concretization of the learning concept, individualization of instruction and immediacy to pedagogical experiences by the users.

Pedagogic experiences swings between individualistic and collaboration learning among peers to share ideas and experiences using electronic platforms. Harasim (2012) views collaborative online education as a learning model where students are stimulated and guided to work harmoniously in order to construct knowledge in an innovative way and to conceptualize knowledge needed as a solution to pressing academic problem. Collaborative online learning provokes students' activeness and involvement (Stoytcheva, 2018); while the online learning plays a key role not only as part of the community but as a link between the learning community and the knowledge about the particular subject irrespective of locations and other related variables. Ogunleye & Afolabi (2007) and Samuel, Onasanya and Yusuf (2019), in separate studies attested that access, harmonious integration and utilization of ICT facilities in teaching and learning as well as electronic communication and collaboration (Facebook, LinkedIn, Google +, 2go, Friendster, Twitter, Myspace, YouTube, Blogger.com WhatsApp and Slideshare) tools for pedagogical experience in the digital era is determined by availability, learning styles chosen by the students, perceived adequacy of use these technologies in facilitating completion of the given tasks competently and effectively with minimum errors academically (Samuel, Onasanya & Olumorin, 2018) including teachers' and students' awareness and attitudes towards utilization of digital media for learning (Ogunleye, 2009; 2010). Therefore, it is of paramount important for both teachers and students to have balanced knowledge on the use of technology and suitable strategies to employ in order to facilitate pedagogical experiences.

Online communication and collaborative learning has to do with the activities and group work in the online classroom that require additional considerations and modifications beyond the typical face-to-face classroom to communicate, collaborate, and clarify written instructions (Robinson, Kilgore & Warren, 2017) using electronic platform. Collaborative learning encourage intentional design, co-laboring of individuals, and meaningful learning approach

differently in an online course than in a face-to-face course (Barkley, Major & Cross, 2014; Major, 2015). This style of learning exposes students to work closely with their peers in online classes through meaningful and thought provoking collaboration and informal conversations that could lead to deeper thought development and knowledge construction. The focus of online collaboration tools ranges from simple to complex, inexpensive to expensive, locally installed to remotely host and from commercial to open source (Akpan & Ezinne, 2017); to permit teams and students to communicate better on different academic pressing issues, give exploitable pieces of information that are updated regularly in facilitating considerable academic progress and support group of two or more individuals to accomplish goal or objective. The activities and opportunities afforded by electronic communication and collaborative tools enable immediacy, enhanced voice communications, ambient communications, image sharing, document construction, social interaction and geographic richness for academic collaboration and innovation.

Hence, this learning environment encourages brainstorming, valuing individual cutting-edge ideas and approaches in order to improve students' performance using the emerging pool of knowledge inform of a group by working together in a learning community to consolidate findings (Moore & Kearsley, 2012) using emerging collaboration and communication tools in facilitating cross-breeding of ideas, cognitively, emotionally and psychologically. Collaboration tool is a form of application software that allows user to work together and share knowledge online with other users and for solving academic related problem because procedural steps can easily be taught using technologies without being physically present. For instance, cloud tools enable the user have access to all documents from anywhere.

Akpan and Ezinne (2017) attested to some of the characteristics of collaborative learning as positive interdependence among group members, individual accountability, cooperative skills and interactions between learners and instructors using newer electronic technologies. In the collaborative learning environment, learners are challenged both socially and emotionally as they listen to different perspectives, and are required to articulate and defend their ideas (Laal & Laal, 2012). Thereby facilitating learners to create their own unique conceptual frameworks and not rely solely on expert's or text's framework. In a collaborative learning environment, learners have the opportunity to question other conceptual frameworks, converse with peers, exchange diverse beliefs, present and defend ideas, and are actively engaged (Srinivas, 2011) in electronic communication irrespective of their gender and course of study. It is a universal, versatile and accessible tool for communication and collaboration that provides synchronous communication text between two or more users through computers to create environment that encourages people to link to each other by creation of information and sharing spaces of different type of contents in real-time (Inês, Abílio & Carlos, 2015).

According to Kimbrough, Guadagno, et al. (2013), studies have revealed differences in the internet deployment between male and female students. Male students more often use the internet for fun, social interaction and maintenance of relationship; while the female students tend to use the internet for obtaining financial information or reading the electronic news. The author further found out that the female students seem to have incorporated text-based or email communication more often than their male counterparts. However, some studies revealed that online practices by both female and male have significant difference due to

known inherent gender differences (Kimbrough, Guadagno, et al., 2013). Other related study revealed that female students more often tend to engage in electronic collaborative communication, while their male counterparts engages more in competitive conversation (Tekobbe, 2013). Hence, students access and usage of electronic communication and collaboration tools based on gender are inconclusive. Therefore, this study examined the undergraduates' accessibility and utilisation of electronic communication and collaboration tools for learning based on gender and course of study.

Statement of the Problem

Electronic communication and collaboration tools are effective learning tools used for diverse of pedagogical services. However, Nigerian undergraduates students are faced with pedagogical challenges due to population explosion and deployment of electronic communication and collaboration tools. Online collaborative learning represents a paradigm shift from teacher-centered or lecture-centered milieu by using electronic platform in facilitating cross breeding of ideas among peers and professional colleagues. However, considerable number of students are skilful in deploying collaboration and communication tools like Google + Linkedn, Twitter, Blogger.com, Skype, YouTube, Wikki, Drawbox, Facebook, Flickr, etc. for fun and social related functions.

Henry (2010) attested that collaboration is important to the development of social connectedness in order to enhance learning experience and course completion among undergraduate students using electronic resources. This made the application of electronic communication and collaboration tools for learning useful in facilitating knowledge sharing among peers, improve learners' manipulative skills, facilitate the learning process and foster evaluation process (Barhonme&Ghailan, 2015); creativity, critical thinking and problem-solving skills among learners irrespective of students' gender and course of study (Akpan&Ezinne, 2017) and the level of Nigerian universities students exposure and awareness. This strategy of learning complement face-to-face learning method that stimulates and arouses students' interest towards learning via electronic communication and collaboration tools. Therefore, this study examined the undergraduates' accessibility and utilisation of electronic communication and collaboration tools for learning based on gender and course of study.

Purpose of the Study

The purpose of this study is to:

1. examine the frequency of accessing electronic communication and collaboration tools that are accessible for learning among university undergraduates.
2. investigate the type of electronic communication and collaboration tools used by undergraduate students for learning.
3. determine the influence of gender on the use of electronic communication and collaboration tools for learning by university undergraduates.
4. Find out the influence of course of study on the use of electronic communication and collaboration tools for learning by university undergraduates.

Research Questions

The following research questions were raised to guide this study.

1. What is the frequency of accessing electronic communication and collaboration tools by university undergraduates students for pedagogic experiences?
2. What is the frequency utilizing electronic communication and collaboration tools by university undergraduates students for pedagogic experiences?
3. What is the influence of university undergraduates' gender on the use of electronic communication and collaboration tools for pedagogic experiences?
4. What is the influence of university undergraduates' course of study on the use of electronic communication and collaboration tools for pedagogic experiences?

Research Hypotheses

The following hypotheses were tested in this study.

H₀₁: There is no significant difference between male and female undergraduate son the use of electronic communication and collaboration tools for pedagogic experiences.

H₀₂: There is no significant difference in the use of electronic communication and collaboration

Tools for pedagogic experiences among the undergraduates in the Humanities, Pure Sciences and Applied Sciences (course of study).

Materials and Methods

Research Type

This study was a descriptive research of the survey type. Researcher-designed questionnaire was employed to collect relevant information on Nigerian university undergraduates' accessibility and utilization of electronic communication tools for pedagogical experience in Oyo State, Nigeria based on gender and course of study.

Sample and Sampling Techniques

The population for this study were all undergraduate students in Oyo State. However, a total of 876 out of 900 respondents from University of Ibadan, Ladoke Akintola University of Technology Ogbomoso, Lead City University Ibadan, Ajayi Crowther University Oyo, The Technical University Ibadan, Kola Daisi University, and Atiba University in Oyo State, Nigeria were randomly sampled from various course of study and participated in the study. The moderating variables used for the study were gender and courses of study. Based on gender {male (442) and female (434)} and area of study {Humanities (468), Pure Sciences (172) and Applied Sciences (236)} participated in the study.

Research Instrument

Researcher-designed questionnaire was employed, which contained Section A, B and C. Section A consisted of a demographic information of the respondents while Section B and C sought information on the accessibility and utilisation of electronic communication and collaboration tools for learning by university students in Oyo State, Nigeria. The developed rating scale used for the accessibility of electronic communication and collaboration tools was Accessible (A) and Not Accessible (NA), while for the utilisation of electronic communication and collaboration tools was Utilised (U) and Not Utilised.

Data Analysis Techniques

The data collected on accessibility and utilisation of electronic communication and collaboration tools (Facebook, Google Plus (Google +), 2go, Twitter, Flickr, You Tube, Digg, Technorah, Scribd, Rogo, Hi5, Linkedin, Bebo, Friendster, Orkut, Myspace, Blogger.com, Ning, etc.) were collated and analyzed using frequency counts, means and simple percentage. Analysis of variance (ANOVA) and independent *t*-test inferential statistics was used to test the research hypotheses on students' gender and course of study respectively at 0.05 alpha level of significance.

Data Analysis and Results

Table 1: Respondents Demographic distributions Based on Gender and Course of Study

<i>Students' Demographic</i>	Frequency	Percentage (%)
Gender		
Male	442	50.6
Female	434	49.4
Total	876	100
Course of Study		
Humanities	468	53.5
Pure Sciences	172	19.6
Applied Sciences	236	26.9
Total	876	100

Table 1 revealed the demographic information of the respondents based on students' gender and course of study. Based on students' gender, a total number of male 442(50.6%) and female 434(49.4%) students participated in the study. Subsequently, based on students' course of study, Humanities 468(53.5%), Pure Sciences 172(19.6%) and Applied Sciences 236(26.9%) were also involved in the study.

Table 2: Respondents Accessibility of Electronic Communication and Collaboration Tools for Learning

Electronic communication and collaboration tools	Accessible		Not Accessible		Electronic communication and collaboration tools	Accessible		Not Accessible	
	Freq	%	Freq	%		Freq	%	Freq	%
Google Plus +	722	82.4	154	17.6	Bebo	55	6.3	821	93.7
Facebook	831	94.9	45	5.1	Linkedin	474	54.1	402	45.9
2go	613	70.0	263	30.0	Friendster	678	77.4	198	22.6
Twitter	826	94.3	50	5.7	Orkut	154	17.6	722	82.4
Flickr	431	49.2	445	50.8	Myspace	440	50.2	436	49.8
You Tube	791	90.3	85	9.7	Blogger.com	720	82.2	156	17.8
Digg	118	13.5	758	86.5	Ning	208	23.7	668	76.3
Technorah	28	3.2	848	96.8	Twoo	4	0.5	872	99.5
Scribd	85	9.7	791	90.3	Slideshare	788	90.0	88	10.0
Rogo	2	0.2	874	99.8	Vimeo	107	12.2	769	87.8
Hi5	239	27.3	637	72.7	WhatsAps	871	99.4	5	0.6

The results contained in Table 2 revealed that the frequency counts of university undergraduates that affirmed having access to WhatsApp 871(99.4%), Facebook 831(94.9%), Twitter 826(94.3%), YouTube 791(90.3%), Slide share 788(90.0%), Google Plus 722(82.4%), Blogger.com 720(82.2%), Friendster 678(77.4%), 2go 613(70.0%) and LinkedIn 474(54.1%) in enhancing pedagogical experiences. However, Rogo2(0.2%), Twoo 4(0.4%), Technorah 28(3.2%), Bebo 55(6.3%), Vimeo 107(12.2%), Digg 118(13.5%), and Orkut 154(17.6%) are electronic communication and collaboration tools that were not frequently accessed by university undergraduates students for pedagogical experiences. This implies that WhatsApp, Facebook, Twitter, YouTube, Slide share, Google Plus, Blogger.com, Friendster, 2go and LinkedIn were the familiar electronic communication and collaboration tools that were frequently accessed by undergraduates for learning.

Table 3: Utilization of Electronic communication and collaboration tools by Undergraduate Students for Learning

Electronic communication/and collaboration tools	Utilized		Not Utilized		Electronic communication and collaboration tools	Utilized		Not Utilized	
	Frequency	%	Frequency	%		Frequency	%	Frequency	%
Google Plus	710	81.1	166	37.8	Bebo	31	3.5	845	96.5
Facebook	854	97.5	22	2.5	LinkedIn	754	86.1	122	13.9
2go	450	51.4	426	48.6	Friendster	798	91.1	78	8.9
Twitter	870	99.3	6	0.7	Orkut	36	4.1	840	95.9
Flicker	563	64.3	313	35.7	Myspace	736	84.0	140	16.0
You Tube	814	92.9	62	7.1	Blogger.com	760	86.8	116	13.2
Digg	24	2.7	852	97.3	Ning	208	23.7	668	76.3
Technorah	6	0.7	870	99.3	Twoo	9	1.0	867	99.0
Scribd	6	0.7	870	99.3	Slideshare	829	94.6	47	5.4
Rogo	4	0.5	872	99.5	Vimeo	107	12.2	769	87.8
Hi5	39	4.5	837	95.5	WhatsApps	873	99.7	3	0.3

The results contained in Table 3 revealed that the frequency counts of university undergraduates that affirmed using WhatsApp 873(99.7%), Twitter 870(99.3%), Facebook 854(97.5%), Slide share 829(94.6%), YouTube 814(92.9%), Friendster 798(91.1%), Blogger.com 760(86.8%), LinkedIn 754(86.1%), Myspace 736(84.0%) and Google Plus 710(81.1%) in

enhancing pedagogical experiences. However, Rogo 4(0.5%), Technorah and Scribd 6(0.7%), Twoo 9(1.0%), Digg 24(2.7%), Bebo 31(3.5%), Orkut 36(4.1%), Hi5 39(4.5%), Vimeo 107(12.2%) and Ning 208(23.7%) are the electronic communication and collaboration tools that were not frequently used by university undergraduates students for pedagogical experiences. This implies that WhatsApp, Twitter, Facebook, Slide share, YouTube, Friendster, Blogger.com, LinkedIn, Myspace and Google Plus were the familiar and frequently used electronic communication and collaboration tools by undergraduates for enhancing pedagogical experiences.

Table 4: Use of Electronic communication and collaboration tools by Undergraduates for Learning Based on

Electronic communication and collaboration tools	Utilization of Electronic Communication Tools							
	Male				Female			
	Utilize		Not Utilize		Utilize		Not Utilize	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Facebook	312	70.6	130	29.4	302	69.6	132	30.4
2go	204	46.2	238	54.8	235	54.1	199	45.9
Flicker	237	53.6	205	46.4	202	46.5	232	54.5
You Tube	240	54.3	202	45.7	198	45.6	236	54.4
Linkedin	227	51.4	215	48.6	211	48.6	223	51.4
Friendster	221	50.0	221	50.0	219	50.5	215	49.5
Myspace	272	61.5	170	38.5	223	48.4	211	51.6
Blogger.com	264	59.7	178	40.3	175	40.3	259	59.7
Slideshare	306	69.2	136	30.8	220	50.7	214	49.3
WhatsApp	374	84.6	68	15.4	230	53.0	204	47.0
Mean scores	268	60.6	174	39.4	222	51.2	212	48.8

Table 4 shows the analysed data on the use of electronic communication and collaboration tools for learning by university undergraduates students based on their gender. Having considered the most frequently accessed and utilized tools by the respondents, the findings revealed the frequency counts and percentages of respondents that utilized WhatsApp {male 374(84.6%) and female 330(76.0%)}, Facebook {male 312(70.6%) and female 302(69.6%)}, Slide share {male 306(69.2%) and female 280(64.5%)}, Myspace {male 272(61.5%) and female 255(58.3%)} and Blogger. com {male 264(59.7%) and female 243(56.0%)}. The grand mean scores for using electronic communication tools based on gender was {male 268(60.6%) and female 222(51.2%)}. This implies that the use of the tools for communication and collaboration were in favour of male undergraduates that their female counterparts. However, the implication is that both male and female undergraduates students frequently utilized WhatsApp, Facebook, Slide share and Blogger. com for pedagogical experiences irrespective of their gender.

Table 5: Use of Electronic communication and collaboration tools for Learning by Undergraduates Students based on Course of Study

Electronic communication and collaboration tools	Utilization of Electronic Communication Tools											
	Humanities				Pure Sciences				Applied Sciences			
	U		NU		U		NU		U		NU	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Facebook	283	60.5	185	39.5	103	59.9	69	40.1	145	61.4	91	38.6
2go	216	46.2	252	53.8	93	54.1	79	45.9	120	50.8	116	49.2
Flicker	274	58.5	194	41.5	81	47.1	91	52.9	104	44.1	132	55.9
You Tube	254	54.3	214	45.7	79	45.9	93	54.1	129	54.7	107	47.3
Linkedin	241	51.5	227	48.5	84	48.8	88	51.2	124	52.5	112	47.5
Friendster	289	61.8	179	38.2	107	62.2	65	37.8	147	62.3	89	37.7
Myspace	289	61.8	179	38.2	100	58.2	72	41.8	139	58.9	97	41.1
Blogger.com	237	50.6	231	49.4	86	50.0	86	50.0	116	49.2	120	50.8
Slideshare	324	69.2	144	30.8	105	61.0	67	39.0	151	64.0	85	36.0
WhatsApp	403	86.1	65	13.9	143	83.1	29	16.9	198	83.9	38	16.1
Mean scores	281	60.0	187	40.0	98	57.0	74	43	137	58.1	99	41.9

Table 5 shows the analysed data on the use of electronic communication and collaboration tools for learning by university undergraduates students based on course of study. The findings revealed the frequency counts and percentages of respondents that utilized WhatsApp {Humanities 403(86.1%), Pure Sciences 143(83.1%) and Applied Sciences 198(83.9%)}, Slide share{Humanities 324(69.2%), Pure Sciences 105(61.0%) and Applied Sciences 151(64.0%)}, Friendster {Humanities 289(61.8%), Pure Sciences 107(62.2%) and Applied Sciences 147(62.3%)} and Facebook {Humanities 283(60.5%), Pure Sciences 103(59.9%) and Applied Sciences 145(61.4%)}. The implication is that the most frequently used of electronic communication and collaboration tools for learning by university undergraduates students based on their course of study are WhatsApp, Slide share, Friendster and Facebook. Subsequently, the grand mean scores of using electronic communication and collaboration tools for learning based on course of study{Humanities 281(60.0%), Pure Sciences 98(57.0%)}

and Applied Sciences 137(58.1%)), revealed frequent usage of collaboration tools irrespective of their course of study.

Hypotheses Testing

Table 6: Independent *t*-test of University Undergraduates' Utilization of Electronic Communication and Collaboration tools for Learning based on their Gender

Gender	No	X	SD	Df	t	Sig.(2-tailed)	Remark
Male	442	44.42	3.49	874	-1.43	0.43	Not rejected
Female	434	42.04	3.41				
Total	876						

Table 6 reveals that there was no significant difference between male and female undergraduates' in utilizing electronic communication and collaboration tools for pedagogical experiences. This is as shown in the result: $t(876) = -1.43$, $p = 0.43$ ($p > 0.05$). That is, the result of the *t*-value of -1.43 resulting in 0.43 significance value was greater than 0.05 alpha value. Therefore, the stated null hypothesis was not rejected. This implies, there was no significant difference between male and female undergraduates' in the use of electronic communication and collaboration tools for learning. This also implies that .43 was considered for the sig.(2-tailed) of the *t*-test for equality which shows that there was no significant difference in the mean scores (since sig.(2-tailed) was greater than 0.05). Also, the mean scores of male (44.42) and the female (42.04) undergraduates depicts negligible difference in the use of online collaborative tools for learning, however in favour of the male students. Thus, male undergraduates' uses electronic communication and collaboration tools for pedagogic experiences.

Table 7: Analysis of Variance of University Undergraduates' Utilization of Electronic Communication Tools for Learning based on Course of Study

	Sum of squares	df	Mean Squares	F	Sig.	Remark
Between Groups	68.068	2	39.049	1.82	0.45	Not rejected
Within Groups	12214.269	873	25.040			
Total	1404516.000	876				

The analysis in Table 7 reveals $F(2, 873) = 1.82$, $p = 0.45$ ($p > 0.05$) for undergraduates' use of electronic communication and collaboration tools for learning based on their course of study. This implies that the significant value (0.45) was greater than the alpha value (0.05). Thus, the stated null hypothesis was not rejected. By implication, the null hypothesis was established as thus: there was no significant difference in undergraduates' use of electronic communication and collaboration tools for learning based on their course of study (humanities, pure sciences and applied sciences).

Discussion of Findings

This study agreed with Akpan and Ezinne (2017) that frequent access and use of electronic communication and collaborative tools permit teams and students to communicate better on different academic pressing issues, give exploitable pieces of information that are updated regularly in facilitating considerable academic progress in supporting group of two or more individuals to accomplish goal or objective. The author further reiterated that activities and opportunities afforded by electronic communication and collaborative tools enable immediacy, enhanced voice communications, ambient communications, image sharing, document construction, social interaction and geographic richness via academic collaboration and innovation. The study agreed with Samuel, Onasanya and Yusuf (2019) that access, harmonious integration and utilization of electronic communication and collaboration (Facebook, LinkedIn, Google +, 2go, Friendster, Twitter, Myspace, YouTube, Blogger.com WhatsApp and Slideshare) tools for pedagogical experiences was based on the availability of online communication and collaboration tool, learning styles chosen by the students, perceived adequacy of use these technologies in facilitating completion of the given tasks competently and effectively with minimum errors academically (Samuel, Onasanya & Olumorin, 2018) and students' positive attitude towards utilization of digital media for learning and flair for utilizing digital media for learning. Based on gender, this study agreed with Kimbrough, Guadagno, et al. (2013) that the male and female undergraduate students mean scores depict negligible difference in the use of online collaborative tools for learning, however in favour of the male students. Thus, male undergraduates' uses electronic communication and collaboration tools for pedagogic experiences. Also, that the male students more often use the internet for fun, social interaction and maintenance of relationship. This study agreed with Onasanya, Samuel and Akingbemisilu (2012) that electronic communication media and collaboration tools facilitate equality in accessing information (irrespective of gender, course of study, tribe and nationality), retention and concretization of the learning concept, individualization of instruction and immediacy to pedagogical experiences by the users. Therefore, the use of electronic communication and collaboration tools, newer technologies and suitable strategies in facilitating learning by undergraduate students should be encouraged with high esteem.

Conclusion

The perceived adequacy of use electronic communication and collaboration tools in facilitating accomplishing academic related given tasks competently and effectively with minimum errors encouraged the use of these tools for pedagogical experiences. The results from this study indicated that the frequently accessed and utilized electronic communication and collaboration tools for pedagogic experiences by the students include: WhatsApp Facebook, Slide share, Myspace, and Blogger.com. The study revealed no significant difference on the access and use of electronic communication and collaboration tools for learning based on undergraduates' gender and course of study. Therefore, it is of paramount important for students to have balanced knowledge on the use of newer technologies and suitable strategies in facilitating learning. It was recommended among others that university students should be encouraged to use electronic communication and collaboration tools for pedagogic experiences irrespective of their gender and course of study.

Recommendations

1. Seminars, workshops and trainings should be organized for all students in Nigerian universities on how to harmonize the use of electronic communication and collaboration tools to enhance pedagogical experiences.
2. University administrators should encouraged access and use of electronic communication and collaboration tools for learning by all students in Nigerian universities.
3. Access and use of electronic communication and collaboration tools for pedagogical experiences in Nigerian universities should be encouraged irrespective of students' gender (male and female) and course of study (Humanities, Pure Sciences and Applied Sciences).
4. Female university undergraduates should be encouraged to frequently access and utilise electronic communication and collaboration tools for learning like their males counterparts.

References

- Akpan, K. P. & Ezinne, A. (2017). Effectiveness of Whatsapp as a collaborative tool for learning among undergraduate students in university of Uyo, Akwalbom state, *International Journal of Advanced Education and Research*2(5), 43-46.
- Al-Rahmi, W., Othman, M. S., & Yusuf, L. M. (2015).The role of social media for collaborative learning to improve academic performance of students and researchers in Malaysian higher education.*The International Review of Research in Open and Distributed Learning*, 16(4), 12-21.
- Barhonme, M, & Ghailan, F. (2015).Whatsapp as a learning tool.Retrieved, 2017.From http://www.slide share.net/ fatmaGhailian / whatsapp_as_a_learningtool.
- Barkley, E. F., Major, C. H., & Cross, K. P. (2014).*Collaborative learning techniques: A handbook for college faculty*. San Francisco, CA: Jossey-Bass.
- Bates, A. W., & Sangra, A. (2011).*Managing technology in higher education: Strategies for transforming teaching and learning*. San Franscisco, CA: Jossey-Bass/John Wiley & Co.
- Harasim, L. (2012). *Learning Theory and Online Technologies*, New York/London: Routledge ISBN: 978-0-415-99975-5 (hbk).
- Henry, K. C. (2010).Students' perceptions of collaboration tools in a higher education online collaborative learning environment. A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the College of Education at the University of Central Florida Orlando, Florida
- Inês, L., Abílio, O. & Carlos, J. C. (2015).Tools for Online Collaboration: Do they contribute to Improve Teamwork?*Mediterranean Journal of Social Sciences* 6(6), 2039-9340.
- Khwaja, T., & Eddy, P. L. (2015).Using Mendeley to support collaborative learning in the classroom.*I-Manager's Journal of Educational Technology*, 12(2), 19.
- Kimbrough, A. M., Guadagno, R. E. et al. (2013). Gender differences in mediated communication: women connect more than men. *Computers in Human Behaviour* 29, 896-900.
- Laal, M. & Laal, M. (2012). Collaborative learning: what is it? *Elsevier, SciVerse Science Direct, Procedia - Social and Behavioral Sciences* 31, 491 – 495.
- Major, C. H. (2015).*Teaching online: A guide to theory, research, and practice*. Baltimore, MD: JHU Press.

- Moore, M. G., & Kearsley, G. (2012). *Distance education: A systems view of online learning*. Belmont, CA: Wadsworth.
- Ogunleye, B. O. & Afolabi, B. T. (2007). A survey of computer facilities, teachers' computer literacy, attitude and utilisation in chemistry teaching in Ogun West Senatorial District, Ogun State, Nigeria. *Nigeria Journal of Computer Literacy*, 8 (1), 133-155.
- Ogunleye, B. O. & Apata, F. S. (2018). Integrating intelligent pedagogical agents into learning management systems for student exposure to science experiments in the National Open University of Nigeria. *KIU Journal of Education*, 13 (2), 31-51.
- Ogunleye, B. O. (2009). Integration of contemporary ICT tools in the teaching of chemistry: awareness and attitudes of chemistry teachers in South West, Nigeria. *Journal of e-Learning*, 8 (2), 1-18.
- Ogunleye, B. O. (2010). Computer literacy and attitude to computer as predictors of chemistry teachers' utilization of computer technology in selected Nigerian schools. *African Journal of Educational Research*, 14 (1 & 2), 20-29.
- Ogunleye, Y. O. (2010). *Impact of Collaborative Intervention Programme on Pre-Primary and Primary School Teachers' Awareness, Acquisition and Utilisation of Educational Research Findings in Oyo State, Nigeria*. Unpublished PhD Thesis, University of Ibadan, Ibadan.
- Onasanya S. A., Samuel, Nathaniel, Akingbemisilu A. A. (2012). Influence of Satellite Communication Devices on Students' Acquisition of Hidden Curriculum in Nigeria Senior Secondary Schools. *Journal of Education and Practice*, 3, (16), 96-102. Downloadable at: <http://www.iiste.org/Journals/index.php/IJEP/article/view/3701/3750>
- Robinson, H. A., Kilgore, W. & Warren, S. J. (2017). Care, communication, learner support: Designing meaningful online collaborative learning. *Online Learning*, 21(4), 29-51. doi:10.24059/olj.v21i4.1240.
- Samuel, Nathaniel, Onasanya, S. A. & Olumorin, C. O. (2018). Perceived usefulness, ease of use and adequacy of use of mobile technologies by Nigerian university lecturers, *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 14(3), 5-16.
- Samuel, Nathaniel, Onasanya, S. A. & Yusuf, M. O. (2019). Engagement, learning styles and challenges of learning in the digital era among Nigerian secondary school students, *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 15(4), 35-43.
- Srinivas, H. (2011). *What is Collaborative Learning?* The Global Development Research Center, Kobe; Japan .Retrieved 5 Nov 2011, from: <http://www.gdrc.org/kmgmt/c-learn/index.html>.
- Stoytcheva, M. (2018). Students' perceptions of online collaboration in a distance learning French language course, *Proceedings of the 44th International Conference on Applications of Mathematics in Engineering and Economics AIP Conference Proceedings*. 2048, 020030-1-020030-9; <https://doi.org/10.1063/1.5082048>
- Tekobbe, C. K. (2013). A site for fresh eyes. *Information, Communication and Society* 16(3), 381-396.
- Vuopala, E., Hyvönen, P., & Järvelä, S. (2016). Interaction forms in successful collaborative learning in virtual learning environments. *Active Learning in Higher Education*, 17(1), 25-38.
- Waugh, M. L. & Su, J. (2016). Student perceptions of a successful online collaborative learning community, *Journal of Interactive Online Learning*, 14(1), 1-16.