



Assesment of ICT Literacy Level among Senior Schools Biology Teachers in Kwara State, Nigeria

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Article Information	ABSTRAK
Submitted: 06 – 01 – 2025 Accepted: 26 – 03 – 2025 Published: 31 – 03 – 2025	Teknologi informasi dan komunikasi (TIK) telah menjadi alat penting dalam berbagai aspek kehidupan, mulai dari bidang kedokteran hingga keamanan dan pendidikan. TIK merupakan bagian yang tak terpisahkan dari sistem pendidikan dan telah berkontribusi terhadap peningkatan kualitas pendidikan. Oleh karena itu, penelitian ini bertujuan untuk menilai tingkat literasi TIK guru biologi sekolah menengah atas di Negara Bagian Kwara, Nigeria. Penelitian ini juga meneliti pengaruh usia, pengalaman mengajar, dan jenis kelamin terhadap tingkat literasi TIK di kalangan guru biologi sekolah menengah atas di Negara Bagian Kwara. Penelitian ini menggunakan jenis penelitian survei. Sampel penelitian terdiri atas 259 guru biologi dari 119 sekolah menengah atas negeri dan swasta di Negara Bagian Kwara. Teknik pengambilan sampel yang digunakan adalah purposive sampling. Instrumen penelitian berjudul <i>Biology Teachers' ICT Literacy Level Questionnaire</i> (BTICTLLQ) telah divalidasi oleh tiga ahli di bidang pendidikan sains dan teknologi pendidikan, dengan indeks reliabilitas sebesar 0,72 menggunakan Cronbach's Alpha. Data dianalisis menggunakan frekuensi, persentase, tabel tabulasi silang, dan uji Chi-kuadrat pada taraf signifikansi 0,05. Hasil penelitian menunjukkan bahwa: tingkat literasi TIK di kalangan guru sensitif terhadap faktor jenis kelamin; usia guru memengaruhi tingkat literasi TIK mereka; dan terdapat perbedaan yang signifikan dalam tingkat literasi TIK guru berdasarkan pengalaman mengajar. Penelitian ini menyimpulkan bahwa ketika guru biologi memiliki literasi TIK yang baik, pemanfaatan sumber daya TIK dapat meningkatkan proses pembelajaran biologi. Penelitian ini merekomendasikan agar intervensi dalam bentuk seminar dan lokakarya diselenggarakan secara rutin untuk meningkatkan tingkat literasi TIK dan pemanfaatan alat TIK oleh guru biologi sekolah menengah atas. Kata kunci: Asesmen; Biologi; Teknologi Informasi dan Komunikasi; Literasi; Sekolah Menengah.
Publisher	ABSTRACT
Program Studi Pendidikan Biologi, Fakultas Sains dan Teknologi, UIN Walisongo Semarang	Information and communication technology (ICT) has become an important tool in all aspects of life ranging from medicine to security and education. It is an indispensable part of education system and has brought about quality education. This study, therefore, assessed ICT literacy level of senior school biology teachers' in Kwara State, Nigeria. The study investigated the influence of age, teaching experience and gender on ICT literacy level among senior school biology teachers in Kwara State. The study was a survey research type. The sample comprised of two hundred and fifty-nine (259) biology teachers from one hundred and nineteen (119) public & private senior secondary

schools in Kwara State. Purposive sampling technique was adopted. The instrument entitled "Biology Teachers' ICT Literacy Level Questionnaire" (BTICTLLQ) was validated by three experts in science education and educational technology and its reliability index was 0.72 using Cronbach's Alpha. Data were analyzed using frequency, percentages, cross tabulation tables and Chi-square at 0.05 level of significance. The findings of the study revealed that: ICT literacy level among teachers is gender sensitive; the age of teachers influence their ICT literacy level; and there was significant difference in ICT literacy level of teachers on the bases experience. The study concluded that when biology teachers are ICT literate, the use of ICT resources could enhance teaching and learning of biology. The study recommended that intervention inform of seminars and workshops should be organized on regular basis to improve ICT literacy level and utilization of ICT tools by senior school biology teachers.

Keywords: Assessment; Biology; Information and Communication Technology; Literacy; Secondary school.

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INTRODUCTION

Biology involves the study of living things which inhabit the earth surface (Ramalingam, 2013). Biology deals with the study of living organisms and life; this includes the physical structure, the chemical processes and the molecular interactions as well as the physiological mechanisms, development and evolution. Biology is often viewed as the most simple science subject to understand among all the science subjects and based on this view it has attracted the widest enrolment of students. Ofoegbu (2003) reported that biology has the largest enrolment of student in comparism with other science subjects in senior secondary school. Though biology is seen as a simple subject to understand relative to other science subjects, the academic performance has little or no difference when compared to other science subjects. Akubuilu (2004) stated that in spite of the popularity of biology among students, the failure rate has remained very high. This may be attributed to many factors which could be from students, parents or the school.

Students' performance in biology can be influenced by their attitudes to study. According to Mbugua et al (2012), the reason for failure may not be unconnected with inadequate or insufficient instruction by the teacher but by non-active preparedness of learners and negative peer influences. Another factor that may affect students' performance in biology is parent-based factor. Low parental socio-economic status is associated with diminished resources hence contributing to low academic achievement. Parental diminished resources will result in the inability to provide needed textbooks and other learning materials for the children. Araoye (2010) reported that good student's background constituted one of the factors that could promote high performance in biology. School based factors can also influence student performance in biology. Schools that are well-equipped, with regards to textbooks and science laboratory equipment, qualified teachers and instructional materials tend to generate better outcome while insufficiently equipped schools gives poor output in biology.

Akinfe, Olofinniyi and Fashiku (2012) noted that without modern instructional materials, effective teaching and learning cannot be achieved. Among the modern instructional materials that are deployed in the process of teaching and learning in schools nowadays are information and communication technology gadgets. Many types of technology can be used to support and enhance learning. Video content and digital movie making and laptop computer can be used in the classroom. Senthilkumar, Sivapragasam and Senthamaraiannan (2014) described various technologies that can be used in teaching biology in senior secondary schools biology classrooms to support teaching and learning. Some of the technologies highlighted are: Computer, Class website, Class blogs and Wikipedia, Wireless microphones, Mobile devices, Interactive Whiteboards, Digital video, Online media.

Also, novel technologies like use of pod casting are currently evolving (Marshall, 2002), to engage the use of various technologies to deliver content serve different purposes in the classroom. Email and Microsoft word processing promote communication literacy; database and spreadsheet programmes promote organizational literacy while the understanding of Science and Mathematics concepts is promoted with modeling software. Pensky (2005) stated that cell phones that people carry about daily can be used for learning. According to Lei and Zhao (2006) each technology is likely to play a different role in students learning. Instead of describing the impact of different technologies in the same way teachers need to know the type of technologies required in the classroom as well as the purposes it is required. Students can learn from computers where technology are used essentially as tutors and serve to increase student's basic knowledge and use. This however is dependent on the extent at which the teachers are knowledgeable or literate about Information Technology. The term literacy was initially used to describe the ability to read and write texts.

Kim, Kil and Shin (2014), stated that the emergence of digital technology language extends the concept of literacy to include the propensity to read and write in a digital and multimedia language ICT literacy simply means to know what digital technology, communications tools and networks are in order to function in a knowledge society. The term ICT literacy has been used to identify ones knowledge about digital technology (Huggins, Ritzhaupt & Dawson, 2014). Teachers should be well equipped with the requisite knowledge for them to be able to successfully impart knowledge into learners. Rosnaini&Mohd-Arif (2010) reported that only a few group of teachers have basic knowledge in ICT. Majority of the teachers only have average knowledge in ICT or very minimal knowledge of ICT. This simply means that the key factor in making ICT programs successful in school is to upgrade the level of ICT knowledge among teachers (Moganashwari&Parilah, 2013). This will enable teachers to reap the various benefits that are accrued to ICT usage. The use of ICT by the teachers in teaching is highly advantageous to students. The right use of ICT in education could add value to teaching and learning effectiveness that was not previously available to the learners. Since ICT improves the quality of education of a nation, then national development depends on the extent to which a nation uses ICT

facilities in education This is because it enables the teacher to demonstrate understanding of the opportunities and implications of the uses for teaching and learning in curriculum context; plan, implement and manage teaching and learning in open flexible learning environment (United Nations Educational Scientific and Cultural Organization (UNESCO, 2004).

ICT usage in teaching is beneficial to teachers as it enhances: individualized interactivity, delivery of educational resources, access to global knowledge base, and facilitation and integration of resources to simplify teachers work (Mathayo, 2016). As valuable as the use of ICT in teaching and learning, the extent of its adoption and utilization in Nigerian secondary schools still left many questions to be answered. Okebukola cited by Aduwa and Iyamu (2005) stated that in 90% of the Nigerian schools, computer has not been part of the regular classroom technology. This implied that chalk board and textbooks have been the dominant classroom instructional materials in Nigerian secondary schools. This could be as a result of lack of knowledge of the ICT facilities, lack of interest in using the resources or lack of information literacy. Studies by scholars also attest to the underutilization of ICT in secondary schools in Nigeria and have identified numerous factors that may be responsible for the situation. A study conducted by Kazi, Ahmad, and Mosa (2012) showed that there was underutilization of ICT resources in Eastern Europe, Africa and some parts of North America. This underutilization is born out of a number of barriers; lack of ICT support personnel, intermittent internet condition, absence of ICT-related projects, lack of teachers training programs in ICT use and the nature of the curriculum were cited as some of the overarching

Teachers' attitude of teachers, their confidence, competence and unlimited access to ICT resources and facilities and lack of technical support, inadequate ICT infrastructure on ICT and lack of professional development were identified as the barriers hindering teachers to use ICT to facilitate teaching in secondary schools. Ruthven, Hennessy and Brindley (2004) reported that the older teachers fear or lack experience to use the ICTs. Chemwei and Koch (2014) conducted a study on the assessment of Information and Communication Technology (ICT) integration in instruction in teacher education in Kenya. The study revealed that a teacher that is experienced in subject content and pedagogy but without adequate knowledge in technology was relatively incompetent in ICT integration in teaching and learning.

Aside the inadequate knowledge of ICT, several other factors such as teacher's age group, teaching experience and gender have been identified as having effects on the teaching pedagogy and use of ICT facilities by the teachers. Mulwa and Kimosop (2015) reported that the length of service of teachers in teaching profession influences the use of ICT in daily classroom activities in Kenyan schools. The teachers with 1-5 years of experience in teaching have substantive readiness to adopt and use ICT in teaching unlike with higher years of experience but without interests and skills in technology. Onwuagboke et al found that the number of years of teaching experience of a teacher has a direct relationship with use of ICT in teaching. This entails the fact that the more experienced the teachers are, the more

they readily use technology in teaching and learning processes. Rahimi and Yadollahi (2011) carried out a study on computer anxiety and ICT integration in English classes among Iranian EFL teachers. The result of their findings established no connection between integration and teachers years of teaching experience. Most research outcomes have reported more use of ICTs by young people compared to the older people. The older feel intimidated by the new technologies than the younger generation. Susan (2014) conducted a study on the influence of teachers' age, gender and level of training on attitudes towards the use of integrated e-learning approach to the teaching and learning of business studies in Kenyan secondary .

Teachers were grouped with age differential gap of ten years. The study found that students, teachers, and school heads see integrated E-Learning approach as better than conventional approaches when it comes to learners performance. The respondents have positive opinion regarding the integrating of ICT in teaching and learning Business studies in secondary schools. The research found that the teachers of the different ages were all positive towards the approach. This indicates that age does not affect teachers' attitude towards the new approach.

Hassan and Abdullah (2013) conducted a study to investigate the influence of age of teachers on ICT integration into language teaching. The study utilized a mixed-method approach of investigation, which applies both qualitative and quantitative methods. The instruments used for data collection were a survey and interview. The survey was administered to 46 in-service EFL teachers working at Najran University, Saudi Arabia. The study found no significant difference in the use of ICT by the groups of teachers on the basis of age. The results indicated that majority of the teachers possess personal computers and access internet in their homes. While teachers in the second category indicated that they access internet in their offices more often than teachers in the first group. Also, Chemwei and Koch (2014) stated that teachers within the ages of 41-50 years and above in teaching profession faced challenges of using computers. This implies teachers of lesser years of teaching experience are more interested, enthusiastic and skilled in the use of ICT tools in teaching and learning processes.

Gender is sensitive to educational objectives and may affect interest and confidence of teacher in teaching with ICT. Gender digital divide was viewed as a globally emerging issue that could influence effective adoption and use of ICT in teaching and learning (UNESCO, 2014). Majuto and Gilbert (2015) carried out a study on the use of ICT between male and female teachers in secondary schools in Tanzania with the aim of establishing the differences between male and female teachers awareness in ICT use and attending ICT short trainings. The study discovered imbalance in gender regarding the use of ICT tools and course attendance in Tanzania. The study further showed relative awareness and adoption of ICT applications between the groups of teachers however larger number of male teachers make use of ICT tools than females in science and non-science subjects. Ekua and Prince (2016) conducted a study on information and communication technology literacy level among lecturers in a public university in Ghana, as well as

the influence of gender and age on lecturers' ICT literacy level. The study revealed that the ICT literacy level is gender insensitive. Based on many contradicting results from empirical researches, and the observed ineffectiveness in teachers' ICT utilization in secondary schools in the study area, this study therefore assessed senior school biology teachers ICT literacy level for biology teaching in secondary schools in Ilorin, North central, Nigeria.

METHOD

This study adopted a descriptive research of the survey type. The study was carried out in senior secondary schools in Kwara state, North Central, Nigeria. The target population includes all biology teachers in senior secondary schools in Kwara state, North central, Nigeria. Two hundred and fifty nine (259) biology teachers were randomly selected out of five hundred and sixty six (566) from public and private schools were used for the study. A researcher designed questionnaire was used to generate data for this study. The instrument was validated by five lecturers, one lecturer in the Department of Science Education at the University of Ilorin, two lecturers in the Department of Educational Technology at the University of Ilorin and two other experienced biology teachers in senior secondary schools in Ilorin. Cronbach's Alpha was used to test the reliability of the instrument and a reliability coefficient of 0.72 was obtained, hence, the instrument was said to be reliable.

The questionnaire was administered using two trained research assistants and it was collected on the spot thus ensuring 100% return rate of the research instrument. Descriptive and inferential statistics were used to answer research questions and test the hypotheses respectively. Demographic information were answered with frequency and percentage while research questions were answered using cross tabulation table. Research hypotheses were tested using Chi-square statistics tool at 0.05 level of significance.

RESULTS AND DISCUSSION

Results

The results in Table 1 showed that majority (59.81%) of the teachers have low ability to use the ICT tools while 10.12% cannot use ICT resources. The result also indicated that only very few teachers (6.61%) have high ability to use the ICT resources while 23.46% have medium ability to use the ICT resources to teach biology. This result implies that majority of the teachers have low ability in using ICT resources to teach biology.

Table 1. Percentage Distribution of the Level of ICT Literacy by Senior School Biology Teachers in Kwara state, North central, Nigeria

S/N	Items	4	3	2	1	%
IT1	White interactive board	3.86	28.19	62.93	5.02	100
IT2	Browser	11.97	9.27	59.07	19.69	100
IT3	Laptop	7.72	13.13	63.71	15.44	100
IT4	Facebook	5.02	22.01	67.95	5.02	100
IT5	WhatsApp	1.93	24.71	69.11	4.25	100
IT6	Internet	5.41	20.85	65.64	8.11	100

S/N	Items	4	3	2	1	%
IT7	USB drive	7.34	19.31	66.41	6.95	100
IT8	YouTube	7.34	23.55	61.78	7.34	100
IT9	Smartphone	6.23	31.52	49.03	13.23	100
IT10	Webpage	7.00	26.46	56.42	10.12	100
IT11	E- mail	6.56	30.50	59.85	3.09	100
IT12	Wireless printer	4.63	28.96	59.07	7.34	100
IT13	Instant Messenger	3.50	32.30	59.92	4.28	100
IT14	Power point	4.63	28.57	61.78	5.02	100
IT15	Wireless microphone	8.11	19.31	52.12	20.46	100
IT16	E- education	6.95	27.41	62.55	4.25	100
IT17	Computer Based Test	1.93	31.27	62.55	4.25	100
IT18	Electronic office materials (e.g CD-ROM)	7,72	20.85	68.34	5.02	100
IT19	Install	1.93	28.57	65.64	19.69	100
IT20	Microsoft word	8.49	18.92	56.37	5.02	100
IT21	Multimedia Projector	6.18	26.25	56.37	4.25	100
IT22	Video Conferencing	3.47	33.98	60.23	8.11	100
IT23	Microsoft excel	8.11	26.25	56.37	6.95	100
IT24	Overhead projector	14.29	15.83	55.21	7.34	100
IT25	Virtual Library	5.79	27.03	58.69	7.72	100
IT26	Intranet	8.49	25.10	55.98	10.42	100
IT27	Blog	6.95	16.99	63.32	12.74	100
IT28	Audio Conferencing	10.04	16.60	59.46	13.90	100
IT29	Audio-graphic conferencing	16.60	11.97	48.26	23.17	100
IT30	Podcast	8.11	19.31	58.30	14.29	100
IT31	Paper rater	10.04	14.67	56.37	18.92	100
IT32	Adobe connect	14.67	9.65	48.26	27.41	100
IT33	Virtual class	6.56	23.17	55.60	14.67	100
IT34	Mind meisster	3.86	25.48	62.55	8.11	100
IT35	Design wizard	1.93	27.03	64.09	6.95	100
IT36	Trello	1.16	37.07	57.14	4.63	100
Total Frequency		237	842	2146	363	3588
Percentage (%)		6.61	23.46	59.81	10.12	100

Based on the observed and expected frequencies for age range 20-40yrs and 41-60yrs in table 1, the total frequencies of teachers in age range 20-40years (8944) was higher than that of 41-60yrs (4000). Also, the total percentage of teachers that know the meaning of the ICT tools and have not been using it to teach biology and teachers that know the meaning of the ICT tools and using it to teach biology was 18.9% for age 20-40 years, which was lesser than teachers that have not heard about the ICT tools and teachers that have heard about the tools but don't know the meaning which was 81.1% for age 41 – 60 years. This shows that the teachers in age group 41-60years do not have adequate knowledge of the ICT tools and have not been using the tools to teach when compared to teachers in age group 20 - 40years.

Table 2. Observed and Expected Frequencies of Teachers' Age Using Cross Tabulation

Age Groups	4	3	2	1	Total
20- 40yrs					
Observed	2028	5524	806	586	8944

Age Groups	4	3	2	1	Total
Expected	2104.71	5355.07	881.00	603.22	8944
41- 60yrs					
Observed	287	469	2226	1018	4000
Expected	269.78	394.00	2394.93	941.29	4000
Total	2314	5993	3032	1604	12944

Table 3 showed that there was a significant difference in the ICT literacy level of senior school biology teachers based on age groups. The Chi-square calculated value ($X^2_{Cal} = 48.54$) was greater than Chi-square critical value ($X^2_{Cri} = 7.81$) at 3 degree of freedom, hence, hypothesis 1 was rejected. Also, the percentage of teachers in age 20-40 years that know the meaning of the ICT tools but have not been using it to teach biology and the teachers that know the meaning of the tools and have been using it to teach biology was 84.4% which was higher than the percentage of teachers in age 41-60 years (18.9%) that have not heard about the ICT tools and teachers that have heard about the tools but don't know the meaning. This implies that teachers in age group 20-40yrs have higher ICT literacy compared to teachers in age group 41-60 years.

Table 3. Chi-square Analysis of Teachers' ICT Literacy Based on Age Groups

Age Groups	1, 2	3, 4	Total	Df	X^2_{Cal}	X^2_{Cri}	Remark
20 – 40yrs	1392	7552	8944	3	48.54	7.81	S
41 – 60yrs	3244	756	4000				

The total frequency of teachers that have been teaching biology between 5-10 years was 7096, followed by those that have been teaching biology below 5 years has 3398 frequency while those that have been teaching above 10 years were 2450. Table 4 further showed that biology teachers with 5-10 years of experience have higher ICT literacy than biology teachers with less than 5 years of experience, although, they have high ICT literacy than biology teachers with over 10 years' experience.

Table 4. Observed and Expected Frequencies of Teaching Experience Using Cross Tabulation

Experience	4	3	2	1	Total
Below 5yrs					
Observed	423	2027	720	228	3398
Expected	334.71	2034.49	799.62	229.18	3398.00
5- 10yrs					
Observed	444	644	4408	1600	7096
Expected	478.59	698.96	4248.6	1669.84	7096.00
Above 10yrs					
Observed	201	208	726	1315	2450
Expected	165.24	241.33	576	1466.90	2450.00
Total	1068	2879	5854	3143	12944

Chi-square result in table 5 indicated that there was a significant difference in the ICT literacy level of senior school biology teachers based on teaching

experience. The Chi-square calculated value ($X^2_{\text{Cal}} = 46.98$) is greater than Chi-square critical value ($X^2_{\text{Cri}} = 12.59$) at 6 degree of freedom, thus, hypothesis 2 was rejected. Also, a percentage difference of 56.43% in favour of less experienced teachers' who have heard and could use ICT resources revealed that less experienced teachers have higher ICT literacy than experienced teachers. This implies that majority of experienced biology teachers are not ICT literate and have not been using ICT resources to teach biology.

Table 5. Chi-square Analysis of Teachers' ICT Literacy Level Based on Teaching Experience

Age Groups	1, 2	3, 4	Total	Df	X^2_{Cal}	X^2_{Cri}	Remark
Below 5yrs	948	2450	3398	6	46.98	12.59	S
5 – 10yrs	6008	1088	7096				
41 – 60yrs	2041	409	2450				

Note: S - Significant

The total observed and expected frequencies for both male and female biology teachers were shown in table 6. The total frequency of female teachers (6646) was higher than that of male teachers (6298). Also, the total percentage of teachers that have not heard about the ICT tools and teachers that have heard about the ICT tools but didn't know the meaning across their gender type were higher than the total percentage of teachers that know the meaning of the ICT tools and use the tools to teach biology.

Table 6. Observed and Expected Frequencies of Biology Teachers' Gender Using Cross Tabulation

Gender	4	3	2	1	Total
Male					
Observed	636	1842	3341	479	6298
Expected	620.36	1482.05	3770.82	424.76	6298
Female					
Observed	394	639	4409	1204	6646
Expected	448.24	654.64	3979.18	1563.95	6646
Total	1030	2481	7750	1683	12944

Table 7 showed that there was a significant difference in the ICT literacy level of senior school biology teachers based on gender. This was because, the chi-square calculated value ($X^2_{\text{Cal}} = 279.94$) was greater than chi-square critical value ($X^2_{\text{Cri}} = 7.81$) at 3 degree of freedom, hence, hypothesis 3 was rejected. This implied that gender influenced senior school biology teachers' ICT literacy level. In order to know the direction of the difference, the results of the percentage response were compared and it revealed that male teachers had higher positive response of 39.3% than female teachers with 15.5% positive response. This implied that male biology teachers' are ICT literate than female biology teachers.

Table 7. Chi-square Analysis of Biology Teachers ICT Literacy Level Based on Gender

Gender	1, 2	3, 4	Total	Df	X^2_{Cal}	X^2_{Cri}	Remark
Male	3820	2478	6298				

				3	279.94	7.81	S
Female	5613	1033	6646				

Note: S – Significant

Discussion

The findings revealed that majority of the biology teachers involved in the study are not ICT literate and as such have not been using it to teach biology. This implies that, the level of biology teachers' ICT literacy level is low and they cannot easily use the ICT tools to improve their instructions. This finding agrees with findings of Rosnaini and Mohd- Arif (2010), Moganashwari and Parilah (2013) who found out that only a few group of teachers have adequate knowledge of ICT, majority of the teachers have low knowledge of ICT. On the other hand, the finding is not consistent with that of Saxena and Tekanpur (2017) who reported that teachers are innovative users of ICT.

It was further revealed from the finding that there was a significant difference between the age groups 20 - 40 years and 41 -60 years in the positive direction of age group 20- 40 years. This implied that age group 20-40years are ICT literate and as such use the tools to teach biology than the age group 41-60years who have low knowledge of ICT tools that can be used to improve teaching and learning. Hence, teachers' age is an impediment to teaching and learning using ICT resources which can positively influence learning. This is in agreement with the findings of Chemwei and Koch (2014), Kusano, Frederiksen, LeAnne and Kobayashi (2013) and Peeraer and Petegem(2011) who reported more use of ICTs by young teachers compared to the older teachers. The finding is in disagreement with the findings of Hassan and Abdullah (2013) and Susan (2014) who reported more use of ICT by older teachers when compared to the younger teachers.

The findings on biology teachers' ICT literacy level based on their years of experience revealed that there was a significant difference in biology teachers ICT literacy level based on their years of experience. Although, both groups showed low level of ICT literacy by the teachers but the percentage response of the less experienced teachers was higher than that of the experienced teachers. This implies that the less experienced teachers are ICT literate than the experienced teachers. This finding is in agreement with what Deen-Swarray, Ollhwad and Morrell (2012), Mulwa and Kimosop (2015) and Ruthwen, Bennessy and Brindley (2004) found that experienced teachers are aged and therefore have low self-efficacy in accessing the ease of using of ICT tools in classroom.

Finally, the finding revealed a significant difference in the views of biology teachers' that are ICT literate and those that are not ICT literate based on gender. This means that there is difference between male and female teachers' ICT literacy level. Also, the male teachers had a higher percentage positive response than the female teachers. This implies that male teachers are more ICT literate than female biology teachers'. The finding is in agreement with the findings of Nur (2014), Majuto and Gilbert(2015), Bukaliya and Mubika (2012) and Rimyan (2006) who reported that male teachers have a high ICT use than the female teachers. It however contradicts

the findings of Ekua and Prince (2016) who reported that ICT utilization is not gender sensitive.

CONCLUSION AND RECOMENDATION

This study concluded that ICT literacy level among biology teachers is low, gender sensitive and influenced by age and teaching experiences of the biology teachers. This has limited biology teacher's effectiveness and possibly influences students' performance in biology.

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