PERCEIVED CHALLENGES OF INTEGRATING ICT IN EFFECTIVE TEACHING OF AGRICULTURAL SCIENCE IN SECONDARY SCHOOLS IN KWARA STATE, NIGERIA

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ABSTRACT

The study investigated the perceived challenges of integrating the use of Information Communication Technology (ICT) in teaching Agricultural Students. A two-stage sampling procedure was used to select 150 Agricultural science teachers. Results revealed that the average age of teachers was 35.8 years. Majority of the respondents (76.7%) were married. The result also revealed that the majority, 94.7% of the respondents either have a Bachelor's degree, Higher National Diploma or National Diploma. 50% of the respondents had a high level of technical skills in utilizing ICT facilities such as computers, the internet, and digital instructional materials. Results also showed that 81% of the agricultural science teachers agreed that myriads of problems such as the high cost of ICT facilities and equipment, inadequate training and seminar on ICT, epileptic power supply and poor network service by network providers affected the efficient use of ICT facilities by the Agricultural teachers. The study concluded that younger agricultural teachers have great potential to integrate the use of ICT facilities in teaching agricultural science. It was recommended that the use of ICT for teaching agriculture in Kwara state schools should be encouraged as affordability and professionalism of ICT facilities should be made possible by both government and non-governmental organizations in the country.

Keywords: ICT, Agricultural Teachers, and Technical Skills

INTRODUCTION

Modern information and communication technologies have created a "global village," where people can communicate with others worldwide as if they were living next door. For this reason, ICT is often studied in the context of how modern communication technologies affect society. Today, ICT increasingly pervades various aspects of our daily lives, like work, business, teaching, learning, leisure, and health.

Nigeria currently sees a population explosion alongside many social institutions, which is a good condition for the upsurge of internet usage and other ICT facilities in such areas as education, health, agriculture, business, government, and transportation. Such development has been observed over the last 15 years. (Olaojo, 2010)

Generally, ICT involves activities such as gathering, processing, storing, and presenting data. Personal computers, radio, video games, internet, electronic payment systems, computer software, tablets, mobile phones, transport systems, televisions, projection devices, local area networks (LAN), wide area networks (WAN), digital cameras, compact discs (CDs), digital video discs (DVDs), and routers are just

some examples of the diverse array of ICT tools (John, 2012).

Agricultural science, as a field of study, centres on the cultivation of crops and livestock production and serves as an important engine of growth as well as reducing unemployment and poverty in developing countries; hence, it requires new concepts. Salubi (2019) explained that agricultural production includes collecting, processing, recording, storing, distributing, selling farm products, and supplying raw materials for local and foreign industries. It is the practical aspect of agricultural education that applies all the skills and knowledge that the students have learned in the three domains of learning (cognitive, affective, and psychomotor) for the cultivation of crops and livestock on the farm. Peter and Rexwhite (2012) agreed that, although ICT tools have made access to education and knowledge easier and simpler, teachers are expected to use these tools to facilitate a modified teaching and learning process, make education meaningful to individual learners, and increase their interest rather than just provide knowledge and skills.

Brown (2009) explained that ICT is considered crucial for the achievement of various educational objectives in terms of expanding the citizenry's access to education at all levels and improving the quality of the teaching and learning process. Akintunde (2011) agreed that the application of ICT to teaching and learning makes instructions more effective and productive, thereby developing knowledge, skills, competencies, and abilities in individuals.In this regard, ICT is viewed as an innovation that enables agricultural science teachers to facilitate the teaching and learning of agricultural science.

The emergence of ICT in teaching and learning has been known to make learning more student-centred, persuade cooperative learning, and stimulate improved teacher-student interaction. ICTs have the potential of accelerating, enriching, and deepening learning skills such as reading, writing, speaking, and listening to motivate and encourage students to relate school experiences to work activities (transfer of learning), create economic viability for tomorrow's workers, and strengthen one's teaching in helping schools effect a positive change (Ansan, 2006).

Ikwuka (2012) noted that learners are motivated when their learning is supported by technology, which in turn leads to increased understanding. ICT can provide a means of presenting data digitally or can be used to test students' understanding if it is used in a tutorial role.The rapidity of change within ICT has impacted almost all areas of human endeavour, the impact has been enormous in the field of education, in both areas of teaching and learning.

It is notable that today's society, including Nigeria, has become increasingly dependent on ICT. (Warchauer et al. 2000) stated that the demand for ICT literacy is on the rise in Nigerian education because employers have realised that computers and other ICT tools can enhance efficiency. Adamu and Iyamu (2006), in their assessment of progress made by Nigeria and other African countries to institutionalise educational technology, opined that "though Nigeria has become aware of the invaluable role of ICT for effective teaching and learning, they have not been able to make significant progress in improving education through this medium. In recent times, almost all examinations and interviews have been conducted with the use of ICT tools, some virtually in the comfort of your home. It will be agreed that it is ultimately necessary for students to be ICT-literate.

Many countries around the world have launched programmes to help teachers use ICT in their daily teaching and learning activities in school. Jimoyiannis and Komis (2007) mentioned some examples of such countries, such as the UK, Singapore, China, Australia, and the European Union (EU), which have developed programmes to improve teachers'

skills in using ICT for teaching and learning purposes. Khan et al. (2012) argued that designing and integrating effective ICT teacher preparation programmes is a key factor for successful and comprehensive school reforms. Similarly, many African countries have invested a lot of money and created new policies to encourage teachers to adopt and use ICT in schools. However, there are many challenges that teachers face when using ICTs, some of which are related to their operational skills (Zaman et al., 2011).

Ojowu and Agbo (2006) noted that most teachers not only lack the skills to operate ICT facilities but also do not know what ICT provides to the world. Researchers also opined that there has not been maximum use of ICTs in agricultural science, as the epileptic supply of electricity, the poor network, and the inability to own a computer may have contributed to the low perception of agricultural science teachers' utilisation. The cost of ICT gadgets and products is normally beyond the reach of most schools offering agricultural science as a subject in many parts of the country.

Otagburuagu and Eze (2007) also agreed that the rate of computer literacy among teachers is relatively low and that the awareness available is also limited. Researchers remarked that even when the teachers in Nigeria desired to use ICT, they were not well informed about what they were, where they could find them, or how they might be used for teaching and learning in their study areas, and most of the teachers preferred the traditional chalk and board method. Further studies corroborate the fact that even though computers have come into most secondary schools, the teachers' teaching behaviour has not been totally affected by their presence. It was discovered that these ICT gadgets were only seen in the pools, where they are always protected with dusty covers. (Olibie and Akudolu, 2009).

Jamieson-Proctor et al. (2006) agreed that repositioning teachers' perception, participation, orientation, and awareness in the utilisation of ICT in teaching can afford the students the opportunity to shape their performance, facilitate and uptake progressive, effective group work, and increase their social interactive learning ability (p.512). Vlatonu & Kayode (2013) also agreed that beyond the lack of the necessary tools and gadgets necessary to utilise ICT in teaching (p.2).

The teachers in Nigeria have not responded effectively to the use of some ICT gadgets like computers, laptops, and e-learning and prefer more of the traditional approach to teaching (Akawu, 2009, p. 89), which is less stimulating to students and is more teacher-centred. To achieve the aims of agriculture in this age, teachers need to expose students to innovations that can change agricultural education. The attitude of teachers towards ICT is a key factor that influences the use of ICT tools in agricultural education, and if the teachers have a positive attitude towards ICT, they can use it more effectively to transform agricultural education. Hence, the need to facilitate the awareness and orientation of teachers to integrate ICT into teaching in schools should be of utmost priority in Nigeria's educational policies and system.

Objectives of the study

The study's main objective was to investigate the perceived challenges of integrating ICT in teaching agricultural science in senior secondary schools.

The specific objectives were to:

- describe the socio-economic characteristics of agricultural science teachers.
- identify the available ICT facilities in the secondary schools where the agricultural science teachers teach.
- assess the level of teachers' technical skills in the use of ICT for teaching agricultural science in secondary schools; and
- investigate the constraints limiting the use of ICT by teachers in Secondary Schools in the study area.

Methodology:

The study was conducted in Kwara State. The coordinates are 8.9669^{0}N, 4.3874^0 E. The state has a total area of 36,825km^2 (14,218 sq. mi), 16 local government areas (LGAs) and a population size of about 5.3 million people which constitutes about 1.69% of the Nation's total population having relied upon immigration for population growth and socio-economic development. (Wikipedia, 2021).

The study adopted descriptive survey research, focused on investigating the challenges of integrating ICT in the teaching of agricultural science in secondary schools in Kwara state. All agricultural science teachers in secondary schools in Kwara state were the study's target population, the study used a two-stage sampling technique in selecting respondents. The first stage involved the selection of schools in Ilorin East, Ilorin South and Ilorin West local governments of the state, where agricultural science is being taught as a subject. The second stage was a simple random selection of 150 agricultural science teachers.

The instrument for data collection was a researcher-designed closed-ended questionnaire, consisting of six sections: Sections A, B, C, D, E and F built in line with the research questions. Section “A" of the instrument elicits respondents' personal information, such as age, gender, household size, marital status, and educational qualification while section "B" comprised of questions about the available ICT facilities in their school, ticking either available or not available to the stated examples of ICT facilities in the questionnaire. In Section "C", respondents were requested to state their degree of operational skills for each ICT facility stated in the instrument by using a 3-point Likert scale; Low, Moderate and High. Section "D' obtained respondents' level of agreement with some listed importance of the use of ICT in the teaching-learning process of agricultural science using a 4-point Likert scale such that each statement requires the respondents to tick either Strongly Agree (SA), Agree (A), Disagree (D) or Strongly Disagree (SD). In order to determine the constraints hindering the use of ICT, using a 3-point Likert scale; Highly Severe (HS), Less Severe (LS) and Not Severe (NS), Section "E" required the respondents to state their level of agreement with some listed possible constraints limiting the use of ICT tools by agricultural science teachers in secondary school in Kwara state. Section "F" elicits the respondents' degree of agreement with possible strategies to enhance the adoption of ICT in teaching agricultural science in secondary schools, using a 4-point Likert scale such that each statement requires the respondents to tick either Strongly Agree (SA), Agree (A), Disagree (D) or Strongly Disagree (SD).

The instrument was scrutinized by two research experts and necessary adjustments were appraised to ascertain the content and construct validity of the instrument. The questionnaires underwent a test and re-test method using the teachers selected for the study. The questionnaires were administered twice at two separate periods and the respondents rated the same, hence the instrument was reliable. The data collected was analyzed using descriptive statistical tools such as frequency counts, percentages, and mean statistics.

Results and Discussion

Socio-economic characteristics of respondents

Table 1: Agricultural Teachers' socio -economic characteristics

Socio-economic Characteristics	Frequency	Percentage (%)
Age (in years)		
. < 30	41	27.3
31-40	75	50.0
41-50	29	19.3
Above 50	5	3.30
Average Age	35.80	
Sex		
Male	91	60.70
Female	59	39.30
Marital status		
Single	30	20.00
Married	115	76.70
Married	115	76.70
Divorced	1	0.70
Widowed	4	2.60
Education qualification		
SSCE	1	0.70
Adult Education	4	2.70
National Diploma	19	12.70
Higher National Diploma	57	38.00
Bachelors' Degree	66	44.00
Masters' Degree	3	1.90
Household size		
1-4	36	24.1
5-9	114	75.9
Average	5.37	

Source: Field Survey, 2021

Table 1 shows that half (50%) of respondents fell within the age bracket of 31-40 years of age, the average age was 35.8 years. This implies that most of the respondents were still in their productive age group, were relatively mature in terms of age and were able to provide sufficient information on the influence of teachers' socioeconomic characteristics on integrating ICT to teaching agricultural science.

Majority (60.7%) of the respondents were male. This shows that male teachers prefer teaching agricultural science compared to their female counterparts This therefore implies that teaching of agricultural science in secondary schools is dominated by male teachers. This finding is in tandem with a study by Oyediran et al. (2014) that people within this age bracket are

full of energy and economically active, they further reported that the mandate of colleges of education to produce young, qualified teachers which stimulates ladies to seek admission into the teaching profession. If well harnessed, the implication is that a high population of females in the teaching profession will assist in boosting knowledge and skill transfer to the students. There is a common saying that "Teach a woman, teach a nation".

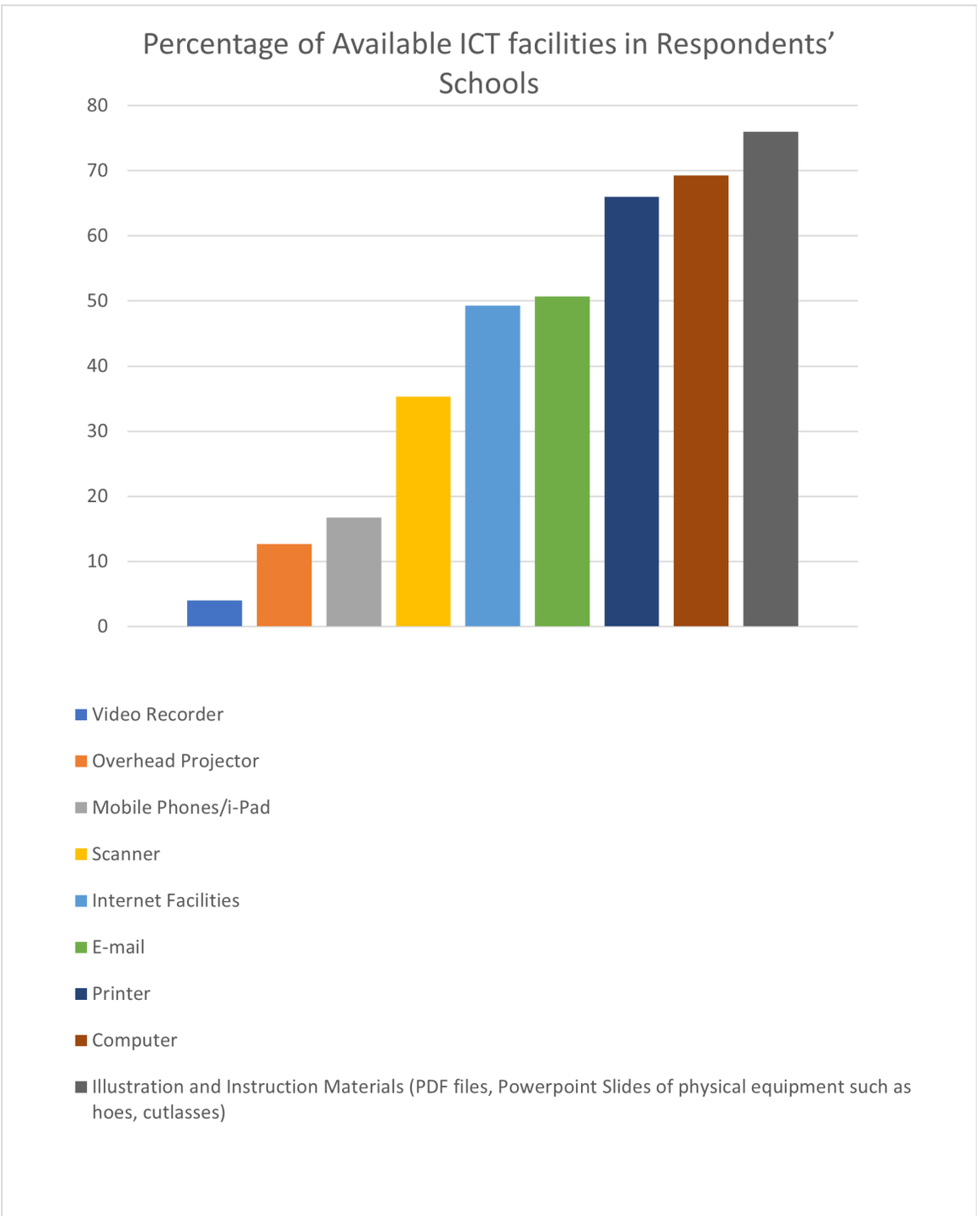
Majority (76.7%) of the respondents were married. This implies that they are responsible since marriage confers some level of responsibility on the married people and it will go a long way in better teaching and caring for the students. Most (99.3%) of the respondents were tertiary graduates and had acceptable qualifications from various Nigerian Institutions. This shows that a good number of the teachers are literate and have passed through a system of education where different communication channels about the use of ICT have been employed hence, they are aware of technological changes in the educational sector, and this will facilitate rapid adoption of new innovations and use of ICT in the teaching profession.

Most of the respondents (75.9%) reported having a large household size, with an average of 5 persons per family. This only includes the teachers' immediate relatives, such as their children and spouses. This means that the respondents likely had teenagers and young adults in their families who had access to the Internet and other ICT tools. The personal experience of these family members could have influenced the respondents' teaching activities. The household size also affects the teachers' motivation and the positive outcomes of the teaching-learning process.

The study deduced that the integration of ICT in teaching agricultural science effectively is significantly influenced by several teachers' characteristics, such as the teachers' age, household size and, most importantly, educational qualification.

Availability of ICT Facilities in Schools

Table 2: Available ICT facilities in Respondents' Schools



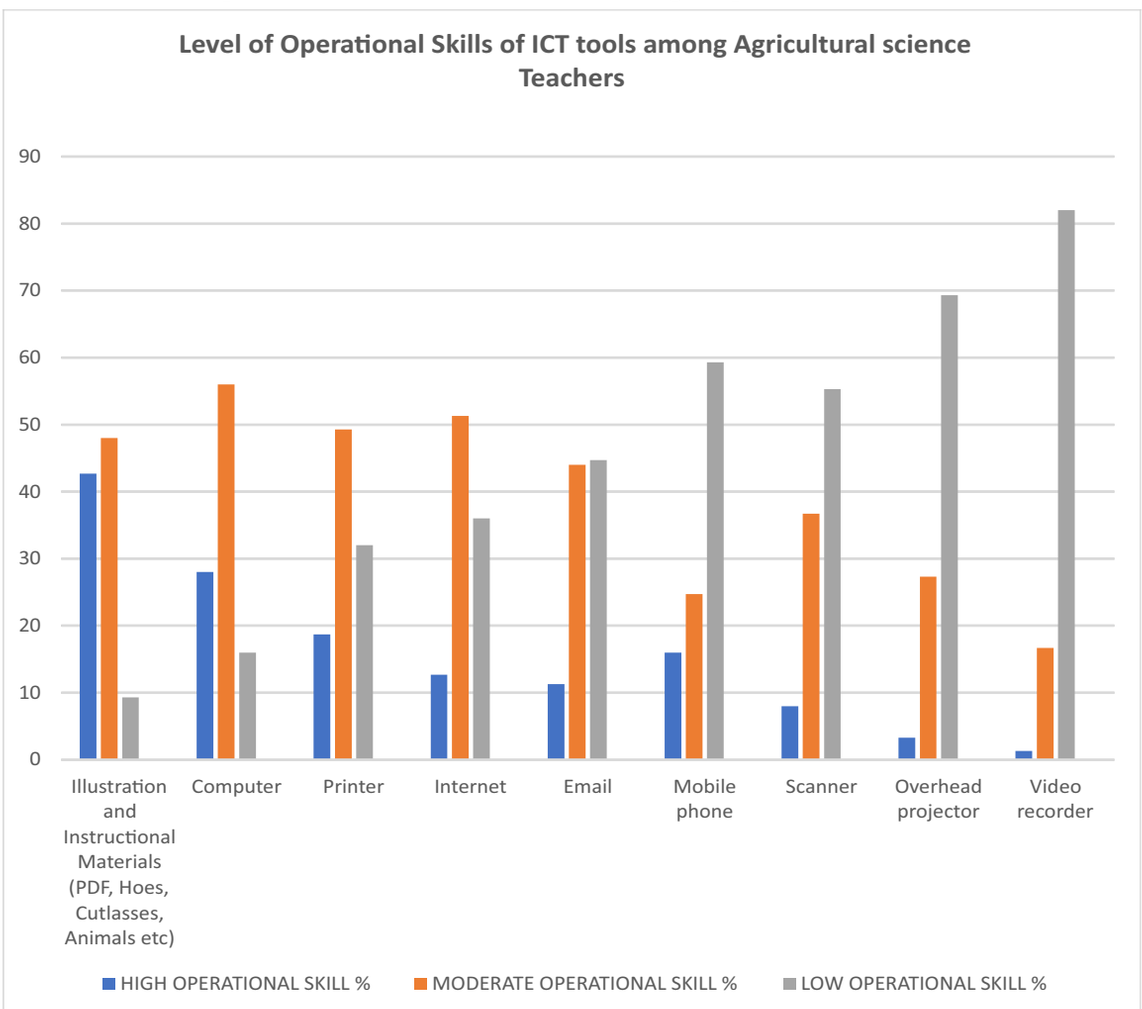
Source: Field Survey, 2021

Most (69.3%) of the teachers had computers in their school. Also, 74 (49.3%) teachers had access to internet facilities in their schools. Only a few 19 (12.7%) teachers had overhead projectors in their schools, whereas 76 (50.7) schools had an email.

The study further found out that 53 (35.3%) only had scanners in their school and most, 125 (83.3%) of the schools did not have mobile phones specifically used for teaching or other uses in the school. 99 (66%) schools have printers readily available and just a few 36 (24%) do not have illustration and instructional materials in their school. The lack of adequate ICT resources in schools can be explained by the insufficiency of funds and low levels of ICT training among the teachers. These findings agree with Singh et al. (2014) who concurred that the use of ICT tools is impeded by the insufficient availability of computers and other technological devices, as well as the low coordination among agricultural stakeholders.

Level of agricultural science teachers' operational skills in the use of information and communication technologies.

Table 3: Level of Operational Skills of ICT facilities among Respondents



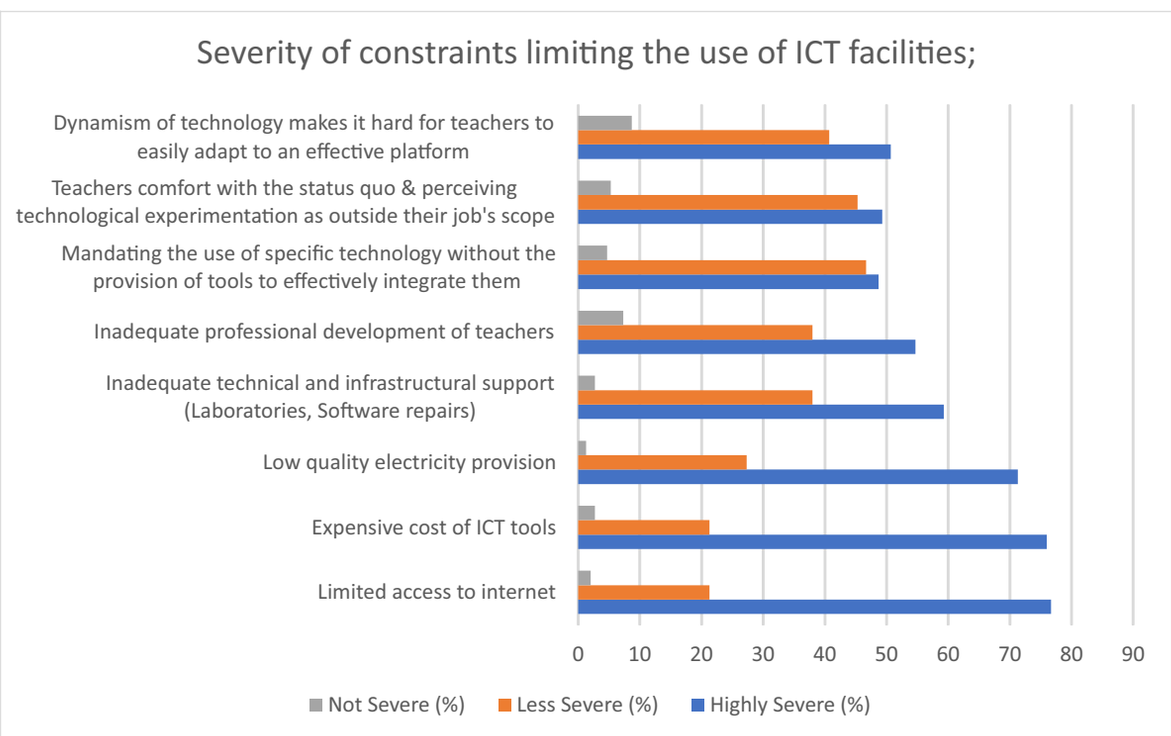
Source: Field Survey, 2021

Table 3 indicates that the respondents had varying levels of operational skills in using different ICT tools for teaching agricultural science. The most commonly used tools were illustration and instructional materials (such as PDF files, PowerPoint slides, physical objects, etc.) and computers, with 42.7% and 28% of the respondents having high skills and 48% and 56% having moderate skills in using them. This could be attributed to the availability and acceptance of these tools compared to others. Other ICT tools, such as printers, internet facilities, e-mail, mobile phones and scanners, were used with moderate skills by 49.3%, 51.3%, 44%, 24.7% and 36.7% of the respondents respectively. However, the least used tools were video recorders and overhead projectors, with 82% and 69.3% of the respondents having low skills in using them. This could be due to factors such as personal preference, maintenance, language literacy, clarity and effectiveness. The skill level of teachers in operating ICT tools, as well as their self-efficacy and attitudes towards technology utilization, are important factors that influence the teaching-learning process. This agrees with Watsons (2001) argument that the success of educational innovations depends largely on the skills and knowledge of teachers. Dakie (2004) also suggested that using ICT in teaching without adequate skills and knowledge could be detrimental rather than beneficial.

Agbulu and Ademu (2010) reported that agricultural science teachers lacked knowledge in using ICT for teaching and that the utilization of ICT in secondary schools was very low, however, this study noted that the utilization of ICT in secondary schools has improved, and teachers are gradually gaining knowledge in using the ICT tools in teaching.

Constraints Limiting the Use of ICT Facilities by Agricultural Science Teachers

Table 4: Severity of constraints limiting the use of ICT facilities.



Source: Field Survey, 2021

Table 4 identified constraints limiting the use of ICTs by agricultural science teachers in the study area such as limited internet facilities, the exorbitant prices of ICT facilities which share a large percentage as to why schools are unable to purchase them are highly severe to the use of ICT in teaching agricultural science in secondary schools and the epileptic electricity supply in the country which both cause damage to the facilities and hinders students from learning adequately with 76.7%, 76% and 71.3% respectively. Most of the constraints listed were acknowledged by the respondents to be highly severe as they are considered to have hindered their effective use of ICT facilities in the area.

These findings are in tandem with a study by Kale et al., (2015) which concluded that inadequate infrastructure such as reliable power supply and internet connection, poses a great hindrance to the effective use of ICT facilities. Barackabitze et al (2015) also confirmed that power and internet outages are common problems in many developing countries that limit the use of ICT.

Likewise, there is also the barrier of phobia towards technology among teachers, this deems their confidence and readiness to utilize ICT support in the teaching and learning process. Yara (2009) argued that teachers play an influential role in shaping the students' attitudes. The students tend to emulate the teachers' likes and dislikes, values and emotions about learning. Therefore, a teacher who has a positive attitude towards his/her job would be more motivated to help his/her students succeed. These findings concur with a study by Adamu & Iyamu (2006) that established that some of the major barriers to developing maturity when it comes to the utilization of technology in learning include teachers' attitudes, lack of access, insufficient training on the utilization of the ICT resources as well as inadequate ICT skills in general.

Conclusion

ICT and Agricultural Education today are interdependent, and agricultural teachers who need to be efficient in modern society must be ICT-compliant. It was found that teachers' personal characteristics significantly influenced the integration of information and communication technology in teaching agricultural science in secondary schools, however, the teachers and secondary schools both lacked enough ICT resources to integrate into teaching as a result of the expensive cost of ICT facilities, low-quality electricity provision, limited access to the internet. It was deduced that young teachers could easily use ICT tools in teaching whereas older ones found it difficult due to incompetent technical skills. It can be concluded that younger agricultural science teachers have great potential for the use of ICT in teaching agricultural science in secondary schools.

Recommendation

- ICT infrastructures (equipment and accessories) should be affordable for private schools and provided by the government for efficient ICT services in public schools.
- Electric security should be developed in collaboration with the relevant institutions to establish adequate network security, abolishing cyber-crimes that students may be exposed to because of the use of ICT in the teaching and learning process.
- The use of digital learning materials should be introduced, and teachers should be encouraged to utilize them by integrating these materials into teaching agricultural science.
- Agricultural science teachers should be trained and equipped with ICT skills through seminars and public enlightenment relevant to today's knowledge age.
- Effectively sustained level of ICT

leadership and skilled ICT personnel should be provided to facilitate the mobilization of resources needed to develop a conducive ICT environment for schools.

- Non-governmental organizations (NGOs), Parents-Teachers Associations (P.T.A) and area councils should contribute to equipping schools with requisite ICT facilities.

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