

## Computer Efficacy as Determinant of Basic Science and Technology Teachers' Perception of Teaching Skills in Science Schools in Ekiti State, Nigeria

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**Abstract :** The teaching of basic science and technology is important to sustainable development world over and it has implication for science teachers to acquire and develop skills as such for learners to catch up with its advancement in the world today. Moreover, it is clear in baseline studies that many basic education teachers in Nigeria are still struggling to meet up with skills to teach basic science and technology according to global trends of development. This study however investigated computer efficacy as a determinant of basic science and technology teachers' perception of teaching skills in Government science schools in Ekiti state, Nigeria. The study comprises of forty-five 45 basic science and technology teachers who were purposively selected from the three 3 Government Science Colleges (GOSCO) in the three 3 senatorial districts of Ekiti State, Nigeria. Descriptive survey design was adopted for this study while computer efficacy and teaching skills Questionnaire CEATSQ was used to collect data on relevant variables. Data collected were analysed using mean, frequency counts and Pearson's Moment Correlation. The findings showed that teaching skills among basic science and technology teachers in Science Schools in Ekiti state, Nigeria were found to be slightly okay while the status of computer efficacy of the teachers were rather too low. Therefore, based on the findings; it is hereby recommended that teaching skills of basic science and technology teachers can still be enhanced to improve while government should also put in place different programmes and strategies that can help perceptions, frequent usage of computers in schools in Ekiti state, Nigeria.

**Keyword:** Sustainable, Science and technology, basic education, Teaching skills, Computer efficacy

## Introduction

The knowledge of science and technology will continue to be relevant for sustainable development worldwide because of its importance in helping the learners to describe and explore things that surround them. This informed the basis for many countries in the world to invest in achievements of science and technology in schools, ranging from elementary to secondary and even tertiary education. This decision was motivated by the urgency of benefits contained in this kind of practice as it can be verified by how it affects all human endeavours. However, adequate knowledge of Science and Technology at the basic education level will in no doubt create a solid foundation for any technological development (Potvin and Hasni, 2014). It can also help learners at this level with such knowledge and skills to maximize natural resources for daily living and more so, to the benefit of society (Kelley and Knowles, 2016).

Basic Science and Technology according to (Ogbeba, Enemarie, & Ajayi, 2019) is an important subject offered at the basic secondary schools in Nigeria, and it is particularly a preparatory core subject for development of process skills and scientific attitudes to cope with current happenings in the world today. In addition, teaching of the subject is to meet the demands for acquisition of knowledge and development of skills that will make learners relevant as they relate this to real world of work (Darling-Hammond, Flook, Cook-Harvey, Barron and Osher, 2020). Furthermore, Basic Science and Technology can also be considered as a skill-oriented area of learning to acquire the right skills and abilities to cope with the current global development (Wu and Anderson, 2015; Anaeke, 2020).

Consequently, and in line with (Kwaku Sarfo, Debrah, Amankwah and Mensah, 2022) the teaching of basic science and technology in schools should be enhanced for capacity building and development of attitudes that will make the learner relevant in the global economy. This according to and (Degi and Zangmu, 2017) involves planning to meet the objectives of the curriculum, showing the mastery of the subject matter with the support of different instructional strategies and materials to promote pedagogically sound lessons. As a result, and according to (Hassan, Akinduro, Mohammed and Ogunmilade, 2022) the teaching of basic science and technology should involve a commitment and an interdisciplinary approach which greatly depends on the teacher quality. Therefore, it should be noted according to (Nolan & Molla, 2017) that an essential quality of a teacher is to be confident and have a sense of responsibility in the teaching and learning processes.

However, according to (Lauerma, 2014), taking responsibility by the teachers will not be complete without exhibiting the relevant teaching skills to ensure teaching effectiveness and equality in the classroom. This largely to the teaching of basic science and technology involve the awareness of required knowledge and skills, such as

technology integration among others for effective delivery of instructions in classroom practices (Majo, 2016; Samuel, Sani and Oluwatosin, 2021). Moreover, that basic science and technology teachers are instrumental to provision of quality learning experiences for learners to explore science in nature (Adeyemi, 2021).

Teachers are important in any educational system and the quality of teachers in any educational system mostly determines the quality of the system and more so, that every educational system is at the mercy of the professional competence of teachers (Jumare, 2020). Therefore, the teacher who teaches the subjects in the classroom will determine the quantity and quality of science and technology education received by these future leaders. Teachers job during teaching process according to (Babayemi, Utibe and Babalola, 2018) is to make knowledge more tangible by demonstration of teaching skills that can aid learners' acquisition of knowledge.

These teaching skills of teachers should be given considerable attention, and it is not in any way a drastic change in teaching style but however, in this context will be a process of making science and technology to be more explicit in classrooms (Surgihartini, Sindu, Dewi, Zakariah, and Sudira, 2019). Ekpo-Eloma and Udosen (2013) posits that teachers without appropriate teaching skills will struggle to meet up with rudiments of learning. Likewise, Ijaiya (2013) in another study discovered that when a teacher fails in teaching skills, it will be to the detriment of pupils learning.

The summary of teaching skills according to (Jumare, 2020) are:

- i. Lesson planning: preparation of the lesson in an organized manner. It involves the logical sequence of contents of the lesson in a concise, appropriate, relevant ways within specified duration of time.
- ii. Set induction: this is the process of gaining pupil's attention at the beginning of the lesson.
- iii. Stimulus variation: This involves securing and sustaining attention of the learner. The effective components of this skill are gestures, change in speech pattern, and change in interaction style.
- iv. Questioning skills: this is important to allow and encourage the teacher trainees to ask structured questions and clarify doubts. Redirecting, refocusing, and increasing critical awareness are significant component of this skill.
- v. Effective use of Instructional materials: this is to choose the most appropriate teaching aids for learning to engage or stimulate learners' other senses in the leaning process.
- vi. Lesson closure: It is the method of concluding a teaching session, to bring out relevance of what has been learnt, its connection with past learning and its application to the future.

Moreover, (Onocha, 2013; Keiler, 2018; SkillsYouNeed, 2019) earlier supported focusing on an improving quality of teaching through provision of opportunities to improve teaching skills because today's classroom is characterized by the usage of electronic devices for effective teaching and learning process. Additionally, the key to performance at various levels of education is a function of relevant teaching skills, and this is achievable by an effective teacher education program (Darling-Hammond, Hyler and Gardener, 2017). Teaching skills according to Apling and Sri Haryani (2019) must be acquired by a teacher to cope with the complexity of teaching and learning in a contemporary world.

Scholars such as (Onwuagboke, Osuala and Nzeako, 2017; Noonan, 2018) claimed that teaching skills are inevitable tools for effective teaching and teacher training institutions should begin to take responsibility and to plan adequately for the future of teaching profession. There is the need for teachers to be versatile in pedagogical practices and especially through demonstration of basic teaching skills as listed by (Ike, 2017) to include set induction, use of examples/ stimulus variation, various questioning techniques, re-enforcement, planned repetition, non-verbal communication and closure.

(Ukaigwe and Adiemme, 2018) posits that process of knowledge in science and technology teaching can be facilitated when teachers engage teaching skills to achieve the specific objective of the lesson for desired learning outcome. The dynamic age requires that every science teacher must be confident of their teaching skills because teaching offers the chance to change other people's lives permanently for the better (Ige and Ogunseemi, 2016; Langart, 2018). The present age science and technology learners must develop mastery of its dynamic content with the necessary quality to cope with the twenty first century skills, and this makes acquisition and demonstration of teaching skills an indicator of best practices and teaching effectiveness at all levels of education (Cortés, 2016; Goodley, 2018; Jacob, 2018).

The work of scientists embraces a collection of technologies while a major accomplishment in science is often accompanied by sophisticated applications of technology (Gambani, Falode, and Adegbenro, 2014). Therefore, taking a clue from (Kong, and LeVally, 2019) the inclusion of technology both as a tool for learning science content and processes and as a topic of instruction will make the usage of computer an important aspect of teaching and learning of basic science and technology in schools in Nigeria. Consequently, there is the need to consider the teachers' ability to cope with computers and related technologies for effective teaching (Snoek, Dengerink and De Wit, 2019).

Computers have now made a drastic impact on our society particularly in education according to (Paje, Rogayan and Danti, 2021) who revealed that it can be hard for teachers to get students attention in any classroom without computer related programs. In other words, it is important for teachers today to acquire computer skills as posited by (Kumari,

2021) and to cope with multifaceted needs of the 21st century learners which in line with the submission of (Alt, 2018) will include the use of different computer and computer applications that can help the learners to be interested and highly motivated in classroom practices.

However, (Baterna, Mina and Rogayan, 2020) stressed that teachers who are versatile in computer-based instructions will be an advantage to the society as they will complement the students' needs in terms of the usage of digital devices for effective communication. Moreover, according to (Schindler, Burkholder, Morad and Marsh, 2017) computer-based instructions is persistently becoming unavoidable globally for its impact in provoking innovations in classroom practices. Computers are common tools of communication in our society and are being used in all aspects by various means to disseminate information at different times in different situations ranging from education to other areas of the society (Paje, Rogayan, and Dantic, 2021).

Despite the previous submission, it has been shown in research conducted by (Taber, 2017) that while some members of the society are usually enthusiastic about using computers, others are still apprehensive for several reasons which calls for teachers' personal beliefs about their ability to use computer in their teaching. It means that in as much as computers can aid teaching and learning processes, the most important thing now is for all teachers to become familiar and comfortable with its use (Chukwueneke, and Aburime, 2018). More so, that it has been discovered by (Kozcu Cakir, Guven and Celik 2021) that successful computer experiences prepare learners to participate effectively in a computer dominated society.

Recently, there has been a renewed interest in computer efficacy in teacher training because the new generation of students are naturally acquainted with computers, mobile phones, the internet, and social media (Afari, Ahmed Eksail, Khine and Alaam, 2023). Therefore, this development necessitated attempt by teacher training institutions globally to embrace technology enhanced training sessions to improve teaching skills in the classroom to promote meaningful learning. Computer efficacy in teacher training would be the ability of teachers to apply specific computer skills to perform teaching tasks. However, (Loar 2018) noted that teachers' computer efficacy can be associated with positive teaching and learning processes with positive outcomes, it can also mean teaching effectiveness, attitude to teaching and teacher identity in computer-based instructions. In a study to investigate computer efficacy and attitudes towards the use of technology devices among a set of trainee teachers, (Gudek, 2020) found a significant correlation between the level of computer efficacy and attitudes towards digital technology among the sample. Furthermore, (Baroudi and Shaya, 2022) in another study explored teachers' computer efficacy of some in-service teachers across different subjects such as language arts, science, history, and

mathematics, and found a strong correlation between teachers' computer efficacy and teaching skills in classroom practices. However, computer experience and availability alone is not enough but knowledge and attitudes associated with a concept known as computer efficacy will determine the framework for its pedagogical use in the classroom (Yadav, Mayfield, Zhou, Hambrusch, and Korb, 2014).

Computer efficacy according to Kass (2014) refers to a judgement of one's capacity to use a computer and computer efficacy is an essential trait that can influence teachers' decision to use computers. Most especially in preparing written reports or analysing an information. This is based on the submission of Aktag (2015) that Teachers with high computer efficacy will see themselves as being able to use computer technology while on the other hand, teachers with low computer efficacy will become more frustrated and more intimidated working with computers. Teachers with low computer efficacy will hesitate to use computer whenever they face challenges in using it (Weintrop, Beheshti, Horn, Orton, Jona, Trouille, and Wilensky, 2016).

Computer efficacy has been considered by scholars such as (Oviawe and Omoh, 2021) to be the most essential factor related with computer skills and computer usage and embraces the assertion of (Cabrera, Byrne, Jass Ketelhut, Coenraad, Killen and Plane, 2021) that the teachers' computer experience is related to their computer efficacy. This is because their increase in computer experience will lead to increase in computer efficacy. Teachers practice with the use of computer in teaching and learning process determines their versatility in the usage of computer devices most especially in their professional development. Aktag (2014) revealed that computer efficacy level changes based on the teachers' year of job experience.

This kind of change in teaching and learning processes may be a challenge since some teachers might relent and therefore develop anxiety for not using computers effectively. Whereas some of them by acceptance of responsibility will continue to integrate computers into their teaching. Therefore, there is the need for continuous training and retraining of preservice and in-service teachers on the usage of computers to maintain computer efficacy among teachers in the teaching profession.

### **Theoretical Stance**

This work is anchored to the concept of Perceived self-efficacy by (Bandura, 1977) with the claim that "people's beliefs about their capabilities to carry out certain activities have a way of affecting their behaviors. However, Self-efficacy beliefs dictates people's feelings, thinking, and behaviors which is not only limited to the ability or capability of an individual, but it is largely related to what the individual belief can accomplish with such ability in each situation (Bandura, 1997). A teacher's efficacy belief can be a judgment of the teacher's capabilities to engage learners from different backgrounds with focus on ensuring desired learning outcomes in every classroom (Bandura, 1977). Teacher efficacy is

evidently related to the teachers' instructional delivery which in turn determines learning outcomes in classroom practices. Additionally, this aspect of classroom context determines teacher's behavior, goals and achievements in teaching and learning processes (Miller, Ramirez, & Murdock, 2017). Furthermore, teachers with a strong sense of efficacy are more likely to be receptive, and willing to try out new ideas and methods to meet the needs of their students. It can also enable them to take responsibility for their teaching actions and as well impart their students with knowledge as it demands. Similarly, Dilekli and Tezci (2016) in a study to determine relationship between teaching skills and self-efficacy among some elementary teachers found out that self-efficacy was valuable in determining teaching skills among the teachers. Thus, there is a close link between teachers' belief and what teachers do in their classrooms and this, can be closely associated with teaching skills such as lesson planning, introduction, explanation, assessment, and decision-making during classroom interactions. Therefore, in contemporary environments which is highly supported by technology, Yesilyurt, Ulaş, and Akan (2016) showed that teachers' computer efficacy among others can be a great support for achievements in education.

### **Research Questions**

The following research questions were raised to guide the study.

1. What is the status of teaching skills among basic science and technology teachers in government science schools in Ekiti state?
2. What is the status of computer efficacy among basic science and technology teachers in government science schools in Ekiti state?

### **Research Hypothesis**

The following hypothesis was formulated for the study.

1. There is no significant relationship between computer efficacy and basic science and technology teachers' teaching skills (lesson planning, set induction, stimulus variation, questioning, use of instructional materials and closure).

### **Methodology**

Descriptive survey design was adopted for this study because it gives room to collection of information from a selected population. The population of the study comprised of all the basic science and technology teachers at the government science schools in Ekiti state, Nigeria. The study employed purposive sampling procedure to select the sample size. There are three 3 Government Science Colleges (GOSCO) with one each from the three 3 senatorial districts in Ekiti State, Nigeria. Participants were forty-five 45 basic science and technology teachers who have been teaching basic science and technology for a period of three 3 years in the Government Science Colleges in Ekiti state, Nigeria. Computer Efficacy and Teaching Skills Questionnaire CEATSQ was developed to collect data on relevant

variables. The instrument comprises of section A which is the biodata of the respondents among others. section B are relevant questions relating to their knowledge of teaching skills, while section C sought for information on computer efficacy while both are with 4 alternatives scoring A= 4, B = 3, C = 2, D =1 of which respondents are required to pick the correct answer. The reliability coefficient of the instrument was ensured at 0.85. Data collected were analysed using descriptive and inferential statistics. Administration of instrument took about 25-30 minutes during which every participant was given the Computer Efficacy and Teaching Skill Questionnaire CEATSQ to complete. The two research questions were answered using frequency counts, percentages and mean, Pearson Product Moment correlation and Multiple Regression Analysis were used to test hypotheses one and two respectively.

### Results

Research Question 1: What is the status of teaching skills among basic science and technology teachers in government science schools in Ekiti state, Nigeria?

**Table 1: Status of basic science and technology teachers' teaching skills.**

Items	Very High	High	Average	Low	Very Low	Mean $\bar{x}$
Lesson planning	16 (3.56)	12 (26.67)	10 (22.22)	5 (11.11)	2 (4.44)	3.96
Set induction	12 (26.67)	15 (33.33)	8 (17.78)	9 (20.00)	1(2.22)	2.68
Stimulus variation	17 (37.78)	13 (28.89)	5 (11.11)	7 (15.56)	3 (6.67)	2.75
Questioning	20 (44.44)	9 (20.00)	11 (24.44)	4 (8.89)	1 (2.22)	2.54
Use of Instructional materials	15 (33.33)	10 (22.22)	13 (28.89)	5 (11.11)	2 (4.44)	3.71
Closure	18 (40.00)	12 (26.67)	10 (22.22)	4 (8.89)	1 (2.22)	2.83
Weighted Mean	3.08					

Note: Mean responses range from 0-1.40 = Very Low, 1.50-2.40 = Low, 2.50-3.40 = Average, 3.50-4.40 = High, 4.40-5.00 = Very High while figures in brackets are percentages

Table 1 shows that the status of teaching skills of basic science and technology teachers in science schools in Ekiti state was generally higher with the weighted Mean of 3.08 which is greater than threshold of 3.00. It is worthy of note that not all items were rated high, but among the six 6 teaching skills (Lesson planning, Set induction, Stimulus Variation, Questioning, Use of Instructional material and Closure) mentioned in this study, lesson



planning with characteristics of keeping every teacher on track of teaching and learning processes have the average mean of 3.96, followed by the use of instructional materials in terms of choice, relevance, appropriate timing, adequacy and variety in use of instructional materials in teaching and learning processes with average mean of 3.71.

Research Question 2: What is the status of computer efficacy among basic science and technology teachers in government science schools in Ekiti state?

**Table 2: Status of basic science and technology teachers' Computer Efficacy.**

Items	Very High	High	Average	Low	Very Low	Mean $\bar{x}$
Perceptions	19 (42.22)	15 (33.33)	8 (17.78)	2 (4.44)	1 (2.22)	1.57
Frequency in usage	16 ( )	7 (15.56)	11 (24.44)	4 (8.89)	7 (15.56)	1.78
Accessibility	11 (24.44)	22 (48.89)	5 (11.11)	4 (8.89)	3 (6.67)	1.50
Weighted Mean	1.61					

Note: Mean responses range from 0-1.40 = Very Low, 1.50-2.40 = Low, 2.50-3.40 = Average, 3.50-4.40 = High, 4.40-5.00 = Very High while figures in brackets are percentages

Table 2 indicates that the status of computer efficacy among basic science and technology teachers in science schools in Ekiti state is low with the weighted mean of 1.61 which is less than threshold of 3.00. This result showed that all indicators of Computer efficacy such as perceptions 1.57, frequency in usage 1.78 and accessibility 1.50 were insignificant comparing with the threshold of 3.00. This implies that basic science and technology teachers in Ekiti state have a poor understanding, of the various components of computer technology and this important in today's workplace and especially as a teacher who should make its best use in classroom practices. In addition, it shows that the teachers rarely use or interacts with computer technology in their teaching practices and more importantly it shows that computer technology is not readily available and useable and so becomes a barrier for digital inclusion in classroom practices in Ekiti State, Nigeria.

### Testing of Hypothesis

**Hypothesis one:** There is no significant relationship between computer efficacy and basic science and technology teachers' teaching skills (lesson planning, set induction, stimulus variation, questioning, use of instructional materials and closure).

**Table 3: Correlational Matrix of the Predictor Variable**

Variables	Computer Efficacy	Lesson Planning	Set Induction	Stimulus variation	Questioning	Use of Instructional materials	Closure
Computer Efficacy	1.00						
Lesson Planning	0.015**	1.00					
Set induction	0.216	0.352	1.00				
Stimulus variation	0.005**	0.240	0.025**	1.000			
Questioning	0.664	0.756	0.182	0.274	1.00		
Use of Instructional materials	0.023**	0.014**	0.032	0.018	0.086	1.000	
Closure	0.275	0.452	0.383	0.025**	0.336	0.374**	1.00

\*\*= Significant at  $p < 0.05$  alpha level

Table 3 shows the correlation matrix between computer efficacy and teaching skills (lesson planning, set induction, stimulus variation, questioning, use of instructional materials and closure). The study indicates that lesson planning ( $r=0.015$ ,  $p < 0.05$ ), stimulus variation ( $r=0.005$ ,  $p < 0.05$ ) and use of instructional materials ( $r=0.025$ ,  $p < 0.05$ ) have positive and significant relationships with computer efficacy. Moreover, set induction ( $r=0.216$ ,  $p > 0.05$ ), questioning ( $r=0.025$ ,  $p > 0.05$ ) and closure ( $r=0.275$ ,  $p > 0.05$ ) are insignificant to computer efficacy. It implies that out of the six 6 teaching skills captured in this study (lesson planning, set induction, stimulus variation, questioning, use of instructional materials and closure), three 3 of them (set induction, questioning and closure) has no significant relationship with computer efficacy. The null hypothesis is hereby rejected for lesson planning, stimulus variation and use of instructional materials at 0.05 significant level. It appears that the three teaching skills (lesson planning, Stimulus variation and Use of Instructional material) that have significant relationship with computer efficacy are psychomotor skills in the context of physical movements with mental procedures. Moreover, it involves the ability to confidently and effectively use computer and digital technology in teaching and learning processes.

## Discussions

This study showed that the predictive power of lesson planning among the teaching skills captured in this study further shows that good lesson must be planned, because planning can help the teacher to make a lesson clear, concise and well timed. All teachers irrespective of their ability, experience or available resources will require a lesson plan that is thoughtfully prepared to ensure effective teaching and learning processes. Lesson planning generally consists of essential components such as objectives, required resources, procedures and evaluation techniques. This result corroborates Rabiou (2014) who states that learning will usually take place with ease and faster under a well-organized teacher. In addition, use of instructional materials as tools for effective learning perhaps make it noticeable among the teaching skills captured in the study. This is not different from the submission of Bukoye (2019) that instructional materials allow every learner to interact with words, symbols and ideas to develop their abilities in reading, listening, solving problems, viewing, speaking, thinking as well as using media and technology. This result agrees with (Degi and Zangmu, 2017) who revealed that planning to meet the objectives of the curriculum and showing the mastery of the subject matter with the support of different instructional strategies and materials to promote pedagogically sound lessons will improve achievements in classroom practices.

It also showed that all the items on computer efficacy (perceptions, frequency in usage and accessibility) are found to be low among basic science and technology teachers in Science Schools in Ekiti state, Nigeria. The result is not different from Kass (2014) who refers to computer efficacy as a judgement of one's capacity to use a computer which is an essential trait that can influence teachers' decision to use computers. It contradicts Turel (2014) who in a study on a set of secondary school teachers found out good computer efficacy perceptions and frequent usage of computers for a wide range of purposes in carrying out their responsibilities in schools. The result further confirms the submission of (Schindler, Burkholder, Morad and Marsh, 2017) on persistent and unavoidable impact of computer-based instructions in provoking innovations in classroom practices as well as the role every teacher will have to play globally. It is not also different from (Baterna, Mina and Rogayan, 2020) who stressed that teachers who are versatile in computer-based instructions will be an advantage to the society as they will complement the students' needs in terms of the usage of digital devices for effective communication.

The outcome of the only hypothesis tested showed that out of the six 6 teaching skills captured in this study (lesson planning, set induction, stimulus variation, questioning, use of instructional materials and closure), three 3 of them (set induction, questioning and closure) has no significant relationship with computer efficacy. The outcome of this study agrees with (Gudek, 2020) who found a significant correlation between the level of computer efficacy and attitudes towards digital technology among the

sample in a study to investigate computer efficacy and attitudes towards the use of technology devices among a set of trainee teachers. Furthermore, it is in line with (Baroudi and Shaya, 2022) who concluded that there is a strong correlation between teachers' computer efficacy and teaching skills in classroom practices in another study to explore teachers' computer efficacy of some in-service teachers across different subjects including science. The result agrees with (Baterna, Mina and Rogayan, 2020) that computers are essential tools for effective communication in our society, and it can be used in all aspects of teaching and learning to disseminate information at different times in different situations. It is also in line with Aktag (2015) who recognized computer efficacy as a potent force to enhance what a teacher can and would do in the process of teaching and learning.

### **Conclusions**

Teaching skills among basic science and technology teachers in Science Schools in Ekiti state, Nigeria were found to be slightly okay while the status of computer efficacy of the teachers were rather too low. However, this study is concluded that teaching skills should be considered essential for effective teaching where learners can gain understanding and meaningful knowledge of scientific concepts. Moreover, the low computer efficacy among the basic science and technology teachers could contribute to a digital divide with situation where learners do not have equal access to computer and digital resources. In addition to this, there tendency for teachers with low computer efficacy to struggle with students' engagement through digital tools and resources is high and this can potentially reduce students' engagements in science subjects.

### **Recommendations**

Based on the findings; it is hereby recommended that teaching skills of basic science and technology teachers can still be enhanced to improve while government should also put in place different programmes and strategies that can help perceptions, frequent usage of computers in schools in Ekiti state, Nigeria. Moreover, more computers and enabling environment should be provided for schools to ensure efficiency and accessibility to functional educational systems in schools in Ekiti state, Nigeria. Furthermore, addressing computer efficacy among basic science and technology teachers in Ekiti state is important for preparing students to be involved in the digital economy and as well contribute to technological innovations in the future. Additionally, there is the need for targeted professional development programs which could focus on teaching skills and computer proficiency for science teachers in Ekiti state.

**References**

1. Adeyemi, A. (2021). Attitudes Towards Teaching of Basic Science and Technology and Students' Achievement at Junior Secondary School Level in Ibadan Metropolis SER Vol. 20 (1 & 2).
2. Afari, E., Ahmed Eksail, F.A., Khine, M.S., & Alaam, S.A. (2023). Computer self-efficacy and ICT integration in education: Structural relationship and mediating effects, *Education and Information Technologies*, 28:12021-12037.
3. tag I. 2014. Computer self-efficacy level and computer usage of academics at Abant Izzet Baysal University. *Abant Izzet Baysal University J. Educ.* 15:1376-399
4. Alt, Dorit. (2018). Science teachers' conceptions of teaching and learning, ICT efficacy, ICT professional development and ICT practices enacted in their classrooms, *Teaching and Teacher Education*, Vol. 73, Pg. 141-150.
5. Anaekwe, M.C. (2020). Challenges of Teaching Basic Science and Technology (BST) in Anambra State Public Schools, *Nigerian Online Journal of Educational Sciences and Technology (NOJEST)*, Vol. 1 No. 1, 66 -76.
6. Apling, M. and Sri Haryani, E. (2019). Analysis of microteaching in improving teaching skills of pre-service physics teachers. *Journal of Innovative Science Education* 8.3:344-348.
7. Babayemi, J.O., Utibe, U.J. & Babalola, G.T. (2018). Teaching Skills in Basic Sciences: Implication for Quality Teacher Education Programmes and Learners' Acquisition of Life Skills for Building a Safer World. *International Journal of Educational Research and Management Technology*, 3 (2), 1-11. TEACHERS'
8. Bandura, Albert (1977). Self-efficacy: Toward a Unifying Theory of Behavioural Change. *Psychological review* 84, 2 (mar 1977), 191-215.
9. Baroudi, S., & Shaya, N. (2022). Exploring predictors of teachers' self-efficacy for online teaching in the Arab world amid COVID-19. *Education and Information Technologies*, 27, 8093-8110.
10. Baterna, H., Mina. T.D.G., & Rogayan, D.V. Jr. (2020). Digital literacy of STEM senior high school students: Basis for enhancement program. *International Journal of Technology in Education (IJTE)*, 3(2), 105-117.
11. ukoye, R.O. (2019). Utilization of Instructional materials as tools for effective academic performance of students: Implication for counselling. *Proceedings for the 2nd Innovative and Creative Education and Teaching International Conference (ICETIC2018)*, Badajoz, Spain, 20-22 June, 2018.
12. Cabrera L, Byrne V, Jass Ketelhut D, Coenraad M, Killen H & Plane J. (2021). Measuring Teacher Self- Efficacy for Integrating Computational Thinking in Science (T-SELECTS), *Educational Innovations and Emerging Technologies, EIET* Vol 1, Issue 1, 3-14.

13. Chukwueneke, B.U., & Aburime, F. (2018). The Effect of Computer Assisted Instruction (CAI) on Students' Academic Achievement in Basic Science: Implication for Socio-Economic Empowerment, *International Journal of Educational Research and Educational Technology*, Vol.3, No.1. casirmediapublishing.com
14. Darling-Hammond L, Hyler M.E and Gardener M. 2017. Effective teacher professional development. Palo Alto. CA: Learning policy institute
15. Darlin-Harmmond, L., Flook, L., Cook-Harvey, C., Barron, B. & Osher, D. (2020). Implications for educational practice of the science learning and development, *Applied Developmental Science*, 24:2, 97-140.
16. Degi, K., & Zhangmu, L. (2017). A study on teaching effectiveness of secondary school teachers of Tawang district, Arunachal Pradesh. *International Education and Research Journal*, Vol. 3, Issue 9.
17. Dilekli, Y. & Tezci, E. (2016). The relationship among teachers' classroom practices for teaching thinking skills, teachers' self-efficacy towards teaching thinking skills and teachers' teaching styles, *Thinking Skills and Creativity*, vol.21, Pg. 144 – 151.
18. Ekpo-Eloma, E. O. and Arikpo, A. and Catherine N. Ebuta. (2013). Integrating video Technology in Micro-Teaching Sessions for Teacher-Trainees' Self-Appraisal and Professional Growth. *Global Journal of Computer Science and Technology Interdisciplinary*, 13, 4, 1.0
19. Frederick Kwaku Sarfo, Patrick Debrah, Francis Amankwah & Francis Owusu Mensah (2022). Development of expertise in science at basic schools: The effect of first principles of instruction with computer animation and chart and their functional effect on gender, *Cogent Education*, 9:1, 2016557.
20. Gambani, A. I., Falode, C. O., & Adegbenro, D. A. (2014). Effectiveness of computer animation and geometrical instructional model on mathematics achievement and retention among JSS students, *European Journal of Science and Mathematics Education*, 2(2), 127–146.
21. Gardner, J., Barclay, M., Kong, Y., & LeVally, C. (2019). Designing an accelerated graduate evaluation course using the first principles of instruction and interactive media. *Journal of Educational Technology Systems*, 1–25.
22. Goodley, C. (2018). Reflecting on being an effective teacher in an age of measurement. *Reflective practices* 19:167-178.
23. Gudek, B. (2020). Computer self-efficacy perceptions of music teacher candidates and their attitudes towards digital technology. *European Journal of Educational Research*, 8(3), 683–696.
24. Hassan, A. M., Akinduro, I. R., Mohammed, K. A. & Ogunmilade, J. O. (2022). Teaching Skills Required by Pre-Service Teachers for Enhancing Teaching and

- Learning of Basic Science and Technology in Bosso Local Government, Niger State, International Journal of Research and Scientific Innovation (IJRSI) | Volume IX, Issue II.
25. Ige, T.A and Ogunseemi, O.E. (2016). Effects of reflective teaching observations on pre-service science teachers' teaching skills and attitude to teaching in southwestern, Nigeria. *ReveuScientifique, Geste et Voix* N° 23, 2.2:442-456.
  26. Ike, G. A. (2017). Historical development and traditional practices of the concept of microteaching and macroteaching and their major advantages, In G. A. Ike. B. B. C. C. Anulobi and M. N. Ukegbu (Eds). *Essential elements of Microteaching theory and practice*. Owerri: Totan Publishers Ltd.
  27. Jacob, A. H. (2018). Flipping with the first principles of instruction: An examination of preservice teachers' technology integration development. *Journal of Digital Learning in Teacher Education*, 34(4), 201-218.
  28. Jumare, A.M. (2020). Impact of Teachers' Quality on Students' Academic Performance in Secondary Schools in North Central Zone, Nigeria, *Africa Scholar Journal of Contemporary Education Research (JCER-8)*, Vol. 18, No. 8.
  29. ass K.D (2014) Computer self-efficacy: Instructor and student perspectives in a university setting. Iowa State University capstones, thesis and Dissertations. Digital repository.
  30. Keiler L. S. (2018). Teachers' roles and identities in student-centered classrooms. *International Journal of STEM education* 5.1:34.
  31. Kelley, T. R., & Knowles, G. (2016). A conceptual framework for integrated STEM education. *International Journal of STEM Education*, 3(11), 1-11.
  32. El Nagdi, M., Leammukda, F. and Roehrig, G. (2018). Developing identities of STEM teachers at emerging STEM schools. *IJ STEM Ed* 5: 36.
  33. Kozcu Cakir, N., Guven, G., & Celik, C. (2021). Integration of mobile augmented reality (MAR) applications into the 5E learning model in Biology teaching. *International Journal of Technology in Education*, 4(1), 93-112.
  34. Kumari, D. (2021). Computer self-efficacy among primary school teachers, *International Journal of Multidisciplinary Educational Research*, vol. 10, 9(5).
  35. Langart, J.L. (2018). Teachers' attitudes towards the use of instructional technologies in Kericho Teacher Training College, Kenya, Munich, Grin, Verlag. [www.grin.com](http://www.grin.com) Unveiling pre-service teachers' attitudes toward teaching: The role of pedagogical practicum. *Profile Issues in Teachers' Professional Development* 18.2:47-61.
  36. Lauer mann, F. (2014). Teacher responsibility from the teachers' perspective, *International Journal Research*, Vol. 65, Pp. 75-89.
  37. Loar, E. A. (2018). Computer self-efficacy revisited. *Journal of Instructional Research*, 7, 55-59.

38. Majo, S. (2016). Factors influencing poor performance in science subjects in secondary schools in Shinyanga Municipality GRIN Verlag. [www.grin.com](http://www.grin.com)
39. Miller, A.D., Ramirez, E.M., & Murdock, T.B. (2017). The influence of teachers' self-efficacy on perceptions: Perceived teacher competence and respect and student effort and achievement, *Teaching and Teacher Education*, Vol. 64, Pg. 260-269.
40. Nolan, A., & Molla, T. (2017) Teacher confidence and professional capital, *Teach. Educ.* 62, 10 – 8.
41. Noonan, J. (2018). An Affinity for Learning: Teacher Identity and Powerful Professional Development. *Journal of Teacher Education*.
42. Ogbeba, J, Enemarie, V., & Ajayi, V.O. (2019). Students' Achievement in Basic Science and Technology as a Predictor of Quality Science Education, *ICSHER JOURNAL*, Vol. 4, No. 2, 178- 187. [www.icshcer.org.ng](http://www.icshcer.org.ng)
43. Onocha, C. O. (2013). Functional Education and Graduate Employability; A Keynote Address of the 15th National Conference of the Association of Educational Researchers and Evaluators, Nigeria (ASSEREN) held at University of Ilorin, Nigeria on July 8-13 201
44. Oviawe, J.I., & Omoh, D. (2021). Technical Teachers' Self-Efficacy and Qualifications as Correlate on Students' Academic Performance in Basic Technology, *Jurnal Pendidikan Teknologi dan Kejuruan*, Vol. 27, No. 2, October 2021, 91-101 ISSN: 0854-4735, accredited by KEMENRISTEKDIKTI, Decree No: 51/E/KPT/2019
45. Paje, Y. M., Rogayan, D. V., & Dantic, M. J. P. (2021). Teachers' utilization of computer-based technology in science instruction. *International Journal of Technology in Education and Science (IJTES)*, 5(3), 427-446.
46. Potvin, P., & Hasni, A. (2014). Interest, motivation and attitude towards science and technology at K-12 levels: A systematic review of 12 years of educational research. *Studies in Science Education*, 50(1), 85-129.
47. Rabi, A.J. 2014. Perception of Junior Secondary School Students on Teachers' Attitude and Competence in Basic Science Teaching in Sokoto State, Nigeria. A Dissertation Submitted to the Postgraduate School, Usman Danfodio University, Sokoto, Nigeria, in partial fulfilment of the requirements for the award of the degree of Master of Education (Science Education).
48. Samuel, O. A., Sani, A. U. and Oluwatosin, A. V. (2021). Assessment of Teaching Effectiveness of Science Ethical Issue Concepts in Basic Science and Technology Curriculum in Junior Secondary School, Gombe State. *Kashere Journal of Education*, 2(2): 250-258.



49. Schindler, L., Burkholder, G., Morad, O., & Marsh, C. (2017). Computer-based technology and engagement: a critical review of the literature. *International Journal of Educational Technology in Higher Education*, 14(1).
50. SkillsYouNeed. (2019). What is interpersonal Skills? (Online) available at [www.skillsyouneed.com](http://www.skillsyouneed.com) accessed July 18, 2019.
51. Snoek, M; and Dengerink, J; De Wit, B. (2019). Reframing Teaching as a Dynamic Multifaceted Profession. A Wider Perspective on Teacher Quality and Teacher Competence Frameworks. *European Journal of Education*.
52. Taber, K. (2017). The role of new educational technology in teaching and learning: A Constructivist perspective on digital learning. In A. Marcus-Quinn & T. Hourigan (eds.), *Handbook on Digital Learning for K-12 Schools* (pp. 397-412).
53. Turel, V. (2014). Teachers' Computer Self-Efficacy and their use of Educational Technology. *Turkish Online Journal of Distance Education*, 15(4),130-149.
54. Ukaigwe, C.P., Adieme, F.G. (2018). Teachers' training needs for sustainable functional secondary education in Imo State, Nigeria. *European Journal of Research and Reflection in Educational Sciences* 6.4:31-42.
55. Weintrop, D., Beheshti, E., Horn, M., Orton, K., Jona, K., Trouille, L., & Wilensky, U. (2016). Defining Computational Thinking for Mathematics and Science Classrooms. *Journal of Science Education and Technology*, 25(1), 127-147.
56. Wu, Y. T., & Anderson, O. R. (2015). Technology-enhanced Stem (science, technology, engineering and mathematics education). *Journal of Computers in Education*, 2 (3), 245-249.
57. Yadav, A., Mayfield, C., Zhou, N., Hambruch, S., & Korb, J.T. (2014). Computational Thinking in Elementary and Secondary Teacher Education. *ACM Transactions on Computing Education*, 14(1), 1-16.
58. Yesilyurt, E., Ulas, A.H., Akan, D. (2016) Teacher self-efficacy, academic self-efficacy, and computer self-efficacy as predictors of attitude toward applying computer-supported education, *Computers in Human Behavior*, Vol. 64, Pg. 591-601,