

Compare Gender Differences in The Use of Technology in Biology Classrooms at Secondary Level in Islamabad

Dr. Rubina Rahat

Assistant Professor Department of Education, MY University, Islamabad.

Email: dr.rubinarahat@gmail.com

Ruqia Bibi

PhD scholar in Al Hamd Islamic University Islamabad.

Email: ruqia10991@gmail.com

Naeem Akhtar

PhD Scholar, MY University, Islamabad.

Email: naeemakht77@gmail.com

Received on: 10-04-2024

Accepted on: 16-05-2024

Abstract

Male students are more at ease utilizing technology for studying than female students, according to past studies. Male are more likely than female to view the employment of technology in schooling favorably. In PAKISTAN, using technology in the classroom is still viewed as a sign of modernity. In the absence of sufficient technological infrastructure assistance from educational institutions, educators devise strategies to integrate communication technology into their teaching methods. The purpose of this study is to investigate how two student groups, one using shared learning devices and the other individual devices, used the emotional domain in biology learning with technology. The research will examine student groupings as well as genders. Based on information gathered from 556 students 280 male and 276 female at five Model colleges for boys and girls in Islamabad, the study uses both quantitative and qualitative methodologies. The results show that attitudes toward the use of technology in biology classrooms vary. The affordances of technologies have an impact on boys' and girls' attitudes, according to quantitative measurements across four attitudinal subscales: biology motivation, attitudes about the use of communication technology in biology, and qualitative data share. Additional information about the views of gender in relation to disparities in attitudes. Using digital technology to teach biology to kids requires appropriate instructional strategies and fair access to technology. This empirical study reveals characteristics of how students use technology to participate in the teaching and learning process, which has significant effects on how students develop and how they might be more creative. The study adds to the body of knowledge in the field of biology education

concerning the application of learning technologies in secondary education in poor nations. Information and communication technology (ICT) is a vital component of daily life and is gaining a lot of attention in education and other fields, but it also reflects individual differences in its usage and required skills. The data analysis procedure will make use of descriptive statistics, such as the T test, mean, standard deviation, and percentage tabulation.

Keywords: Gender differences, Affective factors, Biology learning, Secondary school students, Student confidence, Technology attitude, communication technology

INTRODUCTION

All areas of education are impacted by motivation, which is a crucial component of learning (Kahveci, 2010). Effective learning is the outcome of using appropriate teaching strategies that inspire students.

Numerous research has looked at how students utilize ICT and the relationship between ICT use and academic success. Students' access to and use of digital devices is closely related to the impact of ICT on education. Research revealed that compared to men, women have less access to ICT (Mumporeze & Prieler, 2017). Information and communication technology, or ICT, is the umbrella word covering all plausible methods of processing and exchanging information, including computer technology, mobile devices, multimedia, network hardware, and software. (Anderson, 2008).

ICT applications are widely used in the banking, commercial, political, health, and education sectors, among other areas. However, the way these applications are used differs depending on the nation and area. For instance, the learning environment is made possible by the use of ICT in education. Practical, active, and self-directed learning approaches are available to educators and learners (Qazi, Hardaker, et al., 2021). The most widely used ICT-oriented devices at educational institutions continue to be the focus of much study on the Internet and computer access, use, and skills (Losh & Society, 2003). As a result, the review's research focuses on the usage of skills disparities and covers them from the perspective of education. Studies have indicated that there is a gender disparity in ICT usage and skill development, even though educational institutions use ICT extensively. Many students, especially male students, have a more favorable opinion of ICT and use it to enhance their education (Lee et al., 2019; Tam et al., 2020). Given that ICT and education play such a crucial part in forming our lives, it appears to reflect the focus placed on them. ICT is advancing quickly, yet teachers and students' acceptance and use of its applications varies. Furthermore, a variety of factors, including demographics (age, gender, and education) (Anandhita & Ariansyah, 2018), ethnicity, religion, social class, and economy (Oldeweme et al., 2021; Rahiem, 2020; Wilhelm & Society, 2018), influence this attitude difference.

The learning objectives and attitudes of the students toward ICT access and use are impacted by all of these variations. But gender disparities are important and should be investigated through a comprehensive review (Basavaraja et al., 2017; Gnambs, 2021). Thus, the goal of this research is to comprehend how teachers' and students' use of ICT and related abilities influence each other. Multimedia technology is a broad concept with infinite applications; aside from its use in the statistical and medical fields and in database creation, it is also a significant component of education technology. Furthermore, the industry that uses this

technology the most is the entertainment sector.

Since interaction characterizes the majority of multimedia technology's applications, interaction is the key component. Consequently, combining many technologies into one experiment could be less successful and less impactful than employing multimedia programs. Because multimedia targets the senses of sight and hearing concurrently, the researcher believes that it is one of the greatest educational strategies. A variety of stimuli are presented in multimedia programs' presentations, some of which include (Aloraini, 2005,). A person's unique methods of experiencing, acting, and digesting information in a learning environment are referred to as their learning style.

According to Atkins, Moore, and Hobbs (2001), pupils react to learning situations in diverse ways because their answers are shaped by their surroundings, experiences, and way of thinking. We call this strategy "individual learning style." This study tests the idea that the learning styles of men and women differ in an effort to advance the database. People vary based on their gender. Males and girls learn differently from one another, according to Greb (1999). Compared to women, men tend to be more kinesthetic, tactile, and visual, and they require greater mobility in casual settings.

Because gender is one of the factors that has been discovered to influence learning practices, along with age, academic accomplishment, brain processing, and creative thinking, this study aims to determine the preferred learning styles of males and females. By adjusting education to the needs of each individual student, gender-specific teaching strategies could be developed and put into practice to enhance motivation and learning.

Access to technology

According to research, men are more likely than women to have access to smartphones and laptops, which can be useful in any classroom that incorporates technology. These devices can also be used to improve the teaching and learning process through the use of communication technology (Pew Research Center, 2019). It's possible that women have less access to technology than men, which could limit their use of it outside of the classroom, particularly when studying biology.

Performance and participation

According to research, men may have shown more confidence when it comes to utilizing multimedia on laptops and tablets in the classroom, which can increase student engagement (Margaryan, Littlejohn, & Vojt, 2011). When utilizing digital or communication technology, women tend to be less confident at first, but with the right help and advice, they may get over this obstacle (Sáinz & Meneses, 2012).

Digital proficiency When using sophisticated biology software, particularly SPSS data analysis software, men may have an advantage because they, on average, have a little greater level of digital literacy (Vekiri & Chronaki, 2008). However, female students can contribute to closing this achievement difference. In some instances, male students have shown slightly higher academic achievement in biology classrooms that use communication technology because they have more access to and trust in it (Schunk, 2012). However, the focused use of digital technology by women and biology education in conjunction with this sport can help close the accomplishment gap (Miller, Schweingruber, & Oliver, 2010). Can you play some

that might be less impacted by stereotypical threats and technology-related subjects, like biology's code, than females (Spencer et al., 1999).

can affect how well they do in a technology-integrated biology class, making it essential to create an inclusive environment (Steele & Aronson, 1995). It's crucial to remember that these gender disparities might fluctuate greatly between people and between educational environments. Additionally, initiatives are being made to close these disparities by supporting underrepresented groups in STEM, such as women, with focused support and inclusive teaching approaches.

Studies on gender disparities in higher education are far less common than in classrooms. The majority of research on the subject indicate that post-secondary learning is significantly influenced by gender. In a study conducted in 2004, Koochand examined the attitudes of undergraduate hybrid program participants toward using digital libraries. She discovered that males were far more favourable about using these resources than females.

In her study, male students viewed the world more favorably and had more computer experience. various recent studies claim that at various grade levels, the gender difference has shrunk and, in some circumstances, even reversed. Volman, van Eck, Heemskerk, and Kuiper (2005) conducted surveys and interviews with students in elementary and secondary schools. It is plausible to assume that males still enjoy and feel more comfortable using computers than girls in secondary schools, even if there may not be substantial gender disparities in computer use among today's elementary school children (Colley & Comber, 2003; Vale & Leder, 2004).

The connection between a person's gender and particular computer attitudes and uses in particular situations, such a classroom (Goode, 2010). There is little empirical evidence of gender differences in the computer profiles of a new generation of undergraduate students, with the exception of a British study among undergraduate students (Selwyn, 2007). Given the belief that students' gender may have an impact on their academic performance, this study will examine any relationships that may exist between them. Since gender inequalities in achievement have been studied for a while, a sizable body of literature has been produced. Atovigba et al. (2012); Agbaje & Alake (2014) Lessons that include multimedia, gamification, and interactive components will help students learn more effectively and enjoy it more, which will boost their motivation. (Johnson and others, 2016).

Variables: -

The study involved the following variables.

1. The independent variable: - represented in using digital technology.
2. The dependent variables: - represented in the students' academic achievement.

Objectives: -

1. To assess Gender differences in the use of technology in Biology classrooms at secondary level in Islamabad.
 2. To find out Gender differences the availability of technology in teaching-learning process in I.M.C. Boys and girls.
-

Research Hypothesis: -

H₁ There was a significant Gender differences in the use of technology in the classroom at the secondary level.

Significance of the Study: -

1. The study will provide an opportunity for the better use of technology among model colleges students, boys and girls.
2. It can be used to gain the greatest productivity regarding the standard of an institution and to create a better classroom environment for effective learning.

LITERATURE REVIEW

Education study indicates that if students lack confidence when using technology for learning, they will not be motivated to learn (Keller, 2010).

Many studies have been conducted on the impact of gender disparities in the use of technology for learning (Kahveci, 2010). Researchers have previously discovered that men are more likely than women to use technology for learning, and that men also tend to view this use positively. (Li & Kirkup, 2007; Kadijevich, 2000). Furthermore, girls are less likely than males to utilize computers when equal access is granted to all students because they believed that using technology for learning is primarily a male activity (Hwang, Suk, Fisher, & Vrongistinos, 2009).

Furthermore, Dhindsa and Shahrizal-Emran (2011) discovered that female students strongly believed that both genders should be able to use technology equally. The aforementioned results thus demonstrate that there are gender differences in the use of technology for education. Because computer courses are typically associated with men, ladies are less likely than males to be drawn to them. As a result, females get disinterested in using technology for education (Li & Kirkup, 2007). According to another survey, women were more likely than men to believe that computers are helpful, but they also thought that learning how to use a computer was less fun for women (Kaino, 2008). There are several ways to define learning style.

Davidson (2002) found a correlation between a student's learning style and their academic achievement as well as the learning outcome. A person's "distinctive behaviors which serve as indicators of how they learn from and adapt to their environment" is how Gregorc (1979) defines a learning style. According to Suski's (2002) consensus definition, learning style is simply individual variances in learning approaches based on preferences. Students may interact with teachers and peers for conversations and support, regardless of where they live, thanks to communication tools like email, video conferencing, and messaging apps (Anderson & Dron, 2011).

Online assessment tools let students track their progress and make adjustments by streamlining the grading process and giving them instant feedback. (Lehrman & Chang, 2002).

Research indicates that male students tend to be more engaged and self-assured in technology-related classroom activities, such as using computers and software for biology-related tasks (e.g., data analysis, simulations). Tai and associates (2006). Boys are more likely

to be tech savvy and self-assured than girls, which could explain why they use biology technology-based learning materials more actively. Comber, C., and A. Colley (2003) Girls' willingness to engage in tech-based activities may be impacted if they believe technology has less bearing on their interests or potential professions in science or biology. Wang, M. T., and J. S. Eccles (2012).

Student behavior might be impacted by gender and technology stereotypes. Stereotypes that suggest technology is better suited for boys may be encountered by girls, which may have an impact on their willingness to participate.

Gender-neutral technology use in biology classes can be encouraged or discouraged by the classroom environment, which includes peer and instructor conduct. Cheryan, S., Kim, S., Drury, B. J., Vichayapai, M., & Siy, J. O. (2011). Targeted interventions, like promoting girls' involvement in coding or tech-related groups and offering female role models in STEM professions, have been demonstrated in several studies to help lessen gender differences in technology engagement. Cormier, R., and O. Hankivsky (2009).

Disparities in access to technological resources both within and outside of the classroom can have an impact on gender variations in technology use. In order to address gender inequities, it is imperative to ensure equitable access. M. Warschauer (2006). It's critical to understand that there are large individual variances and that these gender disparities are not deterministic. Additionally, addressing misconceptions, fostering inclusive and supportive learning environments, and giving all students equal opportunity to interact with technology should be the main goals of initiatives to overcome gender discrepancies in biology classroom technology use. Studies conducted over the past 20 years have shown that there is a gender difference in the ways that people utilize computers in various contexts. For instance, prior research in schools revealed that male pupils, in comparison to their female colleagues, had greater access to computers, were more competent using them, and displayed a more positive attitude toward computers. After reviewing the literature on gender differences in computer-based education, Nelson and Watson (1995) came to the conclusion that gender differences in this context were notable in terms of equitable access and academic outcomes. It appears that there was a discrepancy in the amount of time that boys and girls spent on computer activities as early as preschool. Chen (1986) looked at how teenagers' opinions and experiences with computers varied depending on their gender.

Men were more engaged in and more ease with computers than women, the survey found. It also showed that there were disparities in computer usage, with males having greater exposure to them in both official and informal learning settings. Collis (1985) found in a study of numerous secondary school students that boy used computers more outside of the classroom than girls, and that by grade 8, these variations in attitude were noticeable. Research conducted in 1994 by Shashaani on more than 1700 secondary school pupils found a clear correlation between computing attitude and experience. In her study, men viewed the world more favorably and had more computer experience. According to recent studies, the gender gap has shrunk or even reversed at.

They found that there doesn't seem to be much of a gender gap, especially in primary schools. In secondary schools, girls' perceptions of computers are slightly less positive than boys'. There are little to no differences in the opinions of boys and girls regarding computers when they start first grade, according to Christensen, Knezek, and Overall (2005) and Collis et al.

(1996), who carried out a trend analysis of data collected from 10,000 school pupils in grades K–12 over the first five years of this century. By grades 4 and 5, girls' appreciation of computers is more favorable. Compared to males, girls' self-reported computer perception begins to deteriorate around grade six, and by grade eight, it has significantly decreased.

It is reasonable to conclude that, despite the fact that there may not be significant gender differences in computer use among today's primary school students, boys still prefer and are more comfortable using computers than girls in secondary schools (Colley & Comber, 2003; Vale & Leder, 2004).

Studies on gender disparities in higher education are far less common than in classrooms. The majority of research on the subject indicate that post-secondary learning is significantly influenced by gender. In a study conducted in 2004, Koohand examined the attitudes of undergraduate hybrid program participants toward using digital libraries. She discovered that males were far more favorable about using these resources than females. At an open university, Enoch and Soker (2006) investigated how students used web-based instruction. They discovered that both male and female students had been using the Internet more often over time. The disparities between the two gender categories were still notable and substantial, though. The usage of online resources in addition to printed materials was more common among male students. Male college students saw themselves as more computer skilled and experienced greater daily computer participation than female students, according to research by Williams, Ogletree, Woodburn, and Raffeld (1993). Some research, meanwhile, did not find any appreciable gender differences. For instance, Zhang (2005) discovered that college students' openness to distant learning was not significantly influenced by their gender.

According to Davis and Davis (2007), there was no statistically significant variation in the general opinion of computer competency between genders.

Research on how men and women use computers at home and at work has revealed a similar pattern. Previous research found that women generally appear to have less computer expertise and tend to be less proficient computer users (Harrison & Rainer, 1992). Furthermore, it appears that women have higher levels of computer anxiety (Igbaria & Chakrabarti, 1990).

Few studies have examined gender disparities in faculty use of educational technology in higher education, despite the fact that many have looked into potential gender inequalities among adults in the workplace and home, as well as among students in schools and universities. Even Nevertheless, the research that are currently available paint a contradicting image. According to research by Spotts, Bowman, and Mertz (1997), male faculty members had more computer technology expertise and experience. Their answers to the variables impacting the use of educational technology likewise demonstrated this disparity. Female participants in the study gave greater weight to training, time to learn, and simplicity of use than did male participants.

According to Thompson and Lynch (2003), men were far more likely than women faculty members to express confidence in their capacity to plan and carry out online action courses. But Anduwa - Ogiegbaen and Isah (2005) found no appreciable differences in the amount of time faculty members spent using the internet between male and female. Gerlich (2005)

discovered that faculty perceptions of teaching online are mostly unaffected by gender. Male faculty do not use networks more than female professors, according to Parry and Wharton's (1995) research. Gender disparities have been the subject of attempts by scholars to explain them. According to Cockburn and Ormond (1993), technology has historically had a gendered function in western culture. peer evaluation, group projects, cooperative learning, fieldwork, and student-developed activities (Park, 1996). We speculate that men and women will view and approach technology differently as the literature has shown that there are gender disparities in pedagogy. This difference is more subtle and hence more difficult to investigate than gender differences in computer knowledge and skills. There aren't many studies in this field. Research by Campbell and Varnhagen (2002) is one example of an exception. They contend that while women are more likely to favor interactive teaching approaches, technologies that encourage greater engagement and participation networks will likely be more appealing to female educators.

Methodology

In order to collect data for this study, a convenience sample of students completed a questionnaire. Given that gender is not assigned at random to an individual. In order to be sure that variations in other variables aren't hiding or exaggerating a notable disparity in income, it was necessary to determine whether the ownership type of T model schools and colleges for Boys and Girls in Islamabad had an impact on the gender gap. This provided context for the inclusion of school type in the study's necessary stratified analysis. Using the SPSS data statistical package, the independent t-test and descriptive statistics (such as the tabulation of percentages, mean, and variance) will be employed to analyze the data.

Results

TABLE 1: DISTRIBUTION OF RESPONDENTS ACCORDING TO SEX

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	280	50.3	50.4	50.4
	Female	276	49.6	49.6	100.0
	Total	556	99.8	100.0	
		557	100.0		

The gender distribution of the respondents (students) is roughly even, as Table 1 reveals that 50.3% of them are men and the remaining 49.6% are women.

Table 2: Descriptive statistics of the gender-based performances of the entire students

Sex	N	Mean	Std. Deviation	variance	
Score (%)	Male	280	1.5264	.50044	250
Female	276	1.4632	.50022		

The average performance of all male and female respondents (students) is displayed in Table 2. It demonstrated that when compared to female pupils, male students do better. In contrast to the female pupils, the male students do, however, differ somewhat more on average.

Table 3: Distribution of respondents according to age and gender

	N	Mean	Std. Deviation	Std. Error Mean
Age	556	14.5540	.72706	.03083
Gender	556	1.4964	.50044	.02122

The mean performance by age and gender for all male and female respondents (students) is displayed in Table 3. When compared to female pupils, research demonstrated that male students do exceptionally well. On average, nevertheless, the male pupils differ slightly more than the female students.

Table 4 Distribution of respondents according to classes, subjects and institutes

	N	Maximum	Sum	Mean	Std. Deviation	Variance
Class	556	2.00	970.00	1.7446	.43648	.191
Subject	556	3.00	1202.00	2.1619	.83335	.694
Institute	556	6.00	1992.00	3.5827	1.69854	2.885
Valid N (listwise)	556					

The mean performance of classes, subjects, and institutions for all male and female respondents (students) is displayed in Table 4. When compared to female pupils, research demonstrated that male students do exceptionally well. On average, nevertheless, the male pupils differ slightly more than the female students.

Table 5: T-test of the performances of student’s model college for boys and girls

Variable	Df	Mean difference	t-value	Sig. (2-tailed)	Remark
Age	555	14.5536	472.07	0.00	Significant
gender	555	11.9674	70.508	0.00	

The age and gender performance t-test statistics are displayed in Table 6. The data indicates that the 14.5 and 11.96 age and gender higher marks received by students at model colleges are significant; thus, they cannot be attributed to chance alone, as the test's significance value (0.00) is less than 0.05.

DISCUSSION

According to this study, when it came to using student-centered teaching strategies, female teachers employed them more frequently than their male counterparts. Examples of these strategies included asking students to share their ideas with classmates, involving them in small group discussions, and having them give presentations before introducing new concepts. Compared to teaching topic content, they were more likely to view "facilitate student intellectual development" as a higher priority high order teaching aim and "students' active involvement in the course" as a key sign of effective instruction.

The use of student-centered teaching practices, understanding of teaching, teaching

objectives, and criteria for evaluating teaching success were some of the perspectives from which the broad concepts of teaching held by women were examined. Table 3 indicates that while males and girls had similar levels of teaching expertise as shown by their top-ranking statement on the nature of teaching, females had a more student-centered approach. These results suggest that female educators may be more inclined than male educators to support student-centered learning. The results of earlier research on faculty pedagogy (Campbell & Varnhagen, 2002; Park, 1996; Robin & Harris, 1998) corroborate this conclusion.

According to this survey, women reported being less proficient with computers than men in one-third of the computer tools used in instruction. Additionally, they said they were less at ease and experienced with using computers in the classroom. The knowledge, comfort, and familiarity that women had with computers was also evident in how they answered the barrier questions. Unstable hardware or software and a dearth of training opportunities were cited by more women than men as major obstacles to computer use. These results are in line with research by Spotts, Bowman, and Mertz (1997), which found that women felt less confidence than men about their computer-using abilities and expertise.

Nonetheless, our research revealed that a similar proportion of men and women had used computers for instruction, and there were few appreciable variations in the reasons why they had chosen to use them. According to Spotts, Bowman, and Mertz (1997), there is a notable gender disparity in one of the obstacles to technology use: insufficient time. In their study, women perceived time constraints as a bigger obstacle than their male counterparts. According to our research, this discrepancy did not exist at the university under investigation. However, we discovered that three barriers—unreliable hardware or software, a lack of training opportunities, and a paucity of research evidence—showed substantial gender disparities.

Regarding the motivations, "I don't want to fall behind my colleagues who use computers in teaching" was deemed by females to be a strong motivator more often. Put differently, women were more likely than men to cite peer pressure as a major source of motivation for their use of technology. More women than men saw students' attendance in class and their evaluations of the instruction as important factors when determining the effectiveness of a teacher. These results suggest that women may be more susceptible to outside influences on their use of technology in particular and on teaching in general. Research in the field of sociology indicates that women exhibit greater expressiveness and prioritize social activities, whereas men tend to prioritize task-oriented activities. (Wood & Rhodes, 1992).

Our research presents information to support these assertions on the adoption of technology. According to this study, women preferred to pick up technical skills from other people's experiences, whereas men were more inclined to do it themselves. It seems logical that females have been shown to be more susceptible to outside influences from their coworkers while attempting to utilize technology, given the differences in socialization based on gender. According to Campbell and Varnhagen (2002), faculty members who identify as male and female may have differing perspectives on technology. Some claims were made based on a few faculty surveys that were carried out at the same university as this study.

Whereas women typically begin with their educational needs, men typically learn technology first and then think about how to use it in the classroom. Put differently, men are typically

drawn to technology first, whereas women place more value on pedagogy. They propose many models of professional development for men and women based on this attitude. They contend that training that is pedagogically grounded and includes pertinent tools may be preferred by women. Men could favor technology-based training that incorporates instructional strategies. Given that this study indicated that women are more likely to pick up information and skills from others and may be more susceptible to outside influences when using technology,

We propose, in addition to the recommendations of Campbell and Varnhagen, that professional development programs for women should include more encounters and showcases, and that training programs for men should focus more on hands-on learning.

CONCLUSION

In conclusion, this study suggests that male teachers may be more knowledgeable and self-assured when it comes to using computers than female teachers. The general conception of teaching that is student-centered is more common among women. The results of this investigation led to the conclusion that there is no discernible variation in the academic performance and retention of students studying computers. They might prefer to pick up digital skills from others and be more receptive to outside influences from their colleagues when attempting to use computers in the classroom. Consequently, our present response to the question of whether or not men and women approach technology differently is affirmative.

Examining how men and women utilize technology in the classroom, however, is crucial to producing a more thorough and lucid knowledge of gender disparities in technology use. When it comes to gender disparities, guys reported utilizing digital communication more frequently to work through issues, watch videos, and play educational games, while girls said they used it more frequently to check their grades and print documents from school. Because gender disparities in computing are socially manufactured rather than the result of a learner's natural aptitude, the findings indicated that male students are more confident than female students in using digital technology for teaching and learning.

women report less.

Greater than that of males in terms of:

- a) overall computer self-efficacy.
- b) fundamental operational capabilities; and
- c) advanced operational skills.

Less often than males, women will complete a task involving technology. Compared to men, women will choose less frequently to use more sophisticated technology to complete a task. The results of this study demonstrate that, despite having less favorable opinions about computers overall than do male students, female students are not likely to face disadvantages in the classroom because they share the same attitudes about using computers for learning. This study suggests that girls' more realistic attitude toward computer use is advantageous for them in a learning environment.

RECOMMENDATIONS: -

The findings of the research resulted in the following recommendations being made.

- i. Female students should be cautioned to approach every subject in the learning process without feeling inferior to their male counterparts.
- ii. Regardless of gender, parents are urged to use ICT to give their kids the best education they can afford.
- iii. The Federal Government should consciously adopt a strategy to support female students' enrolment in computer science programs and consultation with other scientific initiatives.
- iv. In addition, it is advised that those involved in the education sector apply these results to their work and investigate methods for creating gender-sensitive policies that both support the teaching and learning process and have no influence on gender inequalities.

References

1. Agbaje, Rashidat O, & Alake, Ese M (2014). Students' Variables as Predictor of Secondary School Students' Academic Achievement in Science Subjects. *International Journal of Scientific and Research Publications*, Volume 4, Issue 9, September 2014.
2. Aloraini, Sara Ibrahim, 2005. Distance learning. Alretha Press, Dammam, Kingdom of Saudi Arabia.2017.05.014
3. Anandhita, V. H., & Ariansyah, K. (2018). Gender inequality on the internet access and use in Indonesia: evidence and implications. 2018 International Conference on ICT for Rural Development (IC-ICTRuDev),
4. Anderson, L.W. & Krathwohl, D.R. (Eds.). (2001). A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. Boston, MA: Allyn & Bacon. 2
5. Anderson, R. E. (2008). Implications of the information and knowledge society for education. In *International handbook of information technology in primary and secondary education* (pp. 5-22). Springer.
6. Anduwa-Ogiegbaen, S. E. O., & Isah, S. (2005). Extent of faculty members' use of internet in the university of Benin, Nigera. *Journal of Instructional Psychology*, 32(4), 269-276.
7. Basavaraja, M., Sampath Kumar, B. J. J.o.I. S. T. & Practice. (2017). Gender disparities in the use of ICT:a survey of students in urban schools. 5(4), 39-48.
8. Bowman, M.A. & Mertz, C. (1997). Gender and use of instructional technologies: A study of university faculty. *Higher Education* 34, 421-436 <https://doi.org/10.1023/A:1003035425837>
9. Campbell, K., & Varnhagen, S. (2002). When faculty use instructional technologies: Using Clark's delivery model to understand gender differences. *The Canadian Journal of Higher Education*. XXXII (1), 31-56.
10. Chang and Lehman 2002•Learning foreign language through an interactive multimedia program: An experimental study on the effects of the relevance component of the ARCS model *Research*, 45(2), 155-165.
11. Chen, M. (1986). Gender and computers: The beneficial effects of experience on attitudes. *Journal of Educational Computing Research*, 2, 265-281.
12. Cheryan, S., Siy, J. O., Vichayapai, M., Drury, B. J., & Kim, S. (2011). Do female and male role models who embody STEM stereotypes hinder women's anticipated success in STEM? *Social Psychological and Personality Science*, 2(6), 656-664.
13. Citation. Steele, C. M., & Aronson, J. (1995). Stereotype threat is being at risk of confirming, as self-

- characteristic, a negative stereotype.
14. Colley, A., & Comber, C. (2003). Age and gender differences in computer use and attitudes among secondary school students: What has changed? *Educational Research*, 45(2), 155-165.
 15. Colley, A., & Comber, C. (2003). Age and gender differences in computer use and attitudes among secondary school students: What has changed? *Educational Research*, 45(2), 155-165.
 16. Colley, A., & Comber, C. (2003). Age, gender and the digital divide: An exploration of the social gap in the use of computers. *British Journal of Sociology of Education*, 24(3), 403-418.
 17. Collis, B. A. (1985). Sex differences in secondary school students' attitudes towards computers. *Computing Teacher*, 12(7), 33-36.
 18. Davidson, R.A., Relationship of study approach and exam performance. *Journal of Accountant education*, 20(1),2002, pp29-44.
 19. Davis, J. L., & Davis, H. (2007). Perceptions of career and technology and training and development students regarding basic personal computer knowledge and skills. *College Student Journal*, 41(1), 69-79.
 20. Davis, J. L., & Davis, H. (2007). Perceptions of career and technology and training and development students regarding basic personal computer knowledge and skills. *College Student Journal*, 41(1), 69-79.
 21. Dhindsa, H. S., & Shahrizal-Emran (2011). Using interactive whiteboard technology-
 22. Eccles, J. S., & Wang, M. T. (2012). Part II Commentary: So what is student engagement anyway? Longitudinal changes in mother and adolescent perceptions. *Journal of Research on Adolescence*, 22(1), 26-29.
 23. Enoch, Y., & Soker, Z. (2006). Age, gender, ethnicity and the digital divide: University students' use of web-based instruction. *Open Learning*, 21(2), 99-
 24. Enoch, Y., & Soker, Z. (2006). Age, gender, ethnicity and the digital divide: University students' use of web-based instruction. *Open Learning*, 21(2), 99-
 25. *Gender & Behaviour*, 6(2), 1841 – 1857.
 26. Gerlich, R. N. (2005). Faculty perceptions of distance learning. *Distance Education Report*, 9(17), 8.
 27. Gnambs, T. J. C. I. H. B. (2021). The development of gender differences in information and communication technology (ICT) literacy in middle adolescence. 114, 106533.
 28. Goode, J. (2010). Mind the Gap: The Digital Dimension of College Access. *The Journal of Higher Education*, 81, 583-618.
 29. Greb, F. (1999) *Learning Style Preferences of Fifth through Twelfth Grade Students*. NJ: Prentice Hall
 30. Gregorc, A. (1979). Learning/teaching styles: Potent forces behind them. *Educational Leadership*, 36(4), pp. 234-236.
 31. Hankivsky, O., & Cormier, R. (2009). Intersectionality and public policy: Some lessons from existing models. *Political Research Quarterly*, 62(2), 217-229.
 32. Harrison, A. W., & Rainer, R. K. (1992). The influence of individual differences on skill in end-user computing. *Journal of Management Information Systems*, 9(1), 93-111.
 33. Heemskerk & Kuiper,(2005)New Technologies, New Differences. Gender and Ethnic Differences in Pupils' Use of ICT in Primary and Secondary Education *Computers & Education* 45(1):35-55DOI:10.1016/j.compedu.2004.03.001
 34. Hwang, Y., Suk., Fisher, W., & Vrongistinos, K. (2009). Calibrating a measure of gender differences in motivation for learning technology. *Journal of Instructional Psychology*, 36(3), 259-272.
 35. Igbaria, M., & Chakrabarti, A. (1990). Computer anxiety and attitudes towards microcomputer use. *Behavior and Information Technology*, 9(3), 229-
 36. Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A. & Hall, C. (2016). *NMC Horizon Report: 2016 Higher Education Edition*. Austin, Texas: The New Media Consortium. Retrieved September 24, 2023 from <https://www.learntechlib.org/p/171478/>.
-

-
-
37. Kahveci, M. (2010). Student's perceptions to use technology for learning: Measurement integrity of the Modified Fennema-Sherman Attitudes Scales. *The Turkish Online Journal of Educational Technology* 9(1), 185-201.
 38. Kahveci, M. (2010). Student's perceptions to use technology for learning: Measurement integrity of the Modified Fennema-Sherman Attitudes Scales. *The Turkish Online Journal of Educational Technology* 9(1), 185-201.
 39. Kaino, L. M. (2008). Usefulness and enjoyment of using computers in learning. *A gender dimension*.
 40. Keller, J. M. (2010). *Motivational design for learning and performance*. New York: Springer
 41. Koohang, A. (2004). Students' perceptions toward the use of the digital library in weekly web-based distance learning assignments portion of a hybrid program. *British Journal of Educational Technology*, 35(5), 617-626.
 42. Koohang, A. (2004). Students' perceptions toward the use of the digital library in weekly web-based distance learning assignments portion of a hybrid program. *British Journal of Educational Technology*, 35(5), 617-626.
 43. Lee, C. C., Czaja, S. J., Moxley, J. H., Sharit, J., Boot, W. R., Charness, N., & Rogers, W. A. (2019). Attitudes toward computers across adulthood from 1994 to 2013. *The Gerontologist*, 59(1), 22-33.
 44. Lee, C. C., Czaja, S. J., Moxley, J. H., Sharit, J., Boot, W. R., Charness, N., & Rogers, W. A. (2019). Attitudes toward computers across adulthood from 1994 to 2013. *The Gerontologist*, 59(1), 22-33.
 45. Li, N., & Kirkup, G. (2007). Gender and cultural differences in internet use: A study of China and the UK. *Computers & Education*, 48(2), 301.
 46. Losh, S. C. J. I., & Society. (2003). Gender and educational digital chasms in computer and internet access and use over time: 1983-2000. 1(4), 73-86.
 47. Losh, S. C. J. I., & Society. (2003). Gender and educational digital chasms in computer and internet access and use over time: 1983-2000. 1(4), 73-86.
 48. Moore and Hobbs (2001) *Journal of Culture, Society and Development* www.iiste.org ISSN 2422-8400 An International Peer-reviewed Journal Vol.8, 2015
 49. Mumporeze, N., & Prieler, M. (2017). Gender digital divide in Rwanda: A qualitative analysis of socio-economic factors. *Telematics and Informatics*, 34(7), 1285-1293. <https://doi.org/10.1016/j.tele>.
 50. Nelson, C. S., & Watson, J. A. (1995, Fall). The computer gender gap: Children's attitudes, performance, and socialization. *Montessori LIFE*, 33-35.
 51. Park, S. M. (1996). Research, teaching, and service: Why shouldn't women's work count? *The Journal of Higher Education*, 67(1), 46-84.
 52. Parry, L. E., & Wharton, R. R. (1995). Electronic networking comes to the university: Factors that influence adoption among faculty. *Journal of*
 53. Qazi, A., Fayaz, H., Wadi, A., Raj, R. G., Rahim, N., & Khan, W. A. J. O. C. P (2015). The artificial neural network for solar radiation prediction and designing solar systems: a systematic literature review. 104, 1-12.
 54. Schunk, D. H. (2012). *Learning Theories, an Educational Perspective* (6th ed.). Boston, MA: Pearson Education Inc.
 55. Selwyn, N. (2007). Hi-tech = Guy-tech? An Exploration of Undergraduate Students' Gendered Perceptions of Information and Communication Technologies. *Sex Roles*, 56, 525-536.
 56. Shashaani, L. (1994). Gender differences in computer experience and its influence on computer attitudes. *Journal of Educational Computing Research*, 11, 347-367.
 57. Spencer, S. J., Steele, C. M., & Quinn, D. M. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social*
 58. Suski, L. (2002) student learningstyles: Frequently asked questions.
-
-

Retrieved

<http://www.oneonta.edu/academics/Assessment/SLA/SLA%20Appendix%207%20and%20Ref.pdf> p14, 133 Hlawaty, H. (2008). Lernen and learning styles a comparative analysis of learning styles of German adolescents by age, gender and academic achievement level. *European Education*, 40(4), 23-45.

59. Tai, R. H., Liu, C. Q., Maltese, A. V., & Fan, X. (2006). Planning early for careers in science. *Science*, 312(5777), 1143-1144.
 60. Tam, H.-L., Chan, A. Y.-F., & Lai, O. L.-H. (2020). Gender stereotyping and STEM education: Girls' empowerment through effective ICT training in Hong Kong. *Children and Youth Services Review*, 119, 105624. <https://doi.org/10.1016/j.childyouth.2020.105624>
 61. Thompson and Lynch (2003) Richard Thompson, Respondent, v. Steven t. Lynch Appellant, and does 1 through 30, Defendants. 76653-8-1
 62. Vale, C. M., & Leder, G. C. (2004). Student views of computer-based mathematics in the middle years: Does gender make a difference? *Educational Studies in Mathematics*, 56, 287-312.
 63. Vekiri, I., & Chronaki, A. (2008). Gender issues in technology use: Perceived social support, computer self-efficacy and value beliefs, and computer use beyond school. *Computers & Education*, 51(3), 1392-1404. <https://doi.org/10.1016/j.compedu.2008.01.003>
 64. Volman, M., van Eck, E., Heemskerk, I., & Kuiper, E. (2005). New technologies, new differences: Gender and ethnic difference in pupils' use of ICT in primary and secondary education. *Computers & Education*, 45(1), 35-55.
 65. Warschauer, M. (2006). *Laptops and literacy: Learning in the wireless classroom*. Teachers College Press.
 66. Wood, W., & Rhodes, N. D. (1992). Sex differences in interaction style in task groups. In C. Ridgeway (Ed.), *Gender, interaction, and inequality* (pp. 97- 121). NY: Springer-Verlag.
 67. Zhang, Y. (2005). Distance learning receptivity: Are they ready yet? *Quarterly Review of Distance Education*. 6(1), 45-55.
-