

A Gender Wise comparison of 21st Century Skills of Secondary School Learners

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Abstract

Advancement in technology is a high demand of 21st century. This study focused at how well high school students understand important skills they need to learn for the modern world. The skills include thinking critically, using technology, and basic reading, writing, and arithmetic i.e., 3Rs skills and to compare these skills on the basis of gender. A sample of 200 male students and female students was used in this study. A survey was conducted on a random sample of 200 using three scales for the measurement of their perceiving level of critical thinking, digital literacy, and test scores of 3Rs skills. Stratified random sampling was utilized. The data was analysed using t-test at 0.05 significance level. Analysis found that secondary school students perceive 21st century skills equally regardless of gender. It is concluded that females' perceived level of critical thinking was higher, whereas both males and females were approximately equal on digital literacy skills and 3Rs skills. Consequently, the findings revealed that critical thinking skill as the noteworthy determinant of the 21st century abilities and digital literacy ability. Whereas 3Rs abilities as non-significant determinant of the 21st century abilities between male and female students at secondary school level.

Keywords: Gender, 21st Century Skills, Critical Thinking Skills

Introduction

In the 21st century, the world has appeared as a global village due to advancement and rapid technological changes, ultimately man's existence would depend on progressive education. Therefore, students must have proficiency in 21st century skills to understand information about the scientific world or knowledge given in their books to succeed by utilizing them. Due to advancement in technology and information, students need to produce new information instead of using the previous information. Therefore, progress can be attained by equipping students with essential abilities and competencies, called 21st century skills (Partnership for twenty-first century skills, 2009).

Manan and Mehmood (2015) illustrated that 21st century skill is students' ability to question, evaluate information, and analyse information. Critical thinkers always state a fact through precise evaluation of any received information. Other qualities of critical thinkers are using abstracts ideas, open-mindedness, and good communication. Contrarily, passive thinkers are uncritical thinkers; always answer as yes or no to any question. Features of uncritical thinkers are narrow-mindedness and egocentric. Therefore, Critical thinking is reasoning thinking, or it is a type of deductive thinking, and uncritical thinking is common-sensical thinking and is a type of inductive thinking.

Mishra & Kereluik (2011) argued that technologies are not weakened or strengthen students' learning by their usage, but technologies provide students with an opportunity zone. Roslaniec (2018) suggested that for students' positive involvement in class and motivation to learn effectively, use of technology should be essential in our classes. Suto (2013) identified that due to tech-fluency, life has become more interlinked globally. Therefore, significant advancement has occurred in ICT and access to it. Royal (2012) featured that development of 21st century skills positively associated with educational technologies. Gülen (2013) explored the importance of digital literacy in secondary education and found that secondary school students possess a satisfactory level of 21st century skills.

Students' daily use of computer has increased their ability to access and analyze data and academic subject knowledge (Sumen & Çalisici, 2017).

As the policy decisions are taken at national level and the provinces are responsible for the implementation of the policy. Policy development and policy implementation are two different things.

Policy implementation is much more challenging and suffers with gaps due to the several factors responsible for the failure of its implementation in education (Ahmed et al., 2012).

The education system must be embedded with essential 21st-century skills to equip students with the capabilities they require to cope with the challenges of the modern era. Unfortunately, due to gaps in the implementation of education policy, students at secondary school level lack the 21st century skills that ultimately affect their academic performance and practical life after college and university. Therefore, taking in account the current situation of Pakistan's education system and rapidly changing globe, the development of the essential 21st century skills are needed for 21st century generation. Pakistan's education system should teach the 21st century skills from secondary level to help students to become consumers of knowledge rather than becoming knowledge recorders.

It is observed that there is contradiction among the life of current students and their developed life pattern in existing educational system. It shows lack of concerns toward proficiency in 3Rs. During the Covid-19 pandemic, the worst hit group in learning loss is secondary school students' group. Only some private schools arrange online classes for students. But mostly students spent time on smart phones rather than paying attention to their studies. On the other hand, government school students were compelled to stay at home without any online classes for almost two years. This result in, students' less attention toward studies in post-Covid classes. Students' proficiency in 3Rs does not match the grade level. School management along with teachers' hard work and parental involvement are required to bridge this gap in implementation of 3Rs well in core subject knowledge along with CTS and DLS to provide them with strong foundation of education.

Statement of Problem

The current study aims to investigate the procurement of 21st-century skills in secondary school male and female students and assess their perception about three crucial domains: critical thinking, digital literacy and 3Rs, additionally, the purpose of the present study to conduct an analysis of the gender differences regarding critical thinking skills, digital literacy and 3Rs skills among the secondary level students.

Objective

The accomplishment of the following objective was the main purpose of designing the present study.

- Evaluation of the overall perception of 21st century skills, namely critical thinking skill, digital literacy skill, and test scores of 3Rs skills among male and female secondary school students.

Hypotheses of Study

In this study, following hypotheses were tested:

- ¹H₀ There exists no significant difference between the critical thinking abilities of male and female students in secondary schools.
- ²H₀ There exists no significant difference between the digital literacy abilities of male and female students in secondary schools.
- ³H₀ There exists no significant difference between the 3Rs abilities of male and female students in secondary schools.
- ⁴H₀ There exists no significant difference in the overall perception of 21st-century skills between male and female students in secondary schools.

Review of literature

Critical thinking skill is conceptualized as an essential skill of understanding possessed by someone. Researchers have different views in defining critical thinking skill: whether critical thinking skill is simply a general transferable ability to solve problems or a domain-specific ability to construct new and innovative knowledge. Creshaw, Hale, and Harper (2011) argued that the main hindrance in developing research related to critical thinking skills is the non-existence of any standard definition for critical thinking skills. However, some scholars emphasized that more integrity can be promoted by launching a standard definition of critical thinking skills. There is also a chance that inquiring critical thinking skills can be limited (Moore, 2013).

Digital literacy skills are one of the third category of twenty-first century skills, i.e., Information and computer technology skill. Over the past decades, Digital technologies are becoming more and more crucial in everyday life (Bakker, Bekker, Douma, Poel, & Scheltenaar, 2015). The intensively growing digital culture has driven school education towards digital resources

to seek information and better communication (Kong, 2014). Digital media provides students the platform to express their ideas in a well-organized manner (Chan, Churchill, & Chiu, 2017).

Karpati (2011) identified significant digital literacy skills' domains, i.e., digital content management, including identifying, acquiring, organizing, storing, developing information, computer supportive, and web-based learning environment. The use of technology to obtain, control, estimate and transmit information is an essential digital literacy skill (Hatlevik & Christophersen, 2013). Digital literacy skill comprises access to digital devices, digital technology, and attitudes towards digital technology used for the survey measuring perceived level of digital literacy skills (Bollard, Kerry, Whitney, & Fidock, 2014).

Reynolds (2016) highlighted the conceptual model of digital literacy based on social constructivism that comprises of six domains: creating, managing, publishing, socializing, researching, and surfing. Josie et al. (2018) investigated that the digital literacy skill consists of five major domains:

1. Information literacy

Information literacy is the set of skills comprised of creating, searching, retrieving, manipulating, evaluating, and synthesizing.

2. Computer literacy

Computer literacy is the set of skills comprises of operating multiple digital tools, either hardware or software.

3. Media literacy

Media literacy is the set of skills comprised of interaction with different media, including social media.

4. Communication literacy

Communication literacy is the set of skills comprised of communication in different mediums such as traditional and innovative.

5. Technology literacy

Technology literacy is the set of skills comprised of adopting different technologies in life.

National Education Policy (2017) defined that literacy is merely acquiring 3Rs skills, i.e., reading, writing, and making simple calculations. 3Rs skills are the survival skills essential for communication and earning a livelihood and are considered as the first step in seeking knowledge.

3Rs importance in the 21st century is well explained by Kivunja (2015) that 21st-century skills should be appropriately identified in students and implemented effectively with strong knowledge of academic subjects, determined by redesigning 3Rs stage life the 21st century. For extraordinary achievement, the transformation of education is needed in instructional methods that build instructing, studying, evaluation and assessment plans of the 21st century and redesigning 3R's for fundamental training, specifically reading, writing and arithmetic in related subjects.

Methodology

This study was conducted through a method called descriptive research design. The researchers used a quantitative approach for the measurement of level of perception of twenty-first century skills because it worked best. The researcher applied stratified random sampling to collect the sample. The overview approach was utilized for this investigation because it was for all intents and purposes attainable for the analyst. Three Scales were utilized to gather information from secondary students of Islamabad. Quantitative investigation techniques were used to analyze collected information.

Ten educational institutions were chosen by utilizing the technique of random sampling from the male and female student populations within the Federal Area. The educational institutions imparting secondary education are located in Islamabad. Thus, to take the sample of 200 students for data collection, a stratified random sampling technique was used.

In total 151 Federal Government secondary schools of boys and girls in Islamabad were stratified through a random sampling technique. Scales were used to test the perceiving level of critical thinking skill, digital literacy skill, and scores of 3Rs were distributed in person, and respondents had filled out themselves.

Three kinds of instruments were used for this study. Three scales were used for the measurement of perceived level of critical thinking skill, digital literacy skill, and 3Rs skills.

Data analysis

For the data analysis, inferential statistics were used. T-test were used to compare the 21st century skills between male and female secondary school students.

Table 1.

Participants' Demographics (N = 200)

Variables	Frequency	%
Gender	N	N
Males	100	50
Females	100	50

Table 1 presents a comprehensive view of the demographic data. The present study employs a representative sample of the target population, comprising 200 students from secondary schools, with attention given to gender stratification.

Table 2.

Overall Gender-wise Comparison of Students' Perceived level of CTS, DLS & 3RsS (N = 200)

Variables	Female Students (n= 100)		Male Students (n= 100)		t(198)	P
	Mean	Standard Deviation	Mean	Standard Deviation		
CTS	3.5945	.23736	3.3612	.17206	7.959	.000
DLS	3.3517	.17737	3.3043	.38569	1.117	.265
3RsS	21.09	3.806	20.99	3.287	.099	.921

Note: CTS = Critical thinking skill; DLS = Digital literacy skill; 3RsS= Reading, writing & arithmetic skills

Table 2 demonstrates the gender wise differences in overall mean scores of critical thinking skill, digital literacy skill, and 3Rs skill. The mean difference is found to be significant on critical thinking skill, whereas, non-significant at digital literacy skill and 3Rs skill. It implies that females were higher on critical thinking, whereas both males and females were approximately equal on digital literacy and on core subjects.

Table 3.

Gender wise comparison of Perceived level of CTS

Groups	N	M	t	p
Female Secondary School students	100	3.5945	7.959	.000
Male Secondary School students	100	3.3612		

*df=198

The results presented in Table 3 indicate that the t value was 7.959, indicating a statistically significant difference between the male and female student groups. However, it was observed that the p value of both female and male students (0.000), was greater than the commonly accepted significance level of 0.05. The null hypothesis was negated, and the alternative hypothesis was endorsed at a level of significance of 0.05. The findings of the study indicate a statistically significant difference in the critical thinking abilities between male and female students enrolled in secondary education.

The findings of the study suggest that the average score of female respondents (M = 3.5945) was significantly higher than that of male respondents (M = 3.3612). The results indicate that female students possess a more favourable perception of critical thinking aptitude compared to their male students.

Table 4.

Gender wise comparison of perceived level of DLS

Groups	n	M	t	p
Female Secondary school students	100	3.3517	1.117	.265
Male Secondary school students	100	3.3043		

According to Table 4, the t-value was observed to be 1.117. Furthermore, it was demonstrated that the p-values for both male and female students, which amounted to 0.265, exceeded the critical threshold of 0.05. The null hypothesis was accepted at a significance level of 0.05, while the alternate hypothesis was rejected. Based on the results of the experiment, it was determined that there was no notable distinction in the digital literacy abilities of male and female Secondary school students in secondary schools. The average response score of female secondary school students (3.3517) was

found to be nearly identical to that of male students (3.3043). The data demonstrates that there exists a nearly equitable level of perceived digital literacy skill among female and male student populations. Table 5.

Gender wise comparison of Perceived level of 3Rs

Groups	n	M	t	p
Female Secondary school Students	100	21.09	.099	.921
Male Secondary school Students	100	20.99		

Table 5 presents that the calculated t value was found to be 0.099, while the obtained p value for female and male students was observed to exceed the critical value of 0.05. Thus, at a 0.05 level of significance, the null hypothesis was deemed to have been supported, while the alternate hypothesis was deemed to have been rejected. Based on the results of the conducted tests, it can be inferred that there was no noteworthy variance detected between the proficiency levels of male and female students in the context of the 3Rs skill within the secondary school setting. The average rating provided by female students (21.09) was found to be nearly equivalent to that of male students (20.99). This finding suggests that there is little discernible difference in academic performance between female and male students when it comes to proficiency in the essential skills of reading, writing, and arithmetic.

Table 6

Gender wise comparison of perceived level of 21st Century Skills

	n	M	t	p
CTS Female	100	3.5945	7.959	.000
CTS Male	100	3.3612		
DLS Female	100	3.3517	1.117	.265
DLS Male	100	3.3043		
3RsS Female	100	21.09	.099	.921
3RsS Male	100	20.99		

Note. CTS = Critical thinking skill; DLS = Digital literacy skill; 3RsS= Reading, writing & arithmetic skills

As presented in Table 6, the computed t-values for CTS, DLS, and 3RsS were 7.959, 1.117, and 0.099, respectively. The p-value for CTS (0.000) suggests significant differences in students' perceived level of critical thinking skills in relation to 21st century skills. In contrast, the p-value for DLS (0.265) indicates insignificant differences in students' perceived level of digital literacy skills, while a p-value of 0.921 for 3RsS also suggests insignificant performance in 21st century skills among male and female students at the secondary school level. It is evident from the analysis that there is significant difference regarding critical thinking skills as these are crucial determinant of 21st century skills, while skills relating to digital literacy and basic reading, writing, and arithmetic (3Rs) are not found at significant level. Consequently, it may be inferred that the overall perceived level of 21st century skill sets among male and female students at the secondary education level does not exhibit a substantial variance.

Discussion

The present study aimed to investigate the degree of 21st-century competencies, namely critical thinking, digital literacy, and 3Rs skills, as perceived by male and female students enrolled in secondary school. Furthermore, the influence of demographic variables, particularly those related to gender distinctions, were subject to evaluation. The research outcomes expose noteworthy distinctions in critical thinking abilities amidst male and female students, while registering no remarkable disparities in digital literacy competence and basic 3Rs proficiencies. Previous scholarly investigations have demonstrated that females exhibit superior critical thinking abilities in comparison to males.

No significant difference was found in the overall perception of 21st-century skills among male and female students in secondary schools. Hence the hypothesis stands approved. In developing and accessing a wide range of skills linked with 21st century skills, teachers require assistance from comprehensive curriculum and fundamental educational programs specifically based on integration of essential skills in education system. Not only teachers, but students are also provided with regular opportunities for the practice of 21st century skills within the school environment. For effective collaboration and development of critical thinking, along with progressive education and curriculum's target practice, progress in perceiving interpersonal and proficient skills need to be monitored over

time in an efficient way. Proper guidelines delivered to instructors regarding assessment of students in terms of relationship administration, where they empower cooperation from each other, as well as skills in communication where they effectively communicate to their group individuals (Fiore, 2019).

The present investigation asserts that there exists no noteworthy distinction in the critical thinking skill between male and female pupils within the secondary education tier. The statistical analysis utilizing the t-test revealed that there exists a significant relationship between gender and critical thinking ability among students. The mean scores described that females are higher on critical thinking than males. Previous literature and empirical support also revealed significant differences in critical thinking; mostly females are higher on critical thinking, like problem-solving, open-mindedness, and maturity (Shubina & Kulakli, 2019).

The current study stated no significant difference in secondary school digital literacy skills of students concerning their gender. The analysis showed that digital literacy had non-significant results concerning gender. It means that no significant difference is presently based on gender, i.e., males and females have almost same perceived level of digital literacy skill.

Moreover, males and female have same perceived level of digital literacy skill. In the 21st century, a computerized era, where, smart phones and laptops are commonly used at homes, providing equal opportunities to female to use these digital gadgets. From the start of 2020, after COVID-19, online studies played an important role in enhancement of digital literacy skills among females. Otherwise, in past, circumstances were totally contradictory; males were considered more efficient in technological skills and spend most of the time with their smart gadgets (computers, smart phones, tabs). The literature provides empirical support that research over the previous decade had uncovered the predominance of males to use and possess PC (Gunn, 2003). Indeed, even in circumstances where they are given equivalent access, females are more reluctant to utilize PCs than males (Gebhardt, Thomson, Ainley & Hillman, 2019).

The results indicated that there exists an insignificant association between digital literacy proficiency and 3Rs skills. However, there is a highly significant relationship with critical thinking ability. The present study has determined that the perceived level of 21st-century skills is lacking statistical significance, primarily because two domains of 21st century skill, namely digital literacy skills and 3Rs skills, are found to be non-significant.

Conclusion

The present study sought to examine the perceived competence of students in the essential skills of the 21st century across three distinct domains, namely, critical thinking, digital literacy, and the traditional 3Rs skills. Multiple statistical analyses, including descriptive statistics, reliability analysis that indicated almost all instruments have good psychometric properties and all are appropriate to administer in the main study. The findings revealed that there exists no significant relationship among male and female students' digital literacy skill and 3Rs skills but significant results with critical thinking skills.

Recommendations

The current study has certain restraints that must be seen cautiously in the upcoming studies. Data collection through a single source is also one of the limitations of this study. It is suggested that in future research, both self-report measures and observer-report measures should be used to overcome this limitation.

With all these limitations, the study is still worthwhile to understand the relation of perceived skills of 21st century.

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