



## ROLE OF DIGITAL TECHNOLOGY IN ENHANCING COLLABORATION AMONG STUDENTS AND TEACHERS AT THE SECONDARY SCHOOL LEVEL

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### **Abstract**

*This study was conducted to investigate the role of digital technology for enhancing collaboration among students and teachers at secondary school level. The objective of the study was: (1) To examine the role of digital technology in collaboration among students and teachers at the secondary school level. The study employed the quantitative research design. The population consisted of all 12618 female teachers working in government girls' secondary schools in Khyber Pakhtunkhwa, especially in the districts of Peshawar, Mardan, and Nowshera. Cluster sampling approach was utilized to draw sample of 350 female teachers working in the mentioned district of Khyber Pakhtunkhwa. Study was delimited to urban areas. A questionnaire comprising of five-point likert scale was developed for collection of data. The questionnaire was validated and its reliability was ensured. Chi-square tests were used for analysis of the collected data at a significance level of 0.05. The analysis of the data revealed that the integration of the digital technology into education plays a vital role in enhancing collaboration among students and teachers. Based on this positive data, it is recommended that digital technology may be incorporated into education to create a more dynamic learning environment.*

**Key words:** *Digital technology, collaboration, secondary level.*

### **Introduction**

In contemporary society, people find it difficult to imagine conducting activities without technological assistance, as it enhances various societal aspects, particularly education. When digital technology is integrated into educational settings, it can revolutionize conventional teaching and learning approaches, creating new opportunities for student-teacher collaboration (Khan et al., 2017).

Digital technology prefers and encompasses various tools and platforms, including online communication systems, collaborative software, learning management platforms, and mobile apps. These technologies offer educators and students with fresh, innovative approaches to interact, exchange information, and work together on projects regardless of physical distance. When educational institutions integrate these digital tools, they can establish interactive, social,



and engaging learning environments that promote cooperation and clear communication (Kudratilloev & Akhmedov, 2021).

Digital technology developments have revolutionized education by altering how students learn, communicate, and work together. In secondary education, where students build fundamental academic and life competencies, successful teacher-student collaboration is essential for promoting engagement, creativity, and critical thinking abilities. Rather than relying solely on traditional face-to-face, text-centered instruction, digital tools render more comprehensive and interactive learning experiences, improving the entire educational process (Akbar, 2016).

Digital technology serves a crucial function in strengthening collaboration between students and teachers in secondary schools. Using communication applications and shared platforms, it enables immediate interaction, collaborative assignments, and purposeful engagement, resulting in better academic performance (Penprase, 2018).

Collaboration, where students work collectively and exchange ideas, can substantially improve learning results. Through the various platforms that digital technology provides, students can efficiently tackle problems, demonstrate creativity, and explore different perspectives on topics. They can readily connect with peers and share thoughts and viewpoints on subjects without being limited by location. This makes learning and education more effective and engaging. Digital platforms and tools support students by offering extensive resources that encourage deeper learning (Zheng, Zhang & Gyasi, 2019).

### **Problem Statement**

In today's educational landscape, conducting classroom activities without incorporating digital tools presents significant challenges. Digital platforms enable learners to work together effectively, transcending geographical barriers and allowing collaborative project work, resource sharing, and peer feedback regardless of physical location. Modern technology has enhanced students' social connectivity more than previous generations has experienced. Given the growing relevance of digital innovations, educators actively encourage learners to leverage contemporary technological solutions for addressing academic challenges. This represents a fundamental shift in educational approaches, as traditional instruction relied exclusively on direct, in-person teacher-student interactions (Kudratilloev & Akhmedov, 2021).

Digital innovation has become fundamental to educational systems worldwide. Nevertheless, the technological capabilities of government schools are frequently overlooked, with many assuming that these institutions cannot adequately support technology-enhanced learning environments. This perception doesn't fully reflect reality. Government schools have successfully integrated computer literacy into their academic programs and developed supporting infrastructure including dedicated computer facilities, digital Learning Management Systems, and comprehensive electronic monitoring protocols for standardized assessments. These developments demonstrate that government educational institutions are actively implementing technological solutions in their educational practices.

Extensive research has examined how digital technology enhances collaboration and interaction between educators and learners at universities, both within national boundaries and across international contexts. However, there's a notable gap in understanding these dynamics at the secondary education level, particularly within government-funded institutions. This research

addresses that gap by examining how digital tools facilitate interaction and cooperation between teachers and students in government level secondary schools. As educational institutions continue to adopt digital platforms and resources, understanding their influence on teaching-learning relationships becomes increasingly important, especially in public secondary education settings.

### **Objective**

The Objective of this study was

- (1) To examine the role of digital technology in collaboration among students and teachers at the secondary school level.

### **Hypothesis**

The following null hypothesis was tested to get the objective of the study.

**H<sub>01</sub>:** There is no significant role of digital technology in collaboration among students and teachers at the secondary school level.

### **Significance of the study**

The results of this research work will be very helpful as it will stress on the importance of digital technology and its need in enhancing the collaboration between students and teachers. By using digital technology, educators can better teach and facilitate their students. This shows the importance of better innovative teaching and learning methods which will improve student's participation and show better academic outcomes. This study will elaborate the role of better communication in building a strong student teacher relationship. Along with this, it will elaborate how digital technology can provide better collaboration channels and a more personalized learning and supportive environment.

### **Literature Review**

#### **Theoretical Framework of the Study**

The theoretical framework helps in shaping the research questions, providing methodology and understanding the findings of the research work. It provides guidance in a structured way and empirical support all along the research process (Yüksel & Yıldırım, 2015).

#### **Constructivist and Social Constructivist Learning Theory**

Constructivist learning theory, as proposed by Lev Vygotsky , elaborates the process of active learning through social interaction. This research work goes in accordance with social constructivism, as using digital technology allows the students to collaborate, communicate and build up knowledge by working together as a productive group. Different digital tools like WhatsApp and Google platforms allow the students to work together beyond the boundaries of classroom and improve peer interaction (Kantar, 2014; Midtlund, Instefjord & Lazareva, 2021).

#### **Social Learning Theory**

Social Learning Theory, developed by Bandura, elaborates that individuals can better learn through observation, collaboration, and interaction with others. Through this study it can be evaluated that digital technology provides platforms—such as messaging apps, collaborative tools, and effective online discussion forums—that allow the students to observe peers' contributions, collaborate with teachers, and engage in group learning. These tools allow doing collaborative activities like group discussions and peer feedback, enhancing both academic development and social interaction. Students can enhance their collaboration and critical thinking



skills by working with each other which is in accordance with principles of social learning. (Kattari, 2015; Smallhorn, 2017; Jong, 2017).

### **Engagement Theory**

Engagement theory, developed by Kearsley and Shneiderman (1998), elaborates the idea that active involvement of students in learning process can be done through better peer interaction and collaborative tasks. This study is in accordance with the theory, as different platforms provided by the digital technology such as virtual classrooms and online forums allow the students to collaborate beyond the boundaries of classroom. As noted by Pange, Lekka, and Toki (2010), technology is one of the most effective ways to involve students in collaborative learning.

### **Collaboration and Networked Learning Theory**

Collaboration refers to the process in which individuals work together to achieve a common goal by gathering their ideas and efforts. This process can be made more effective in different educational settings by allowing students and teachers to work together from far off distances and allow the students to engage in collective tasks and share their resources with each other. Through virtual teamwork, students can develop critical thinking, communication, and problem-solving skills by working together and resulting in better academic outcomes (Gordon, 2019).

This study aligns with the concept of collaboration through Networked Learning Theory, developed by David D. Boud and Judy Harris. The theory elaborates the ways in which digital technologies can allow better learning by allowing the students to connect with each other. Different digital platforms such as online forums, collaborative documents, and social networks provide opportunities for students to interact with each other and share knowledge with each other. As Goodyear et al. (2021) highlight, the introduction of networked learning shows the increasing role of connecting the students through digital technology in order to allow collaborative educational experiences.

### **Research Methodology**

#### **Research Design**

The present study employed quantitative research method using the survey research design with descriptive approach to examine the role of digital technology in collaboration among students and teachers at the secondary school level.

#### **Population of the Study**

The population of the study consisted of all government girls' secondary school teachers in Khyber Pakhtunkhwa, which comprises 28 districts with a total of 12,618 female teachers (Annual School Census Report 2021-2022). Data was collected from the female teachers working in three districts of Khyber Pakhtunkhwa, namely Peshawar, Mardan, and Nowshera. The total number of teacher working in these districts was 2,821, which constituted the accessible population for the study.

#### **Sample and Sampling Technique**

A Cluster sampling approach was used to draw the sample from the study population. A sample comprising 350 female teachers working in secondary-level girls' schools in three districts of Khyber Pakhtunkhwa—Peshawar, Mardan, and Nowshera—were selected by using Yamane's sample formula.

### Data Collection Tools

A five-point Likert scale questionnaire was developed as a data collection tool for this study. It included a series of statements intended to examine the role of digital technology in enhancing collaboration among students and teachers at the secondary school level.

### Data analysis technique

Inferential statistics were used for analyses of the data. Chi-square tests and percentage analysis were employed to examine the impact of digital technology on collaboration among students and teachers at secondary school level. The chi-square test was used to know whether there exists statistically significant relationship between the categorical variables such as students' interaction and collaboration levels and various digital tools

**H<sub>01</sub>** There is no significant role of digital technology in collaboration among students and teachers at the secondary school level.

In order to test the null hypothesis H<sub>01</sub>: “There is no significant role of digital technology in collaboration among students and teachers at the secondary school level” five different statements were prepared to get teachers' idea regarding the role of digital technology in enhancing collaboration among students and teachers at the secondary school level. In order to determine the statistical significance of the observed responses, each statement was tested using the Chi-Square test. This statistical technique enables us to evaluate the hypothesis objectively based on the responses.

**Table 4.1: The incorporation of digital tools enhances collaboration among students and teachers.**

N	SA	A	UD	D	SD	$\chi^2$
330	102 30.91%	169 51.21%	28 8.48%	18 5.45%	13 3.94%	279.73

**Degree of Freedom=4, Significance level =0.05, Table Value =9.49**

According to Table 4.1, the calculated Chi-Square ( $\chi^2$ ) value of the respondents was 279.73, which is much greater than the table value of 9.49. Thus the statement was accepted, showing that the distribution of responses was statistically significant. A great number of respondents i.e. 82.12% (with 30.91% “Strongly Agree” and 51.21% “Agree”), showed agreement towards the statement. On the other hand, only a less percentage of respondent's i.e 9.39% showed disagreement with the statement, which means there was little opposition with the idea that digital technology improves collaboration in the sector of education.

**Table 4.2: Digital technology promotes active involvement of learners in collaborative learning.**

N	SA	A	UD	D	SD	$\chi^2$
330	112 33.94%	165 50.00%	27 8.18%	14 4.24%	12 3.64%	288.76

**Degree of Freedom=4, Significance level =0.05, Table Value =9.49**

From Table 4.2 we get 288.76 as the calculated Chi-Square ( $\chi^2$ ) value, which is greater than the table value of 9.49 with a significance level of 0.05. It demonstrates that the statement was acceptable, showing a statistically significant distribution of responses. A significant number of respondents i.e. 83.94% showed agreement with the statement in which 33.94% of respondents chose Strongly Agree and 50.00% selected Agree, showing their consent with the idea that active involvement of students is observed as a result of using digital technology. Conversely less percentage of respondents have been found who disagree with the statement in which 4.24% selected Disagree and 3.64% claimed for Strongly Disagree, showing that there was minimum opposition with the statement.

**Table 4.3: Digital technology improves the standard of teamwork in secondary education.**

N	SA	A	UD	D	SD	$\chi^2$
330	115 34.85%	157 47.58%	32 9.70%	19 5.76%	7 2.12%	265.58

**Degree of Freedom=4, Significance level =0.05, Table Value =9.49**

Table 4.3 demonstrates that the calculated Chi-Square ( $\chi^2$ ) value of respondents for the statement was 265.58, which is well above the table value of 9.49. From this data, we get a substantial majority who agreed with the statement among which 82.43% of respondents were in favour of the idea that the standard of teamwork can be improved by the use of digital technology. Significantly, 34.85% of respondents selected Strongly Agree and 47.58% Agree. A small percentage of respondents expressed disagreement including 5.76% of them who selected Disagree and 2.12% selected strongly Disagree.

**Table 4.4: Digital tools promote the process of giving and receiving feedback**

N	SA	A	UD	D	SD	$\chi^2$
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330	111 33.64%	164 49.70%	28 8.48%	14 4.24%	13 3.94%	281.61
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**Degree of Freedom=4, Significance level =0.05, Table Value =9.49**

From Table 4.4 we get 281.61 as the calculated Chi-Square ( $\chi^2$ ) value of the respondents for the statement which is well above the table value of 9.49. From this, it is clear that the statement was accepted and that the distribution of responses was statistically meaningful. A notable percentage of respondents i.e., 83.34% showed agreement with the statement (with 33.64% “Strongly Agree” and 49.70% “Agree”). While on the other hand only 8.18% of respondents selected the disagreeing options demonstrating that the statement got minimal opposition by the respondents, and that the respondents agree with the idea that digital technology facilitates the process of feedback exchange between the students and teachers

**Table 4.5: Digital tools help in creating a more responsive and participatory learning environment**

N	SA	A	UD	D	SD	$\chi^2$
330	119 36.06%	161 48.79%	23 6.97%	16 4.85%	11 3.33%	291.03

**Degree of Freedom=4, Significance level =0.05, Table Value =9.49**

Table 4.5 shows a calculated Chi-Square ( $\chi^2$ ) value of 291.03, which surpasses the table value of 9.49. This shows broad acceptance of the statement and a statistically meaningful response pattern. A majority of respondents with a substantial percentage of 84.85% expressed agreement with the statement (with 36.06% who selected “Strongly Agree” and 48.79% chose “Agree”). Meanwhile a small percentage of respondents i.e. 8.18% showed disagreement which shows that majority of respondents view digital technology as a tool for improving the learning environment and makes it more interactive and responsive

On the bases of the Chi-Square test results for all statements associated with  $H_{01}$  “There is no significant role of digital technology in collaboration among students and teachers at the secondary school level,” it is clear that each of the statement validates a statistical significance of response distribution. The null hypotheses were rejected as the calculated Chi-Square values for all the statements are significantly greater than the table value. This reflects that collaboration between students and teachers is enhanced by the use of digital technology.

**Summary of Hypothesis Testing and Achievement of Objective**

On the basis of the data analysis using the Chi-Square test, the status of the hypothesis is explained as follows



Hypothesis	Statement	Result
H <sub>01</sub>	There is no significant role of digital technology in collaboration among students and teachers at the secondary school level.	Rejected

### Achievement of Research Objective

The analysis of the collected data verifies that the research objective was successfully accomplished:

- (2) **Objective 1:** To examine the role of digital technology in collaboration among students and teachers at the secondary school level.

→ Addressed through statistical analysis under H<sub>01</sub>.

### Findings

Following were the findings of the study

- The incorporation of digital tools enhances collaboration among students and teachers (82.12% of respondents agreed, Table 4.1), highlighting its role in improving effective interaction and promoting exchange of knowledge.
- Digital technology promotes active involvement of learners in collaborative learning (83.94% of respondents responded towards agreement, Table 4.2), showing that the digital technology has the ability to engage the students in doing group tasks in a better way
- Digital technology improves the standard of teamwork in secondary education (82.43% of respondents agreed, Table 4.3), emphasizing its importance in improving the level of teamwork and interactive learning.
- Digital tools promote the process of giving and receiving feedback (83.34% of respondents showed agreement, Table 4.4), highlighting its role in giving and receiving instant feedback.
  - Digital tools help in creating a more responsive and participatory learning environment (84.85% of respondents agreed, Table 4.5), reflecting the idea that students engagement and involvement can be enhanced by using digital technology.

### Discussion

The Chi-Square test was used for analyzing the Likert-scale items at a significance level of 0.05. The findings of all statements related to the hypothesis “There is no significant role of digital technology in collaboration among students and teachers at the secondary school level,” showed meaningful responses to all the individual statements. The null hypothesis was rejected since the calculated Chi-Square values were greater than the critical values. This affirms that digital technology improves teamwork between students and teachers. Ultimately this increased involvement of students led the students to interact more with each other in group works and learn effectively. A more engaging classroom environment was confirmed in which students remained involved in discussions. These findings are consistent with the findings of Gordon (2019) and Penprase (2018) who emphasizes the use of digital and computer based techniques in order to collaborate with group mates as well as with teachers, allowing efficient and easy exchange of knowledge along with improving teamwork among them. This shows betterment in



the educational sector as students improve themselves by the prompt feedback given by the teachers.

### **Conclusion**

Based on the analysis of the study and its findings, the researcher has concluded that integrating digital technology in classroom has many significant and beneficial outcomes. One of the most important is that it allows the students and teachers to collaborate with each other and provides an open and comfortable environment for both the students and teachers that enable the students to discuss their difficulties with the teachers, creating a better academic and supportive environment.

Moreover the use of digital technology plays a crucial role in strengthening the collaboration among the students. They work together using all the beneficial resources provide by the digital technology, creating an environment that is interactive and built on cooperation. They actively involved in group studies and complete group tasks in an effective way by meaningful interaction. Resultantly the quality of teamwork improves and the students start working together to achieve common goals by understanding the importance of shared responsibilities.

Ultimately, digital tools provide such an environment to both the students and teachers in which they can give and receive feedback, which helps in improvement of both of them. This allows for quick adjustments in the teaching learning strategies which builds a dynamic and inclusive learning environment in which the teachers and students are actively engaged and involved.

### **Recommendations**

Based on the conclusion, the following recommendations were made.

1. Modern day teachers may encourage students to use blended learning system by incorporating technology support in their classroom activities for multiplying learning outcomes effectively.
2. School heads may ensure the availability of digital devices i.e. computer, laptop and internet in the schools and they should arrange Teachers' learning sessions to improvise and update their technological knowledge
3. All the educational institutions may ensure the use of technological tools by both the teachers and students to attain a holistic learning experience.
4. The curriculum developers may also play a pivotal role in shifting traditional learning experiences toward a more globalized and sophisticated educational outlook.
5. The policymakers may also play their roles as the baseline for bringing and including Technology supported knowledge in educational policy and declaring it as mandatory to meet the modern day challenges.
6. They government may ensure the provision of funds and material for the schools and colleges in order to make the students and teachers equipped with the modern technology.

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