

## **Analyzing the Encouraging Factors and Barriers to the Adoption of Instructional Technologies in Regular and Special Education Institutions: Transforming Education in Punjab**

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### **Abstract**

*Modern advancements caused schools, colleges and universities to rethink their existing educational systems including how to use instructional technologies effectively and successfully. Partially or fully usage of instructional technologies may not be rapidly possible in under developed countries like Pakistan. Therefore, it was important to review literature on using instructional technologies at educational institutions and to understand this complex phenomenon in Pakistani perspective. The present study aimed to investigate the encouraging factors and barriers in using instructional technologies at the general and special educational institutions of the Punjab province, Pakistan. The researchers reviewed academic literature and grey literature, identified total forty-eight encouraging factors to the use of instructional technologies and thirty-seven barriers to the use of instructional technologies on first stage. Fifty-one of these cases were purposefully selected for further exploration on second stage. By using thematic analysis, these fifty-one cases were abridged into thirty-six major themes on third stage. Eighteen were related to the encouraging factors to the use of instructional technologies and eighteen were related to the barriers for the usage of instructional technologies. The encouraging factors to promote the instructional strategies included the supply of material and resources, adequate infrastructure, formulation of effective policy to implement the instructional technology. The barriers in the adoption of the instructional strategies included the insufficient investments made by the government, lack integration of curriculum, lack proper knowledge of teachers in use of instructional strategies, poor access to libraries and laboratories and low level of teacher interest. It finally led to discuss and reflect it in higher education context of Pakistan at the end.*

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**Keywords:** *Instructional technologies, encouraging factors, barriers, special education, general education.*

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## Introduction

The integration of instructional technologies in educational settings has become increasingly vital for enhancing pedagogical practices and improving student outcomes (Groves & Zemel, 2000). In Punjab, Pakistan, a region characterized by its diverse educational landscape, both general and special education institutions face unique challenges and opportunities in this domain. Understanding the encouraging factors and barriers that affect the use of instructional technologies is crucial for fostering effective educational environments. However, significant gaps exist in the current literature and practical implementation, warranting a closer examination.

Instructional technologies, such as interactive whiteboards, educational apps, and gamified learning platforms, capture students' attention and foster active participation (Robin et al., 2011). By incorporating multimedia elements like videos, animations, and simulations, educators can create a dynamic learning environment that resonates with diverse learning styles (Geoghegan, 1994). Technology enables personalized learning experiences. Tools like learning management systems can track individual progress and adapt content to meet specific needs (Chen, 2003). This allows educators to tailor instruction based on each student's strengths and areas for improvement, promoting a more effective learning experience (Moller et al., 2009).

The internet provides vast educational resources, from online courses to digital libraries. Students can access a wealth of information beyond traditional textbooks, allowing for a more comprehensive understanding of subjects. This

access also supports independent learning and research skills. Instructional technologies facilitate collaboration among students and between students and teachers. Tools like discussion forums, collaborative documents, and video conferencing enable real-time communication, making group projects and peer learning more manageable and effective, regardless of geographical barriers (Saettler, 1968).

Digital tools allow for more efficient assessment methods. Online quizzes, surveys, and assignments provide immediate feedback, helping students identify areas for improvement quickly (Kulik, 2003). Educators can analyze data to refine their teaching strategies and address learning gaps more effectively. Technology also benefits educators through professional development opportunities (Hsu et al., 2007). Online workshops, webinars, and communities of practice allow teachers to share best practices, learn new technologies, and enhance their instructional skills without the constraints of time or location (Oliver et al., 2012).

While the benefits of instructional technologies are significant, challenges exist (Willis, 2013). These include ensuring equitable access to technology, maintaining student engagement in virtual environments, and addressing concerns about data privacy and security. Educators must also be trained effectively to integrate these technologies into their teaching practices.

## REVIEW OF RELATED LITERATURE

We are living in an increasingly connected society. The educators are facing with a multitude of opportunities for strategic expansion

(Guardia et al., 2021). According to Baldwin and Ching (2019), our society is benefiting from the increased access to education. The innovative, advanced, original educational technologies are innate and utmost to manage and implement educational electronic devices during the teaching learning process (Walder, 2017). On other hand, Rof et al. (2018) defined that this highly interconnected world faces many challenges to use instructional technologies. Government, society and students expect from the universities to be innovative, advanced, original, and cost effective in order to remain applicable ((Van Vught, 1999; Jan & Contreras, 2011) and delivering quality education focusing on the whole child's progress (Damewood, 2016). It ultimately points out many concerns related to pedagogy, instructional planning, professional training, and knowledge transformation in higher education (Smaldino, 2008). In this way, transformation as an ongoing process heralds the increasing convergence of technology in the institutions to meet the needs of the time (Ruano-Borbalan , 2019).

Moreover, Bennett et al. (2018) explained that management of instructional technology poses challenges for teachers and philanthropists and educational administrators and organizers recently developed instructional pedagogies and technologies continue to materialize, requiring strategic planning and decision-making processes to guide and implement inside the premises of institutions (Spotts & Bowman, 1995). However, the most effective pedagogical innovations implemented in digital learning environments becomes valued and dynamically constructed to respond. Therefore, in accordance with DeVries (2019), it is compulsory to understand the encouraging factors and barriers in using instructional technologies that could transform decision making about the future of education (Garrison & Akyol, 2009).

Likewise, it may identify practices that can be adopted in urgent and unprecedented prevailing situations, such as the corona virus infection disease -19 pandemic, allowing institutions to continue imparting education of high quality

focusing on the whole child's progress (Bates, 2020). According to Rapanta et al. (2020), the corona virus infection disease -19 pandemic highlighted disruptive pedagogical practices exposing multiple shortfalls to respond immediately. On other hand, reports from early studies present a mixed review of the effectiveness of technology in the teaching learning process and the urgent online education (Bond, 2021; Bozkurt et al., 2020). It differs from the traditional practices of distance and online education system. It provides benefits of using intensive and extensive technologies inside the educational institutions (Sun & Chen, 2016). Thus, impacting the quality of teaching learning process through digital planning and delivering of knowledge (O'Keefe et al., 2020).

Moreover, many teachers have a little or no experience of educating in online setting (Savina, 2019). Furthermore, the rapid transition from traditional teaching to digital teaching exposed a lack of expertise as an area in great need of further plan and support as well (Uygarer & Uzunboylu, 2017). Therefore, based on a prior study by Guàrdia et al. 1(2018), our study explored technology at general and special education institutions as a force of innovative, advanced, original paradigm shift in higher education and its interlinked encouraging factors, and barriers (Lee & Winzenried, 2009).

Much of the existing research on instructional technologies tends to focus on developed countries, often overlooking the specific socio-cultural and economic contexts of developing regions like Punjab. This gap restricts the applicability of findings and strategies that may not resonate with local realities. While there is a growing body of literature on technology use in general education, special education remains underexplored. Understanding the distinct barriers faced by special education institutions, such as inadequate training, limited resources, and accessibility issues, is essential for creating inclusive educational practices.

Much of the research has relied on quantitative methods, which may fail to capture

the nuanced experiences and perceptions of educators and students. Qualitative analysis offers a richer understanding of the subjective factors influencing technology adoption, including attitudes, beliefs, and contextual challenges. Many studies overlook the voices of key stakeholders, such as teachers, administrators, and policymakers. Engaging these groups in qualitative research can provide deeper insights into the barriers and encouraging factors that shape technology use, leading to more informed and targeted interventions. In the evolving landscape of education, the integration of instructional technologies has emerged as a critical factor in enhancing teaching and learning experiences, particularly in the diverse context of Punjab, Pakistan. However, the successful adoption of these technologies is often hindered by various barriers and influenced by specific encouraging factors within both general and special education institutions.

By identifying the specific barriers and encouraging factors relevant to Punjab's educational institutions, this research can inform policymakers about the necessary supports and resources required to promote technology integration. Tailored policies can help create an environment conducive to the effective use of instructional technologies. Understanding the factors that motivate or hinder educators in adopting technology can guide the development of targeted training programs. These programs can be designed to address the specific needs of teachers, equipping them with the skills and confidence to integrate technology into their classrooms effectively. Addressing the barriers to technology use can lead to more equitable access to educational resources for all students, particularly those in special education. This, in turn, can enhance learning outcomes, engagement, and overall student success. Thence, this qualitative analysis can serve as a foundation for future studies, encouraging a more comprehensive exploration of instructional technology use across diverse educational contexts in Pakistan and beyond. By documenting the experiences and challenges faced by educators, researchers can contribute to

a growing body of knowledge that promotes innovative practices in teaching and learning.

### Objectives of the Study

There were two objectives of the study to:

1. Explore the encouraging factors with regard to the use of instructional technologies as a force of innovative, advanced, original paradigm shift in higher education in Pakistani society.
2. Explore the barriers with regard to the use of instructional technologies as a force of innovative, advanced, original paradigm shift in higher education in Pakistani society.

### Research Questions

There were two research questions of the study:

1. What are the encouraging factors with regard to the use of instructional technologies as a force of innovative, advanced, original paradigm shift in higher education in Pakistani society?
2. What are the barriers with regard to the use of instructional technologies as a force of innovative, advanced, original paradigm shift in higher education in Pakistani society?

## RESEARCH METHODOLOGY

**Research Design:** The researchers used focus groups followed by individual interviews employed as research methods under two consequent phases as per the thematic synthesis guidelines given by Thomas and Harden (2008) to unfold the phenomenon.

**Research Population:** Special needs teachers and regular education teachers of the Punjab province were taken as the population of this research study.

**Sample and Sampling Technique:** Sample was taken into the following two stages:

**Stage 1:** The researchers scheduled and directed 6 focus groups with special educationists at 6 different places and time (N = 89). N = 45 regular education teachers and n = 44 special needs teachers were taken as the sample of the focus groups.

**Stage 2:** The researchers conducted individual interviews at 2 different places and time to synthesize data with those special educationists who participated and provided rich data during focus groups (n = 39). n = 18 regular education teachers and n = 21 special needs teachers were taken sample of the individual interviews.

**Procedure of the Study:** The procedure of the study was performed into the following six steps:

1. The researchers arranged focus groups and individual interviews and collected data.
2. The researchers identified broad themes in using instructional strategies to teach in general and special education institutions
  - a) Conducted desk research to identify relevant themes
3. The researchers identified encouraging factors and barriers; a) total forty-eight encouraging factors to the use of instructional technologies; b) thirty-seven barriers to the use of instructional technologies on first stage.
4. The researchers applied coding to identify the most relevant.
5. Fifty-one cases were purposefully selected for further exploration on this stage. Adopting these phases facilitated the coding of findings, as well as the selection of descriptive themes, which in turn supported the development of the presented framework by providing a clearer understanding of the identified themes related to encouraging factors and barriers for using instructional strategies.
6. The researchers created a roadmap for educationists and policy makers based on

encouraging factors of using instructional strategies at the end.

**Research Instrument:** The researchers used self-developed two versions of the research instrument. Both the versions were included biographical details in the first part of the research instrument. The second part was comprised of open-ended questions. Version for investigating encouraging factors to the use of instructional technologies was included 11 open ended questions while version for investigating barriers to the use of instructional technologies was comprised of 18 open ended questions.

**Conformability and Credibility:** The researchers performed conformability and credibility as the following:

1. To make certain conformability, the researchers took into consideration all the viewpoints of the individuals.
2. To make certain credibility, this research study used simplest the inductive method for analytic procedures evaluation, and accounted for private in addition to studies technique biases in studies.

**Data Collection:** The researchers collected data into two phases:

**Phase 1:** The researchers scheduled and directed 6 focus groups with special educationists at 6 different places and time to collect data by using self-developed research instrument.

**Phase 2:** The researchers conducted individual interviews at 2 different places and time to synthesize data with those special educationists who participated and provided rich data during focus groups to collect data by using self-developed research instrument.

**Research Analysis:** Thematic analysis was performed to identify patterns within the qualitative data to reach the conclusions of the study (Braun & Clarke, 2012; Clarke & Braun, 2017; and Braun et al., 2021). The thematic



analysis was presented into two steps. Each step was included the perspective of regular education teachers and special needs teachers.

Step 1: Thematic Analysis to Explore Major Encouraging Factors in Using Instructional Technologies

Table 1

*Emerged Codes, Basic Themes and Organized Themes by the Perspective of Regular education teachers*

Codes	Basic Themes	Organized Themes
Adequate Instructional Technologies Adequate Infrastructure Provision of Support Services	Availability	“The only way in using instructional strategies”

The table represented the emerged codes, basic themes and organized themes by the perspective of regular education teachers. Regular education teachers promoted the use of

adequate instructional technologies, development of adequate infrastructure and provision of support services to improve the instruction in the schools.

Table 2

*Emerged Codes, Basic Themes and Basic Themes by the Perspective of Special needs teachers*

Codes	Basic Themes	Organized Themes
Use of Instructional Devices  Use of Instructional Strategies Use of Instructional Technologies Well Planned Professional Trainings	Supply of Material Resources  Planning, Formulating and Implementing of Material Resources	“The only way in using instructional strategies”
Government Formulation of Policies Combining Instructional Technologies with Curriculum Implementation of Government Policies		

The table indicated the emerged codes, basic themes and basic themes by the perspective of special needs teachers. Special education teacher opined that material resources are required to provided including instructional devices, and instructional technological tools to

teach the students effectively. Teachers supported the use of planning, formulating and implementation of material resources with planned professional training, policy formulation at govt. level, integrated instructional technologies with effective implementation of

curriculum and policies by the government. Both the themes were highly effective in meeting the instructional requirements of the students.

Step 2: Thematic Analysis to Explore Major Barriers in Using Instructional Technologies

**Table 3**  
*Emerged Codes, Basic Themes and Basic Themes by the Perspective of Regular education teachers*

Codes	Basic Themes	Organized Themes
Time to Develop Instructional Technologies	Insufficient Time Allocation	“The only way to remove in using instructional strategies”
Time to Use Instructional Technologies	Insufficient Investments	
Investments on Infrastructure by Institute	Insufficient Support Services	
Investments on Infrastructure by Punjab Government		
Investments on the In-service Educational Programs		
Support Services for Managing Instructional Technologies		
Insufficient Support for Supplying Instructional Technologies	Inappropriate Policies	
Formulation of Government Policies		

The table exhibited emerged codes, basic themes and basic themes by the perspective of regular education teachers. Regular education teachers were of the view that there was insufficient time in use of instructional

technologies. They had the view that very meager investments were made by the government in developing the infrastructure. The support services provided to the educational setup were also insufficient.

**Table 4**  
*Emerged Codes, Basic Themes and Basic Themes by the Perspective of Special needs teachers*

Codes	Basic Themes	Organized Themes
Integration of Instructional Technologies with the Curriculum	Inadequacy of Resources and Guidance	“The only way to remove in using instructional strategies”
Integration of Instructional Technologies with the Courses		
Knowledge of Instructional Technologies	Lack of Teachers’ Interest	
Accessibility of Instructional Technologies		
Libraries and Laboratories		
Instructional Materials of Instructional Technologies		
Guidance of Instructional Technologies		
Teachers’ Interest		

The table revealed the emerged codes, basic themes and basic themes by the perspective of special needs teachers. Special education teachers indicated the barriers to instructional strategies including inadequacy of resources and proper guidance including poor integration of instructional with the curriculum and courses, lack of knowledge in use of instructional technologies and less accessibility of resources. The teachers had very poor interest in use of instructional strategies as well.

### Findings

This research study highlighted the following findings:

1. One major theme was emerged against four codes by the perspective of regular education teachers related to encouraging factors in using instructional technologies.
2. Two major themes were emerged against seven codes by the perspective of special needs teachers related to encouraging factors in using instructional technologies.
3. Four major themes were emerged against eight codes by the perspective of regular education teachers related to barriers in using instructional technologies.
4. Two major themes were emerged against eight codes by the perspective of special needs teachers related to barriers in using instructional technologies.
5. One theme was organized against the perspective of regular education teachers and special needs teachers related to encouraging factors in using instructional technologies.
6. One theme was organized against the perspective of regular education teachers and special needs teachers related to barriers in using instructional technologies.
7. The encouraging factors to promote the instructional strategies included the supply of material and resources, adequate infrastructure, formulation of effective policy to implement the instructional technology.
8. The barriers in the adoption of the instructional strategies included the

insufficient investments made by the government, lack integration of curriculum, lack proper knowledge of teachers in use of instructional strategies, poor access to libraries and laboratories and low level of teacher interest.

### Discussion

The current research focused on instructional technologies used by teachers as a catalyst for next generation. It was supported by studies that highlighted the key role of technology in both the dimensions i.e. development and paradigm shift in higher education (Haywood et al., 2015; Westine et al., 2019; Goh et al., 2020). As the research how that the teaching process influence students' outcome through the use of technologies. It is useful for students' assessment and can improve learning practices in the learning process (Marshall, 2018; Viberg et al., 2018; Aksit, 2008).

Another relevant outcome from our research is the emphasis on the need to ensure the use of instructional technologies for both teachers and students. It is essential that teachers should be digitally competent in order not only to implement and adopt instructional technologies but also to promote pro-change attitudes (Kennedy & Kennedy 1996; Biraimah, 2003). Researches have also suggested that the negative societal attitudes to change in teaching strategies may limit advances in their implementation (Watty et al., 2016; Englund et al., 2017; Bates, 2019).

Thence, the need to incorporate instructional strategies as a core objective in the institutional planning was emphasized. Undoubtedly, this research study detected and complemented by highlighting the encouraging factors and barriers in using compulsory technological changes leading to pedagogical changes. For teachers, the use of instructional technologies was connected to the increased focus on active learning and students as autonomous pillar in exposing their learning achievements. A major factor behind this was the



student who no longer depends solely on traditional learning resources to continue their personal and professional development (Wick et al., 2015; Henderikx & Jansen, 2018).

## Conclusions

This research study highlighted the following conclusions:

1. The most relevant outcome from our research was emphasized on the need to ensure the use of instructional technologies at general and special education institutions for both teachers and students.
2. This research study endeavored that instructional strategies bring life to learning by stimulating students to learn.
3. This research study found that instructional strategies are essential tools and should be integrated into curriculum for both general as well as special education institutions.
4. This research study created a space for debate on the topic.
5. This research study established a reflection with regard to the usage of instructional strategies during the corona virus infection disease -19 pandemic and later.
6. The encouraging factors to promote the instructional strategies included the supply of material and resources, adequate infrastructure, formulation of effective policy to implement the instructional technology. The barriers in the adoption of the instructional strategies included the insufficient investments made by the government, lack integration of curriculum, lack proper knowledge of teachers in use of instructional strategies, poor access to libraries and laboratories and low level of teacher interest.

## Recommendations

The researchers made following recommendations based on the conclusions of the study:

1. Government should find and create instructional strategies (materials). Existing media resources should be modified to engage students and facilitate active learning strategies to promote deeper learning.
2. Existing instructional strategies should be tested at institutional level and government level as well.
3. General and special needs teachers should use authentic instructional strategies to increase students' motivation.

## Ethical Considerations

The research adheres to the ethical principles in order to protect the dignity, rights and welfare of research participants.

## Conflict of Interest

There is no conflict of interest.

## Funding, Authors' Contribution

There is no funding agency to support financially. Author contributed to carry the research out to disseminate its results.

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