

Leveraging EdTech Tools for Psychological First-Aid and Resilience Building Post-COVID-19: A Case Study in Jeddah, KSA

Munawarunnisa Nazneen^{1*}, Dr. Dalwinder Kaur²

¹ MEd Research Scholar, GlobalNxt University, Kuala Lumpur, Malaysia

² PhD, Assistant Professor, Programme Leader, School of Education, GlobalNxt University, Kuala Lumpur, Malaysia

*Corresponding Author Email: munnaaz1981@gmail.com

Abstract

Acceptance of educational technology has increased in urban centers following the COVID-19 pandemic. During pandemic situations, psychological support has become necessary to foster resilience among students. This assessment focuses on Jeddah, Kingdom of Saudi Arabia (KSA). It highlights the importance of technological support to the students in managing stress in the pandemic situation. COVID-19 disrupts global education and enhances the need for educational technology for developing an interactive learning atmosphere. Involving digital platforms in education makes it possible to attract students in this critical situation. In identifying the role of these advanced technologies, this study includes a mixed method. Both qualitative and quantitative information is collected during this study. Participation of 111 students and 72 other staff make this study more effective as it involves important data. In collecting qualitative information, interviews are conducted regarding role of educational technology to provide emotional support. Findings from data analysis highlights response of 93.7% of students suggesting ability of educational technology to reduce stress. 91.9% respondent on the other side experience that these advanced tools are effective to enhance the academic performance. This study can provide crucial insight for making policies related to technological involvement in the education system to mitigate the impact of pandemics.

Keywords

Advanced Tools, Collaborative Environment, COVID-19, Creative Learning, Educational Technology, Jeddah, KSA, Learning Facilities, Mental Health of Students, Pandemic, Post-Pandemic situation, Psychological First-Aid, Psychological Support, Resilience Building.

INTRODUCTION

Research Background

The global education system experienced a significant change starting in March 2020, marking a pivotal moment in how education is delivered [1]. The COVID-19 pandemic disrupted daily life and forced educational institutions worldwide to shift from in-person to online learning quickly. According to UNESCO, by the end of April 2020, approximately 186 countries had closed schools nationwide, impacting 73.3% of the world's enrolled students. This shift created unprecedented challenges for students, teachers, and educational institutions, as they were unprepared for the sudden shift to virtual platforms [2]. Despite the chaos, the pandemic also prompted widespread adoption of educational technology (EdTech) tools, including platforms like Google Classroom, Zoom, and Microsoft Teams, which played a critical role in maintaining learning continuity during the crisis [3]. These tools provided a temporary yet essential solution to educational disruptions, enabling schools to deliver lessons, assessments, and daily activities online.

However, the sudden switch to online education also greatly affected students' mental health. The lack of social contact, the absence of regular activities, and increased anxiety and uncertainty caused by the pandemic have left many students feeling more stressed, anxious, and isolated [4]

[5]. While online learning maintained academic progress, it also introduced challenges such as the loss of face-to-face interaction, difficulty focusing, and the stress of adapting to new technologies and learning styles. This not only caused academic difficulties but also worsened students' mental well-being [6]. As social beings, children have lost natural ways to interact with peers and teachers, which further worsens their emotional and social issues. Research shows that students struggle to cope with the loneliness of online learning and the inability to communicate face-to-face with peers and teachers.

In this regard, the role of psychological first aid (PFA) in schools was revealed. PFA is a treatment that aims to reduce stress and anxiety in those affected by a traumatic event or crisis [7]. Schools, as core facilities for students, were ideal places to implement PFA, helping students cope with the emotional impact of the pandemic. Schools and colleges were compelled to modify not only their teaching methods but also their approach to addressing students' emotional and psychological needs [8]. The emotional support provided by EdTech tools became another dimension of their use, as students could maintain some form of contact and certainty during an otherwise chaotic period. Learning tools like Zoom, Kahoot, and Google Classroom not only streamlined the learning process but also enabled students to maintain social connections, collaborate on tasks, and receive emotional

support through virtual counseling or peer interactions [9]. Although those tools were primarily used academically, they also played a crucial role in mitigating the psychological impact of isolation and stress.

Although the role EdTech tools can play in addressing not only academic but also psychological challenges is increasingly understood, a significant research gap remains, especially in the Middle East and the Kingdom of Saudi Arabia (KSA). The academic and technological considerations of EdTech during the pandemic have been most extensively studied; however, few studies have examined its potential as a psychological support tool in post-pandemic recovery [10]. The nature of the problem under investigation is crucial, as it focuses on the unique needs of schools in the Gulf region, where sociocultural processes are distinct and influence the adoption and effectiveness of educational technology.

This study is significant as it supports improvements of existing educational policies related to technological involvement. In this post-pandemic era approaches of educational sector towards students have changed and expectations of students towards institutions have also changed. Present research can identify such areas and help educational sector to strengthen its policies for enhancing chances for students to achieve success in the near future.

The study fulfils the following Research Objectives (RO):

- RO1: Exploring the role of EdTech-tools in supporting psychological well-being of students after COVID-19.
- RO2: Exploring the role of EdTech-tools in supporting academic performance of students after COVID-19.
- RO3: Involving EdTech-tools as resilience building process and psychological support in schools in Jeddah, KSA after COVID-19.

LITERATURE REVIEW

EdTech in Crisis Education

The role of Educational Technology (EdTech) in Crisis Education has become more important due to the COVID-19 pandemic, especially the shutdown of schools and universities. As educational institutions shifted to remote learning, EdTech tools became crucial for keeping education going during these unprecedented times [11]. Video tools, learning management systems, and online platforms played a key role in maintaining educational continuity. These tools helped education systems stay functional and follow social distancing guidelines [12]. Similar strategies were also seen in earlier crises, such as the H1N1 pandemic and natural disasters, when learning systems had to switch to online formats [13]. The COVID-19 pandemic has underscored the importance of EdTech as a means of distance education and a vital component of educational resilience. Educational technology made learning possible even when physical schools were closed, and it also supported various learning environments and diverse student needs, as well as the

availability of technology. The use of EdTech tools, therefore, offered a lifeline. However, it also revealed a wide gap, such as the digital divide, particularly among low-income households and students who lack high access to devices and stable internet connectivity [14] [15].

Psychological Impact of COVID-19 Pandemic on Students

The emotional impact of the pandemic on learners is enormous, causing additional stress, loneliness, and demotivation. The transition to online schooling disrupted students' social and academic calendars, leading to a sense of isolation [16]. The lack of direct communication with peers and teachers was one of the factors that contributed to a significant decline in student motivation, and many students failed to attend online classes. The uncertainty associated with the pandemic also contributed to a sense of isolation, which further heightened anxiety and stress among students [17].

Also, the disturbance of the regular social life and extracurricular activities caused emotional distress, which affected the mental well-being of students. The school's routines were poorly organized, leading to difficulties with concentration and a decline in academic performance. The results of research studies carried out in the context of the pandemic have noted that the anxiety levels and the levels of depression and other mental disorders have increased among students, especially those with disadvantaged backgrounds who were more prone to difficulties in access to resources both to learn and support their emotional well-being [18] [19].

Therefore, the psychological effects of the pandemic have not been limited to academic performance but have also affected students' well-being. These mental health issues have emerged as a priority in post-pandemic recovery, especially regarding the provision of the needed psychological support to students during and after the crisis.

Theoretical Frameworks

The following theoretical frameworks can help analyze the implications of EdTech in the post-pandemic educational process, enabling us to understand the interrelationships between technology adoption, user satisfaction, and student wellness.

UTAUT [20] emphasizes the significance of performance expectancy, effort expectancy, and facilitating conditions in predicting user acceptance and satisfaction with technology [21]. In the educational context of the COVID-19 pandemic, the model suggests that teachers' and students' readiness to adopt online learning tools depends on their attitudes toward the efficiency and convenience of using the technology. When technology is seen as improving performance and being user-friendly, it is more likely to be adopted and incorporated into the learning process, both during and after the pandemic [22].

The UTAUT & Expectation Confirmation Model (ECM) [23], commonly used in e-learning environments, focuses on post-adoption behavior, particularly satisfaction and continued use. It suggests that users are more likely to continue using technology in the future based on their satisfaction with their initial experiences. In EdTech, a positive initial experience with digital learning tools can enhance the user experience and increase the likelihood of sustained use, ultimately improving learning outcomes [24]. The biopsychosocial paradigm [25] is crucial for understanding students' overall well-being, particularly during the COVID-19 pandemic. This model posits that biological, psychological, and social factors are key determinants of a person's health and well-being. The social and psychological aspects of students' lives were severely affected during the pandemic, with disruptions to family dynamics, increased stress, and reduced socialization. These factors contributed to deteriorating mental health and learning among students. The model also emphasizes that a holistic approach to student well-being is essential to address the physical and emotional challenges students face [26].

Connectivism, a learning theory [27], emphasizes the role of technology in collaborative learning and persistence. It highlights that learning is a networked process and that knowledge is built through interactions among people and technological devices [28]. Connectivism became especially relevant during the COVID-19 pandemic, enabling the creation of online learning environments where students could interact, share ideas, and learn together from different locations [29]. The theory emphasizes how digital tools can foster a sense of community among students and promote interaction, helping them stay connected and motivated during times of crisis.

Research Gap

Although influence of EdTech in enhancing outcomes of online study during the COVID-19 situation has been extensively discussed, the use of advanced technology as a PFA intervention to support students remains underexplored. Many studies have explored the educational benefits of EdTech applications; however, fewer researchers have focused on their potential to support students' mental health and emotional well-being [30]. The capacity of EdTech to reduce stress and enhance resilience and psychological recovery after the pandemic is another area that needs future research.

Furthermore, the impact of EdTech tools on specific regions, such as the Gulf countries—especially Saudi Arabia—remains understudied. As more educational institutions in these areas adopt digital technologies, understanding how to use these tools to address academic and psychological needs becomes essential, enabling the development of targeted interventions [31]. To address this gap, more empirical research on EdTech's effectiveness as a psychological aid in post-pandemic recovery is necessary to

guide future education practices in the Gulf region.

METHODOLOGY

Research Design

The study used a most suitable approach involving mixed-method based on its requirements. This method supports both quantitative such as measurable data and qualitative involving descriptive information. It enables a systematic along with a structured analysis of this research through using several types of information and contextual data as well. As a result, this study can provide short and measurable information with explanatory information. Quantitative part involves using structured surveys, while the qualitative part includes conducting an interview with respondents to collect detailed information from experiences of participants and perceptions. There are numerous benefits of mixed methods is that they help mitigate the limitations of each approach and offer a more detailed and nuanced view of the research problem [32].

The mixed-methods approach applied to research on psychological impact of post-pandemic along with associated use of educational tools as psychological first aid in relation to students' performance is especially beneficial for studying complex phenomena. In this manner, one can triangulate the data, thereby enhancing the validity and reliability of the findings through supporting evidence from different sources [33].

Participants and Context

This study sample includes a total of 111 students and also 72 staff from “Jeddah Grammar International School” (JGIS) in the Kingdom of Saudi Arabia. The research site, JGIS, was selected because it has used educational technology both before and after the COVID-19 pandemic. It is a modern, innovative school with an excellent learning environment, making it an ideal place to examine how EdTech tools influence student performance and well-being. The student participants span from primary to secondary school, ensuring diversity within the student body. The staff members consist of teachers, academic coordinators, information technology personnel, and school administrators, including the principal and student counselor.

JGIS is a leading school specializing in e-learning and providing high-quality, interactive educational experiences. The students are prepared to face future challenges. The school's proactive approach to digital education has established it as a field where the impact of technology-supported learning on students' psychological well-being during and after the pandemic can be studied [34].

Instruments

The research employed a range of data collection tools, including descriptive data collection and numerical data collection methods. In collecting quantitative information,

online questionnaires were created in Google Forms, with sequential questions to collect numerical data. These questionnaires featured scale items in which participants rated their agreement with statements about usage of EdTech-tools with its effects in performance of students and their well-being. The questionnaires were distributed to students (111 respondents) and staff (72 respondents), enabling the researcher to collect information from both groups.

Regarding the qualitative aspect of the study, in-depth semi-structured interviews were conducted with key workers of school. Respondents involve principal of this school, academic director, the IT Coordinator along with IT Manager (IM) and Student Counselor (SC). These interviews took place in person and online via Microsoft Teams. The purpose was to explore staff perceptions of the usefulness of advanced tools in supporting students during and post-pandemic, especially to provide mental support and fostering resilience. Additionally, IT and Academic Coordinator, completed open-ended questionnaires to share their impressions on integrating EdTech tools into the school curriculum.

Data Collection Procedures

Collected data in this present research obtained through pilot test that also involve a complete survey to ensure the instruments used were reliable and valid. The pilot test was conducted, and the results were analyzed to make adjustments to the survey tools, ensuring they were clear and suitable. After the pilot test, the survey was administered to 111 students and 72 staff members at JGIS. The questionnaire was distributed online via Google Forms, and responses were monitored and stored securely for analysis and review.

In addition to the surveys, key staff members, including the Academic Director (AD), School Principal (SP), IT Coordinator (IC), and Student Counselor (SC), were also interviewed. Such interviews were planned and conducted in person or virtually, depending on convenience and availability. Consent to record the interview was obtained voluntarily, and a comprehensive note was taken to ensure that no pertinent issues were missed.

All the required ethical approvals were obtained from the relevant authorities, including the Program Director of GlobalNxt University, Malaysia, and the Academic Director of JGIS, Jeddah (KSA). All participants were requested to provide consent and were informed that the study was voluntary, with them being made aware of its purpose. The data were stored confidentially, and participants were guaranteed anonymity regarding their participation in the study.

Data Analysis

Quantitative research methods, including descriptive statistics and chi-square tests, were applied to the survey data. Descriptive techniques were used to characterize the respondents' demographic features and to explain their attitudes toward the survey questions. These analyses were

conducted using SPSS, which provides a clear picture of response frequencies and enables the researcher to identify trends and patterns in the data [35].

In this research chi-square test is used for analysing association among variables like involvement of educational technology and improvement of mental well-being of students enhancing academic achievements. This test helped to find out different patterns of responses suggesting significant relationships among variables involving advanced educational tools and academic performance after the pandemic creating more opportunities for students.

For the qualitative data, it is necessary to conduct thematic analysis to evaluate and analyse patterns of data collected for this research during asking for interview questions. Thematic analysis grouped data into themes or topics that appeared similar, enabling a better understanding of staff members' experiences and views at JGIS [36]. Inclusion of quantitative information along with descriptive information offers a broader understanding related to important areas of present research creating more detailed and multifaceted picture that showing importance of advanced educational tools helping learners to balance their mental well-being along with academic achievements during post-COVID recovery period. This complementary methodology strengthened the results obtained and helped confirm the findings from both data types.

RESULTS

Quantitative Results

Student Survey Statistical Analysis (111 responses)

Table 1 displays the number of students in each grade in the research. Grade 4 has the most participants (41.4%), followed by Grade 3 (35.1%). Smaller proportions are found in Grade 5 (7.2%), Grade 6 (12.6%), Grade 7 (1.8%), Grade 8 (0.9%), and Grade 9 (0.9%). This distribution highlights a focus on lower-grade students, with a large concentration in Grades 3 and 4, making up over 75% of the sample.

Table 1: Grade

Grade					
Grade	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	3	39	35.1	35.1	35.1
	4	46	41.4	41.4	76.6
	5	8	7.2	7.2	83.8
	6	14	12.6	12.6	96.4
	7	2	1.8	1.8	98.2
	8	1	.9	.9	99.1
	9	1	.9	.9	100.0
	Total	111	100.0	100.0	

Table 2 displays the distribution of students across different study sections. The largest group is in 3C,

representing 14.4% of the sample, followed by 3A, which accounts for 13.5%. Sections 4A and 4C account for 12.6% of the participants; 3B and 4D make up 7.2% and 9.9%, respectively. Other sections, such as 4B, 5A, and 5B, have

smaller shares, ranging from 2.7% to 6.3%. The least represented are sections 7A, 8A, and 9A, with only 1.8%, 0.9%, and 0.9% of students, respectively. Overall, the distribution covers a wide variety of sections across grades.

Table 2: The distribution of students across various sections

Section		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3A	15	13.5	13.5	13.5
	3B	8	7.2	7.2	20.7
	3C	16	14.4	14.4	35.1
	4A	14	12.6	12.6	47.7
	4B	7	6.3	6.3	54.1
	4C	14	12.6	12.6	66.7
	4D	11	9.9	9.9	76.6
	5A	3	2.7	2.7	79.3
	5B	5	4.5	4.5	83.8
	6A	7	6.3	6.3	90.1
	6B	7	6.3	6.3	96.4
	7A	2	1.8	1.8	98.2
	8A	1	.9	.9	99.1
	9A	1	.9	.9	100.0
Total		111	100.0	100.0	

Table 3 shows the distribution of students by grade level in the study. Most participants are from primary school, comprising 83.8% of the total sample. Middle school students make up 15.3%, while high school students account for only

0.9%. This distribution highlights a strong focus on primary school students in the research, with minimal representation from high school students.

Table 3: Distribution of Students by Grade Level

Grade Level		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High	1	.9	.9	.9
	Middle	17	15.3	15.3	16.2
	Primary	93	83.8	83.8	100.0
	Total	111	100.0	100.0	

Table 4 presents the distribution of students by age. The most common age group is 10 years, representing 35.1% of the total sample. The second-largest group is 9-year-olds,

making up 23.4%. Other age groups include 8 years (15.3%) and 11 years (17.1%), with smaller groups at 12, 13, and 15 years. This distribution indicates that the study predominantly involves younger students, particularly those aged 9 and 10.

Table 4: Age Distribution of Students

Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	8	17	15.3	15.3	15.3
	9	26	23.4	23.4	38.7
	10	2	1.8	1.8	40.5
	10	39	35.1	35.1	75.7
	11	19	17.1	17.1	92.8

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
	12	3	2.7	2.7	95.5
	13	3	2.7	2.7	98.2
	15	2	1.8	1.8	100.0
	Total	111	100.0	100.0	

Table 5 shows the gender distribution of the students. Most respondents are male (59.5% of the sample), while females comprise 40.5%. This suggests a higher participation of male students in the study. The gender distribution is somewhat

skewed, with males representing a larger proportion of the total sample, which may influence the analysis of gender-related trends in the study.

Table 5: Gender Distribution of Students

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	45	40.5	40.5	40.5
	Male	66	59.5	59.5	100.0
	Total	111	100.0	100.0	

Table 6 presents descriptive statistics for the study variables, based on responses from 111 participants. The average grade is 4.11, with a standard deviation of 1.209, showing some variability in academic levels. Stress and anxiety due to COVID-19, health and learning impacts, and challenges faced during the pandemic indicate a level of around 0.74, indicating general agreement among

respondents. Notably, EdTech tools had high perceived effectiveness, with means above 0.90 for reducing stress, supporting learning, improving learning outcomes, and providing psychological first aid. These results reflect positive perceptions of EdTech tools in enhancing academic performance and mental well-being post-pandemic.

Table 6: Descriptive Statistics for Study Variables

Descriptive Statistics										
						N	Minimum	Maximum	Mean	Std. Deviation
Grade						111	3	9	4.11	1.209
Covid19_pandemic_caused_stress_and_anxiety_count						111	.00	1.00	.7387	.44131
Covid19_pandemic_affected_health_and_learning_count						111	.00	1.00	.7387	.44131
Challenges_during_pandemic_affected_the_studies_count						111	.00	1.00	.7748	.41963
After_lockdown_returning_was_difficult_count						111	.00	1.00	.6486	.47956
Use_of_EdTech_Tools_reduced_stress_count						111	.00	1.00	.9369	.24418
EdTech_Tools_supported_during_and_after_pandemic_count						111	.00	1.00	.9189	.27420
EdTech_Tools_made_learning_easy_and_fun_count						111	.00	1.00	.9099	.28761
EdTech_Tools_improved_learning_after_Covid_19_pandemic_count						111	.00	1.00	.9099	.28761
EdTech_Tools_served_as_Psychological_First_Aid_post_Covid19						111	.00	1.00	.7928	.40714
Academic_results_improved_using_EdTech_Tools						111	.00	1.00	.9189	.27420
Valid N (listwise)						111				

Table 7 presents the frequency distributions of key study variables, providing insight into how students have experienced the COVID-19 pandemic and used EdTech tools. Most students (73.9%) said that the pandemic brought stress and anxiety, which shows the common psychological effect. Equally, 73.9% of students reported that the pandemic had a

severe impact on their health and learning, and the pandemic triggered overall academic and personal upheaval.

Regarding the challenges faced during the pandemic, 77.5% of students reported that these challenges affected their studies, highlighting the difficulties they experienced in concentrating and progressing during lockdowns and remote

learning. When asked whether returning to school after the lockdown was difficult, 64.9% of students responded yes, indicating that readjusting to face-to-face learning was not easy for many.

The participants acknowledged the effectiveness of EdTech tools in mitigating the pandemic's adverse impact. A significant 93.7% of students said that EdTech tools helped reduce stress, indicating their significant role in relieving psychological pressure. Furthermore, 91.9% of students reported that during and after the pandemic, EdTech tools

provided crucial support, confirming their importance in maintaining a steady academic process.

Analyzing the report on engagement and enjoyment of learning, 91.0% of students said that EdTech tools helped simplify their learning and made it more fun, demonstrating that these tools effectively foster a more engaging learning environment. Likewise, 91.0% of students reported that EdTech tools improved their learning after the pandemic, emphasizing their role in academic recovery.

Table 7: Frequency Distribution for Various Study Variables

Statistics						
			Frequency	Percent	Valid Percent	Cumulative Percent
Covid19_pandemic_caused_stress_and_anxiety_count	Valid	.00	29	26.1	26.1	26.1
		1.00	82	73.9	73.9	100.0
Covid19_pandemic_affected_health_and_learning_count	Valid	.00	29	26.1	26.1	26.1
		1.00	82	73.9	73.9	100.0
Challenges_during_pandemic_affected_the_students_count	Valid	.00	25	22.5	22.5	22.5
		1.00	86	77.5	77.5	100.0
After_lockdown_returning_was_difficult_count	Valid	.00	39	35.1	35.1	35.1
		1.00	72	64.9	64.9	100.0
Use_of_EdTech_Tools_reduced_stress_count	Valid	.00	7	6.3	6.3	6.3
		1.00	104	93.7	93.7	100.0
EdTech_Tools_supported_during_and_after_pandemic_count	Valid	.00	9	8.1	8.1	8.1
		1.00	102	91.9	91.9	100.0
EdTech_Tools_made_learning_easy_and_fun_count	Valid	.00	10	9.0	9.0	9.0
		1.00	101	91.0	91.0	100.0
EdTech_Tools_improved_learning_after_Covid_19_pandemic_count	Valid	.00	10	9.0	9.0	9.0
		1.00	101	91.0	91.0	100.0
EdTech_Tools_served_as_Psychological_First_Aid_post_Covid19	Valid	.00	23	20.7	20.7	20.7
		1.00	88	79.3	79.3	100.0
Academic_results_improved_using_EdTech_Tools	Valid	.00	9	8.1	8.1	8.1
		1.00	102	91.9	91.9	100.0
		Total	111	100.0		

The importance of EdTech tools as psychological first aid was also emphasized, as 79.3% of students reported that they provided emotional support during the pandemic. Additionally, 91.9% of students reported that using EdTech tools positively affected their academic performance, reinforcing their beneficial impact on both academic success and psychological health.

This analysis showcases trends of involving educational technology in learning process and its outcomes. One-sample

t-test is involved in this research through analysing effectiveness of advanced tools to support mental well-being of students. Based on findings 4.11 is average grade score of participants involving value of standard deviation is 1.209. Such values highlight a moderate expansion of mean value and indicate that EdTech-Tools plays a crucial role in creating a creative atmosphere for leaders after a pandemic. Standard error is 0.03864 that is quite small and shows relevance of this information.

Table 8: One-Sample Statistics for Grade and EdTech Tools Impact Post-COVID-19

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Grade	111	4.11	1.209	.115
EdTech Tools served as Psychological First Aid post-COVID-19	111	.7928	.40714	.03864

Above table expresses role of technology in boosting confidence of students to learn new things and improve academic performance. T-test analysis involves values of grade variables, Cohen's d and Hedges' correction. Each of these calculations highlights role of educational tools to support mental state of students after COVID-19. Values like Hedges' correction is 1.217 and Cohen's d is 1.209 that are

within standard values indicating moderate impact of technology. Such data is crucial for educational sector to plan modification of their existing system and make it more effective for students. These initiatives can attract students towards innovative learning and encourage them to learn new things.

Table 9: One-Sample Effect Sizes for Grade and EdTech Tools Impact Post-COVID-19

One-Sample Effect Sizes					
		Standardizer^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
Grade	Cohen's d	1.209	3.399	2.912	3.883
	Hedges' correction	1.217	3.376	2.892	3.856
EdTech Tools served as Psychological First Aid post-COVID-19	Cohen's d	.40714	1.947	1.628	2.263
	Hedges' correction	.40995	1.934	1.617	2.247

a. The denominator is used to estimate the effect sizes.
Cohen's d uses the sample standard deviation.
Hedges' correction uses the sample standard deviation, plus a correction factor.

This research also involves reliability statistics to check authenticity of collected data from various participants and its implication in modifying educational policies. Above analysis shows that value of Cronbach's Alpha is 0.760 for 6 variables. It highlights internal data consistency and suggests effectiveness of this present research for showing important facts. This value also showcases a strong reliability making this study more scientific and acceptable. Statistical evidence identifies that value of Cronbach's Alpha above 0.7 is acceptable and 0.76 is indicating consistency among collected data.

Table 10: Student Survey Statistical Analysis (Reliability Statistics)

Reliability Statistics	
Cronbach's Alpha	N of Items
.760	6

Table 11: Distribution of Staff Participants by Job Title

Job Title					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Academic Coordinator	1	1.4	1.4	2.0
	IT Coordinator	1	1.4	1.4	2.0
	Arabic Teacher	1	1.4	1.4	2.0

**Scale: Cronbach's Alpha for Student Survey
SPSS Statistical Staff Survey Analysis Involving 72 responses**

Table 11 provides a breakdown of staff participants by job title, illustrating a diverse range of roles within the study sample. The majority of participants were categorized as "Homeroom Teachers" (25%) and "Teachers" (29.2%), making up a significant portion of the sample. Other roles, such as "Teacher Assistant" (13.9%) and "Art Teacher" (2.8%), were also represented. Other titles, including "IT Manager", "Math Teacher", "Subject Teacher", and "Health Counsellor", each accounted for 1.4% of the sample. The data highlight the various teaching and administrative roles that contribute to the study.

Job Title		Frequency	Percent	Valid Percent	Cumulative Percent
	Art Teacher KG-3 to Gr-9	2	2.8	2.8	3.9
	English Teacher	2	2.8	2.8	3.9
	French Teacher	2	2.8	2.8	3.9
	Homeroom Teacher	42	58.3	58.3	80.9
	IT Manager	1	1.4	1.4	41.7
	IT Teacher	2	2.8	2.8	43.1
	Math Teacher	1	1.4	1.4	45.8
	Science Teacher	2	2.8	2.8	48.6
	Secondary Teacher	1	1.4	1.4	50.0
	Special Subject Teacher	3	2.8	2.8	55.2
	Subject Teacher, Health Counselor	1	1.4	1.4	55.6
	Teacher Assistant	10	13.9	13.9	98.6
	Total	72	100.0	100.0	

Table 12 shows the proportion of staff participants by age, revealing a significant age gap. Most participants are aged 20-40, with 40 (13.9%) and 24 (5.6%) individuals being prominently represented. Fewer participants are older, and

only a few are in their 50s and 60s. Age groups are relatively evenly distributed, implying that a variety of younger and more experienced staff members participated in the study.

Table 12: Age Distribution of Staff Participants

Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20.00	1	1.4	1.4	1.4
	21.00	2	2.8	2.8	4.2
	22.00	2	2.8	2.8	6.9
	23.00	2	2.8	2.8	9.7
	24.00	4	5.6	5.6	15.3
	25.00	2	2.8	2.8	18.1
	26.00	1	1.4	1.4	19.4
	27.00	5	6.9	6.9	26.4
	28.00	5	6.9	6.9	33.3
	29.00	1	1.4	1.4	34.7
	30.00	3	4.2	4.2	38.9
	34.00	2	2.8	2.8	41.7
	35.00	5	6.9	6.9	48.6
	36.00	3	4.2	4.2	52.8
	37.00	3	4.2	4.2	56.9
	38.00	5	6.9	6.9	63.9
	40.00	10	13.9	13.9	77.8
	41.00	1	1.4	1.4	79.2
	42.00	1	1.4	1.4	80.6
43.00	2	2.8	2.8	83.3	
44.00	1	1.4	1.4	84.7	
45.00	1	1.4	1.4	86.1	

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
	46.00	3	4.2	4.2	90.3
	47.00	1	1.4	1.4	91.7
	50.00	2	2.8	2.8	94.4
	51.00	2	2.8	2.8	97.2
	54.00	1	1.4	1.4	98.6
	60.00	1	1.4	1.4	100.0
	Total	72	100.0	100.0	

The gender distribution table indicates that the sample consisted entirely of females, as all the staff members who participated in the study were female. In this dataset, the absence of male respondents may indicate the employment of female-only teachers in the girls' section and in primary and middle school, and it may also affect the interpretation of

results on staff experiences and perceptions of EdTech tools. Since the sample's gender representation is also uniform, it is worth noting that gender-specific perspectives may be necessary when interpreting the results for this category of respondents.

Table 13: Gender Distribution of Staff Participants

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	72	100.0	100.0	100.0

Table 14 illustrates that the complete staff are from JGIS. The fact that the vast majority of respondents belong to a single institution suggests that the results are dominated by

the experiences and opinions of the staff from this specific school.

Table 14: School Distribution of Staff Participants

School					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	JGIS	72	100.0	100.0	100.0

The following frequency table presents data from various survey questions on the impact of the COVID-19 pandemic and the effectiveness of EdTech tools. The responses show strong agreement on several key concerns. Most participants (86.1%) reported that the pandemic increased stress and anxiety, while 13.9% disagreed. Similarly, 90.3% of respondents stated that the pandemic disrupted emotional well-being and coping, with only 9.7% disagreeing. This highlights the significant emotional impact of the pandemic on staff members. Regarding academic performance, 86.1% of staff reported that it had decreased during the pandemic, while 13.9% disagreed. However, the majority of personnel (91.7%) stated that physical classrooms stimulated academic achievement in the post-pandemic period, and the role of face-to-face learning cannot be ignored when restoring the post-pandemic situation. EdTech tools were also beneficial for reducing stress and improving mental health, with 91.7% of respondents confirming they were effective in alleviating stress. Moreover, 90.3% of employees confirmed that

EdTech tools could provide emotional support both during and after the pandemic, underscoring the importance of technology in mental health. Regarding the effects on teaching and learning outcomes, 90.3% of those surveyed confirmed that EdTech tools improved learning results after the pandemic. To enhance the learning experience, 98.6% of staff members stated that EdTech tools made the learning process more enjoyable and accessible. It was also noted that EdTech tools played a role in providing psychological first aid after the pandemic, and 83.3% of respondents agreed that they offered the necessary emotional support. Finally, 91.7% of employees believed that using EdTech tools improved their academic performance, highlighting EdTech's role in enabling academic recovery.

Overall, the frequency table indicates a strong positive attitude toward the role of EdTech tools in boosting academic performance and emotional well-being during and after the pandemic. These tools offered psychological support, enhanced learning, and supported academic recovery.

Table 15: Frequency Statistics of Staff Survey Variables

Frequency Statistics of Variables						
			Frequency	Percent	Valid Percent	Cumulative Percent
Pandemic_enhanced_stress_and_anxiety_count	Valid	.00	10	13.9	13.9	13.9
		1.00	62	86.1	86.1	100.0
Pandemic_disrupted_emotional_well_being_and_coping_count	Valid	.00	7	9.7	9.7	9.7
		1.00	65	90.3	90.3	100.0
Academic_performance_declined_during_pandemic_count	Valid	.00	10	13.9	13.9	13.9
		1.00	62	86.1	86.1	100.0
After_pandemic_physical_classrooms_promoted_academics_count	Valid	.00	6	8.3	8.3	8.3
		1.00	66	91.7	91.7	100.0
EdTech_tools_reduced_stress_improved_mental_well_being	Valid	.00	6	8.3	8.3	8.3
		1.00	66	91.7	91.7	100.0
EdTech_tools_offered_emotional_support_during_after_pandemic	Valid	.00	7	9.7	9.7	9.7
		1.00	65	90.3	90.3	100.0
EdTech_tools_promoted_learning_outcomes_post_pandemic_count	Valid	.00	7	9.7	9.7	9.7
		1.00	65	90.3	90.3	100.0
EdTech_Tools_made_learning_fun_and_easy_count	Valid	.00	1	1.4	1.4	1.4
		1.00	71	98.6	98.6	100.0
EdTech_Tools_serve_as_Psychological_First_Aid_Post_COVID_19	Valid	.00	12	16.7	16.7	16.7
		1.00	60	83.3	83.3	100.0
Academic_performance_improved_using_EdTech_Tools_count	Valid	.00	6	8.3	8.3	8.3
		1.00	66	91.7	91.7	100.0

Analysis of linear modelling involves a total number of 72 respondents. This involves complete data that helps to analyse exact information that participants have shared regarding educational technology. This also enhances reliability of findings and enhances specification in collected data. Reliability statistics share important information regarding trends of educational sector through Cronbach's Alpha. Its value is 0.765 that suggests credibility of collected information. This also highlights a close association between mental support of students and advanced technological integration. In understanding findings and its usage in future research such data analysis processes need to be involved. It attracts more readers and enhances its implementation in developing suitable policies in educational sector. Advanced tools are also effective to enhance cognitive intelligence of students and provide a creative environment to polish their knowledge. Reliable information enhances ability to change current educational methods through involving student-centric technology.

Table 16: Case Processing Summary for Automatic Linear Modelling

Case Processing Summary		
	N	Percent
Included	72	100.0%

Excluded	0	0.0%
Total	72	100.0%

Table 17: Staff Survey Statistical Analysis (Reliability Statistics)

Reliability Statistics	
Cronbach's Alpha	N of Items
.765	5

Scale: Cronbach's Alpha for Staff Survey

Qualitative Results

Theme 1: Psychological Impact of COVID-19 on Students

The COVID-19 pandemic greatly affected the emotional and psychological state of students, and these consequences did not stop at the end of the lockdown. The violation of the academic routine and the transition to distance learning produced severe psychological stress. Students returned to school with increased anxiety and emotional problems when the schools reopened.

Sub-theme 01: Anxiety and Emotional Distress

Among the most common effects of the pandemic was the increase in anxiety and emotional distress among students. The sudden transition to online learning and the reopening of

schools with new health measures created an unstable situation for students. The S.P. of JGIS has stated that the health precautions, such as wearing masks, maintaining social distancing, and implementing increased hygiene standards, have been challenging for the students. She noted, *"The huge majority of students were unwilling to make an active contribution to studying and became even more fearful and anxious due to the stress of the COVID-19 effects."* These interferences destroyed their feeling of security and increased their emotional suffering.

The S.C. elaborated, stating that uncertainty about health and safety added an emotional burden to students. "Students were scared and experienced anxiety issues, and they did not want to study; it was hard to restore them to normalcy," she added. Such unwillingness to participate in academic tasks was not isolated, indicating that the pandemic's emotional impact affected not only a few students but the entire student population.

Additionally, the A.D. noted that the shift back to physical classrooms after a long period of online teaching was challenging for most students. "They had been used to e-learning post-COVID-19. Many students would have issues along the way to school because they are not accustomed to the classrooms and school program they used to have before," she posed. The emotional distress, as well as the disruption to their academic lives, greatly hampered their concentration in their studies.

Sub-theme 02: Decline in Academic Performance

The pandemic directly impacted students due to psychological distress, which negatively affected their academic performance. The interviewees added that students did not easily return to face-to-face learning after several months of online courses. The S.P. noted that students struggled to regain focus easily, which led to lower academic achievement. She said, "An urgent necessity to re-align and restructure the academic schedule was there. Educational technology tools have alleviated such challenging situations, and students have adjusted to the new norms of online classes and have resorted to the normal kind of education."

The A.D. noted that students experienced difficulties with classroom dynamics upon returning to offline learning. She said, *"The students experienced issues with coping with classroom activities and routine, which resulted in poor performance in educational aspects."* The I.C. further reinforced this: *"It was time-consuming to restore such classroom norms as punctuality and discipline among the students."*

Emotional distress and academic problems formed a loop that hindered students' learning. As the S.C. remarked, *"In addition to emotional challenges, the negative consequences of the pandemic were connected to the students' academic growth, as well. In addition, the pupils were performing dismally and experiencing learning and adaptation issues; this was both an issue for the pupils and the teachers."*

Nevertheless, over time, the use of educational technology enhanced students' academic performance. The I.M. observed that students became acquainted with technology, which significantly improved their performance.

Theme 2: Role of EdTech Tools in Addressing Psychological Well-being

The EdTech tools played a crucial role in supporting students' psychological well-being during and after the pandemic. The tools not only helped with academic recovery but also helped students manage the emotional stress caused by the pandemic.

Sub-theme 01: Psychological First-Aid Through EdTech Tools

EdTech tools served as psychological first aid, providing students with a structured, supportive environment to overcome their emotional struggles after the pandemic. The S.P. observed and said, "Children had a tough time getting back to school because the health issues caused fear and anxiety. The changing of lockdowns and student admission was a proven challenge. On their way back, there were various measures, like wearing masks, maintaining social distancing, and increasing awareness levels in health and hygiene, which created some doubts." Tools such as Google Classroom, Kahoot, and Nearpod helped stabilize and organize the process, enabling students to reconnect with learning and reduce emotional distress.

According to the A.D., the tools enabled teachers to deliver lessons in an exciting and engaging manner. She said, *"These tools helped teachers present their messages in an exciting and creative way. These tools offered more than academic continuity because they encouraged an interactive atmosphere, which offered emotional solace as they allowed students to feel normal."*

The I.C. also highlighted the role of EdTech tools in providing psychological first aid, especially in helping students rebuild resilience. She stated, "EdTech tools were psychological first aid and assisted students in regaining strength after the pandemic." It was also observed that tools such as storytelling apps, discussion boards, and breakout rooms helped maintain a healthy balance between emotional and academic well-being.

Sub-theme 02: Social Connection and Engagement

EdTech also significantly increased social connection and engagement, easing the emotional isolation many students faced during the pandemic. The A.D. noted that applications like Zoom and Blooket helped students stay connected with their teachers and peers, supporting their return to school. EdTech tools made students feel closer to their teachers and classmates. Features such as Zoom and Blooket facilitated interaction, participation, and connection with classmates, helping students resume a regular school routine.

The S.C. highlighted the importance of these tools in

helping students feel they belong to a particular place, which was crucial to their emotional stability. *“They were all connected with their classmates and teachers, and it assisted them in forming a sense of belonging, which was essential to emotional stability in the transition,”* she added.

The S.P. mentioned, *“EdTech tools helped to bring continuity in terms of social interactions, which was necessary to help students regain their confidence and interest. These resources were sources of education and entertainment that boosted the students' interest in learning before and after the pandemic.”*

Theme 3: Adaptive Learning and Support Mechanisms

The school responded to the pandemic by offering a blended learning experience with remedial assistance to help students overcome learning gaps and foster their emotional well-being.

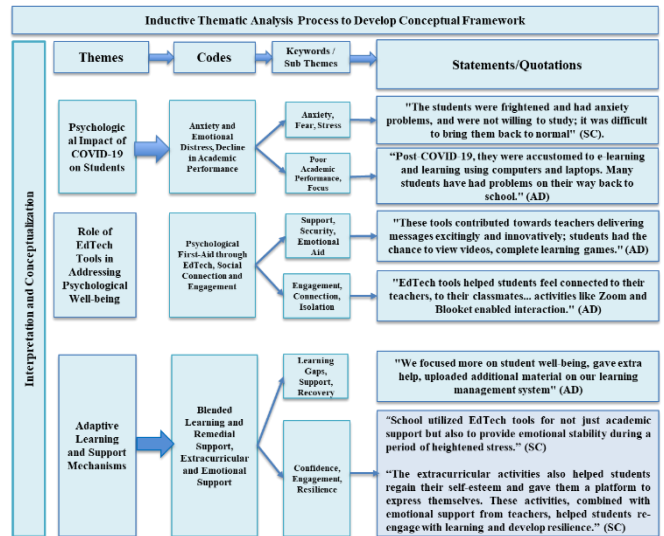
Sub-theme 01: Blended Learning and Remedial Support

Blended learning, which integrates face-to-face and online instruction, played a crucial role in addressing the academic challenges that students faced upon resuming school. The A.C. discussed, *“There was an inconsistency in the academic performance of students after the pandemic. The post-COVID-19 academic performance of students was not uniform upon their return to school. Online learning was good for some students, while others lag far behind.”* JGIS has introduced blended learning solutions, including remedial classes and individualized learning plans, to address this issue. The A.D. mentioned, *“We concentrated more on student well-being, provided additional assistance, posted additional content on our learning management system, and assigned them optional practice tasks.”*

The use of EdTech resources, such as Google Classroom, Nearpod, and Kahoot, enabled students to study at their own pace and receive additional support, allowing them to catch up on their academic progress and maintain emotional stability.

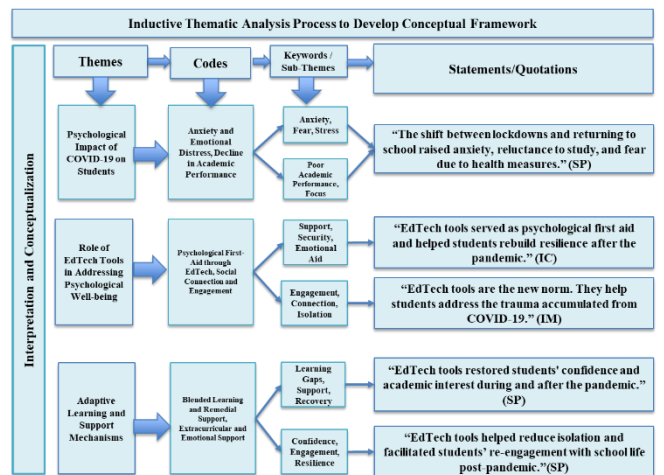
Sub-theme 02: Extracurricular and Emotional Support

JGIS also recognized the importance of extracurricular activities and emotional support in helping students transition back to school life. Such activities helped the students to reunify socially and restore their resilience. The A.D. emphasized the importance of creating a calm and supportive classroom environment. She said, *“They attempted to establish a positive well-being classroom atmosphere and the student well-being.”* Arts, sports, and leadership training were extracurricular activities that helped students restore their self-esteem and reduce anxiety. EdTech tools, such as Zoom and Kahoot, used in these activities also contributed to students' emotional well-being by providing virtual games and socialization options, thereby reducing emotional isolation.



NOTE: (here AD: Academic Director; SC: Student Counsellor; AC: Academic Coordinator)

Figure 1(a). Interpretation and Conceptualization (Systematic Thematic Analysis; Naeem et al., 2023)



NOTE: (here SP: School Principal; IC: IT Coordinator; IM: IT Manager)

Figure 1(b). Interpretation and Conceptualization (Systematic Thematic Analysis; Naeem et al., 2023)

DISCUSSION

Quantitative Analysis Findings

Leverage of EdTech Tools on Academic Performance

The quantitative research showed that educational technology tools could significantly explain improved academic performance after the pandemic. According to students, platforms such as Google Classroom and Kahoot were instrumental in improving their learning outcomes. The interactive content on those platforms also enhanced students' retention and understanding of academic content. The pilot study and the larger sample were statistically analyzed, revealing strong agreement on the positive effect of these

tools on students' academic performance. In particular, 95% of the students participating in the pilot study answered positively to the question of whether the EdTech tools enhanced their learning experience, and the same pattern was observed in the larger sample, with a mean of 0.9099 and a low standard deviation. Those results were statistically significant and indicated the general agreement on the positive influence of EdTech tools in different grades. EdTech tools also helped students adapt smoothly to the learning process, making it more engaging and enjoyable. This flexibility encouraged change, especially among students who experienced learning disruptions due to the pandemic [37]. The tools offered students a flexible learning schedule, allowing them to learn independently and complete their assignments. The flexibility helped students address learning gaps caused by school closures, allowing them to review lessons and assignments whenever needed.

Leverage of EdTech on Psychological Well-being

The analysis also revealed the significant positive impact of EdTech tools on students' psychological well-being. In particular, these tools were important in minimizing stress and anxiety in the post-pandemic era, when students were returning to face-to-face instruction. According to quantitative data, 95% of pilot participants and 90% of the larger sample reported that EdTech tools helped relieve stress and anxiety. Specifically, tools such as Kahoot, Google Classroom, and Zoom helped students feel stable and comfortable in an uncertain environment. These tools were highly organized and consistent, which played a vital role in reducing stress caused by the loss of routine and the transition back to physical classrooms. The survey also indicated that EdTech tools played a crucial role in addressing students' emotional needs. Applications like Google Classroom and Nearpod helped students communicate through discussion boards, group projects, and interactive activities, making them feel less isolated and more connected. These tools provided students with a secure, organized platform to ask questions, receive emotional support, and interact with their peers [38]. Counselors and teachers observed that these tools enabled students to share their feelings and engage in supportive conversations with their classmates, ultimately improving their mental health.

Involvement of EdTech for Offering PFA and Resilience Building Opportunities in Jeddah Schools after COVID-19

This section discusses a third research objective that shows role of advanced tools in supplying cognitive development of learners. It is proved in above analysis part that shows a significant connection between these variables. Focusing on students of Jeddah Schools helps to specify research and provide detailed information about mechanisms of EdTech platforms. During COVID-19 situation education sector takes different initiatives to engage students with learning and

minimising mental stress. It helps to create a collaborative study environment for learners and make them actively involved with learning process. Assessment for learning platforms involving Google Classroom and Zoom meetings helps to analyse its impact.

This study uses effective methods for analysing relevance of chosen objectives and for RO3 interview is conducted among participants. It helps to collect information based on personal experience and make this research scientific. Logical discussions are conducted to address the mechanism of learning platforms, provide digital support to education sectors and enhance chance for knowledge development among potential students. This objective suggests long term application of these platforms in institutions and provides support to students. Findings suggest that these tools are able to offer strong psychological resilience and help education sector in post-pandemic recovery [39].

Qualitative Analysis Findings

Psychological Impact of COVID-19 on Students

The qualitative analysis, which included interviews with key JGIS staff, revealed that COVID-19 had a significant emotional impact on students. The disruption of routines caused emotional distress and anxiety among the students; the move to online learning and the changes in health and safety policies were ongoing. The S.P. stated that the pandemic affected students' sense of stability and routine, increasing anxiety and making students reluctant to participate in learning. The S.C. also explained how many students lost confidence and motivation due to isolation and the lack of regular social interactions during the pandemic. This emotional stress was heightened by concerns about their future health and studies. The disruption of routines caused emotional distress and anxiety among students; the move to online learning and the changes in health and safety policies were ongoing. The S.P. stated that the pandemic affected students' sense of stability and routine, increasing anxiety and making students reluctant to participate in learning. The S.C. also explained how many students lost confidence and motivation due to isolation and the lack of regular social interactions during the pandemic. This emotional stress was heightened by concerns about their future health and studies.

Role of EdTech Tools in Psychological Well-being

The interviews also highlighted the role of EdTech tools in promoting students' psychological well-being during the pandemic. The A.D. stated that Google Classroom, Kahoot, Zoom, and other tools provided students with stability and order during this turbulent time. The tools helped establish a sense of normalcy and continuity, which was crucial to the students' emotional recovery. Additionally, EdTech tools, such as storytelling applications, discussion boards, and other features, enabled students to share their emotions and connect with others in a safe environment, thereby mitigating loneliness and anxiety [40]. The S.C. noted that such tools

enabled students to connect emotionally, which was essential during lockdowns.

Blended Learning and Adaptive Support Mechanisms

Blended learning, which combines face-to-face and online instruction, became one of the strategies to help students overcome the academic and emotional stresses caused by the pandemic. The I.C. discussed how JGIS adopted blended learning to create a flexible, responsive learning environment that meets students' diverse needs. This model allowed students to study at their own pace and provided personalized support to address gaps caused by the pandemic. Additionally, social-emotional learning (SEL) programs were introduced to help students develop emotional intelligence and resilience, thereby improving their overall well-being.

The study also examined the importance of extracurricular activities in supporting emotional recovery. These activities helped restore students' self-esteem and encouraged socialization. Meanwhile, EdTech tools were used for virtual events, team-building exercises, and social gatherings, during which students offered emotional support to one another.

Comparison with Previous Studies

The results of this study align with and expand upon existing research on the effects of EdTech tools in crises, particularly during the COVID-19 pandemic. The role of online learning platforms during the H1N1 pandemic emphasizes their importance in maintaining educational continuity during school closures. This supports the current study's findings, which showed that platforms such as Google Classroom and Kahoot significantly improved students' academic success and provided a framework that enabled them to continue learning even during the pandemic. These two studies highlight the crucial role of EdTech tools in helping students sustain their academic activities during times of crisis.

Likewise, the same concept is supported by studies that argue that EdTech applications can effectively address learning gaps arising from educational interruptions. Such studies have established that these tools play a critical role in addressing learning losses due to school closures, and students were able to make up for their academic progress despite long durations of remote learning. EdTech tools, including Google Classroom, Kahoot, and Zoom, enabled students to learn in an interactive and self-paced manner, which was especially useful for those who had faced setbacks during the pandemic.

However, this study makes a specific contribution to the literature by highlighting the dual role of EdTech tools. These tools not only supported academic recovery but also functioned as psychological support mechanisms that helped students cope with stress, anxiety, and isolation during the pandemic. These dual functions of EdTech as both academic and psychological first-aid introduce a new perspective on how technology can assist students during a crisis,

particularly in the post-pandemic era.

Combining emotional well-being with academic recovery through EdTech tools marks a significant advancement in educational technology.

CONCLUSION

Present research highlights importance of technology in education and discusses its effectiveness to improve academic performance. Learners attracted towards participative approaches and digital platforms provide such opportunities for students. This study demonstrates mechanisms of online learning platforms that enhance awareness of policymakers and educators regarding usage of advanced technologies. Statistical analysis enhances ability of educational organizations to identify trends and its ability to support mental-well-being of students. This research is extremely important for improving modern educational institutions and reducing academic stress for students. In summary, present research identify gaps in existing studies related to EdTech through emphasizing its dual role in academic and psychological recovery during crises. Integrating these tools into the learning process has been vital in improving students' overall well-being, offering a valuable lesson for guiding online learning in post-pandemic times.

Limitations and Future Recommendations

Limited sample size is involved in this research that is a limitation as it may not represent students from different geographic locations. Experiences during COVID-19 are different among students that enhance necessities for cross cultural studies. Other than that, focusing on a single school may not provide sufficient data to generalize a conclusion and enhance capability of the education sector.

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