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Mission Statement

The mission of Sukkur IBA University Journal of Educational Sciences and Technologies is to provide a premier interdisciplinary platform to researchers, scientists, educators and educationists from the fields of educational sciences and technologies for the dissemination of innovative solution oriented social and applied research.

Aims and Objectives

Sukkur IBA University Journal of Educational Sciences and Technologies publishes and encourages the submission of on the cutting edge research in the field of Educational sciences and technologies

Research Areas

- Science Education
- Maths Education
- Foundations of Education
- Educational Technologies
- Sports and Health Sciences
- Language, Pedagogy and Policy
- Humanities and Social Sciences
- Teacher Education and Training
- Technical and Vocational Education
- Teacher, School, Community and Society
- History of Education, Science and Technology

Research Themes

The research focused on but not limited to following core research domains:

- Classroom Management or Classroom-centered research
- Counseling and Guidance
- Development of Learning Environment
- Discourse Analysis
- Diversity and Learning
- Diversity and Teaching
- Education and Society
- Educational Management
- Educational Research
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- Augmented and Virtual Reality Based Education
- Technical and Vocational Education
- Educational Technologies
- Gamification and Simulation Based Education
- Engineering Education
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- Human Resource Management in Education
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- Mathematics Education
- Language and Pedagogy and policy
- Educational Technologies
- Teacher Education and Training
- School Teacher and Community
- Educational Society
- Foundations of Education
- Sports and Health Sciences
- Technical and Vocational Education

Patron's Message

Sukkur IBA University has been imparting education with its core values merit, quality and excellence since its inception. SIBA University has achieved numerous milestones in a very short span of time that hardly any other university has achieved in the history of Pakistan. SIBA University has established its Department of Education (DoE) in 2012 to improve, enhance and maintain the quality education through producing professionally trained teachers and researchers.

The Vision of the DoE is to become reputed teacher education department, which practices international standards of teaching, research, and training with the aim to produce world class teachers and educational managers. The broad goals of DoE are to develop innovative and effective educational models for school improvement, educational leadership and management, curriculum design and assessment and implement them in Pakistani educational contexts and classroom settings in order to get maximum benefits through economic growth and development. The prime purposes of DoE are to build the capacity of teachers and educational institutions to enhance teachers' and teacher educators' professional attitude, to elevate the status and self-esteem through fostering a sense of professionalism, knowledge, competencies, skills, critical thinking, scientific behavior and decision making power.

The SIBA Journal of Educational Sciences and Technologies (SJEST) provides a platform to educational professionals to share their research work. The Journal is multidisciplinary and serves wide areas of educational sciences and technologies. In particularly, this journal promotes researches that are essential for the enhancement of quality of education. SJEST aimed to achieve international repute and high impact research journal in near future.

Prof. Dr. Asif Ahmed Shaikh
Vice Chancellor and Patron SJEST
Sukkur IBA University

Editorial

Dear Readers,

It's a matter of great pleasure to bring you volume 04, issue 01 of ***Sukkur IBA University Journal of Educational Sciences and Technologies (SJEST),*** a multidisciplinary and interdisciplinary research journal. This issue went through the double-blind peer-reviewed articles, which address the key issues in the field of educational sciences, and technologies i.e., Academic Motivation among University Students; effect of COVID on mental health of people; role of STEAM education to enhance the critical thinking; problems of conducting quizzes in science classroom; and boarding issues faced by girls during their academic career, conducted through different research methods, in different context, and areas. The findings of the published papers will be helpful to understand the different points of view and directions about the different phenomena, which are a good addition to the body of existing literature.

SJEST has an institutional association with the ***Department of Education***, ***Faculty of Education, Sukkur IBA University,*** which beliefs in the quality of education and research, and the opening of this journal is an outcome of strong research orientation. In addition, the ***SJEST*** provides a valuable platform for national and international researchers to publish their research articles to disseminate their findings to the largest number of audiences globally to bring scientific and authentic solutions to the problems.

On behalf of the ***SJEST***, I welcome the submissions for the upcoming issues of the journal and looking forward to receive your valuable feedback for the betterment of the journal.

Thanks

Dr. Zafarullah Sahito
Editor-in-Chief
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Academic Motivation among University Students: A Comparison between Conventional and Online Students in Pakistan

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Abstract
There have been a lot of studies about the academic motivation of the students studying through conventional and online modes of education; however, only a few have compared the academic motivation of the students studying through the two modes. Realizing this gap, this study was conducted to compare the academic motivation of students studying through the two modes of education in Pakistan. Data were collected from 243 university students through a self-reported, five-point Likert-type academic motivation scale (AMS). There were statistically significant differences in six items (items # 1, 2, 3, 4, 13, and 17); out of which four showed higher academic motivation levels for online education students. However, overall no statistically significant differences were found between the two groups, nor was there any significant difference based on age. Gender-based analysis revealed that in academic motivation, there were statistically significant differences among females (female students studying through conventional mode reported higher levels of academic motivation than the females studying through online mode); however, no such differences were found among the male students.

Keywords: *Academic motivation, Online education, Conventional education, Higher education, Comparative study, Pakistan*

1. Introduction

Academic motivation plays an important role in students' success (Hustinx et al., 2009; Malik & Akkaya, 2021). Not only does it help the students in overcoming various types of stress (Hartley, 2011) but it is also "an important construct in the academic performance and success of a student" (Malik & Akkaya, 2021, p. 342). Due to its role and significance in students' lives, it has grabbed the attention of researchers from different parts of the world (Turabik & Baskan, 2015; Noyens et al., 2019; Volk, 2020; Brower et al., 2021).

Motivation can be intrinsic, extrinsic, or a combination of the two (Stipek, 1996; Malik et al., 2020). Intrinsic motivation comes from within; while extrinsic one is based on external factors (Essam & Al-Ammary, 2013). Studies suggest that intrinsic motivation plays an important role in improved academic performance and quality of work (Soenens & Vansteenkiste, 2005; Ning & Downing, 2010; Sakineh & Ali, 2020). Extrinsic motivation, on the contrary, is reported to be limited to coping ability (Ryan & Deci, 2000). A student who is intrinsically motivated (self-motivated), and has extrinsic motivation (in the form of appreciation, reward, or promotion) is likely to perform much better than the one who lacks them (Malik & Akkaya, 2021). The level and type of academic motivation may vary for students belonging to different academic levels, socio-economic backgrounds, and learning styles (Hardré et al., 2006; Sengodan & Iksan, 2012; Isik et al., 2018). One of the biggest differences may be based on the mode of education: conventional or online.

1.1. Comparison Between Online and Conventional Education Students' Academic Motivation

Some studies have been carried out comparing the academic motivation levels between online and conventional education students; however, they show mixed results. Wighting et al. (2008) in their study about university students found a higher level of intrinsic motivation among the students studying through the online mode of education. Rovai et al. (2007) found that online university students in America reported higher levels of intrinsic motivation than their counterparts studying through conventional mode. In their study comparing the academic motivation between Lithuanian university students studying through online and conventional modes of education, Malinauskas and Pozeriene (2020) also found that "students' intrinsic motivation scores were higher in online students than in students who attend traditional face-to-face classes" (p. 590); however, they did not find any differences based on gender.

On the other hand, some studies found lower levels of academic motivation among online students. Malik and Akkaya (2021) conducted a study about a Turkish university, comparing the academic motivation level of conventional and distance education students. They found that the students studying through distance education had lower levels of academic motivation. It was mostly attributed to the lack of peers and teachers' physical presence and support as the online and distance students' stress and lack of academic motivation were "likely to remain largely undetected" (Malik & Akkaya, 2021, p. 343). This may further be evident by the higher level of drop-out rate among online education students (Meister, 2002; Park & Choi, 2009) as the lack of motivation is considered one of the more significant factors behind the students' drop-outs (Wolcott & Burnham, 1991).

Yet, some studies show similar levels (or statistically insignificant differences) of motivation between online and conventional education students. In one such study, Stewart et al. (2010) found similar levels of motivation for online and traditional degree programs students in America.

1.2. Students' Academic Motivation in Pakistan

Academic motivation has also grabbed the attention of researchers in Pakistan. There have been a lot of studies about the academic motivation among students studying through conventional mode of education. Most of them focused on the level of academic motivation (Javaeed et al., 2019), the factors behind it (Ali & Pathan, 2017), and its impact on students' academic performance (Afzal et al., 2010; Buzdar et al., 2017).

In the recent decade, there has also been considerable research on academic motivation among online students in Pakistan (Tufail, 2018; Muzaffar & Yamin, 2021), or through online media (Waheed et al., 2016; Sulaiman & Shahid, 2022); yet studies comparing academic motivation between conventional and online education students in Pakistan are almost non-existent. In their study, Adnan and Anwar (2020) also pointed out this gap and highlighted the need and importance of carrying out such studies. As a result, this study has been carried out to reduce some of this research gap.

1.3. Research Objective and Hypotheses

The primary objective of this study is to compare the academic motivation level between conventional and online university students in Pakistan. Keeping that in mind, one main hypothesis (about the research objective), and two secondary hypotheses (about the demographic) have been developed.

H_1: There is no statistically significant difference in the academic motivation level between online and conventional education students.

H_2: In academic motivation, there is no statistically significant difference based on gender among online and conventional students.

H_3: In academic motivation, there is no statistically significant difference based on age among online and conventional students.

2. Methodology

2.1. Research Method and Tool

As the researchers intended to test pre-defined hypotheses, quantitative research was employed. Many studies in this area have also used the same research method (Wighting et al., 2008; Stewart et al., 2010; Malik & Akkaya, 2021). This study adapted a five-point Likert-type academic motivation scale (AMS) originally developed by Bozanoğlu (Bozanoğlu, 2004). The adapted scale has 20 items. Five questions about demographic and educational information were also added for the current study.

2.2. Research Population and Sample

The research population consisted of university students in Pakistan studying through online and conventional modes of education. The sample for this study consisted of 243 students (110 studying through the conventional, and 133 through the online mode of education).

2.3. Data Collection and Analysis Techniques

Data were collected from conventional education students through questionnaires that were distributed at the end of their lectures. Permission was sought from the head of the department and the subject teacher for this purpose. The objectives of the study and the students' rights as participants were first explained in the class. They were asked to sign an informed consent form to ensure research ethics. Data from online students was gathered through online questionnaires which were sent to them through their official email addresses. The first page of the online questionnaires (shared through Google Forms) was about informed consent. The students could proceed to the next page only after agreeing to it. To decide the type of data analysis, a Shapiro-Wilk test among normality tests was run. As a result of the analysis (Table 1), the data was found in a normal distribution (p=.138). Therefore, parametric tests were used to analyze the data. An independent t-test was used to compare the groups with different modes of education, age, and gender.

TABLE 1**:** Shapiro-Wilk Test

	Statistic	**df**	**Sig.**	**Skewness**	**Kurtosis**
Overall	.991	243	.138	-0.011	-0.201

3. Results

3.1. Comparing Academic Motivation of Online and Conventional Education Students

To test the first hypothesis (There was no statistically significant difference in the academic motivation between online and conventional education students), an independent t-test was run. The results of the t-test are given in Table 2.

As seen in Table 2, item number 3 has the highest mean (m=3.95) while item 11 has the lowest mean (m=2.56) for conventional education students. On the other hand, for online education students, item number 1 has the highest mean score whereas item 11 has the lowest mean score.

TABLE 2: Comparison of Academic Motivation between Online and Conventional Education Students

Items	Mode of Education	N	Mean	*t*	df	Sig. (2-tailed)	Sig. Level
1. I try to apply my academic knowledge in the outside world.	Online	133	4.03	3.522	241	.001	***p< .05***
	Conventional	110	3.65	3.480			
2. Learning only excites me for more.	Online	133	3.12	-3.733	241	.000	***p< .05***
	Conventional	110	3.62	-3.769			
3. I concentrate fully during the lecture.	Online	133	2.74	-9.826	241	.000	***p< .05***
	Conventional	110	3.95	-10.027			
4. I do not like school learning and tasks.	Online	133	3.09	2.729	241	.007	***p< .05***
	Conventional	110	2.65	2.758			
5. My learning excites me.	Online	133	3.14	.041	241	.967	*p>.05*
	Conventional	110	3.14	.041			
6. As compared to other students, I consider myself keener to work.	Online	133	2.92	-.006	241	.995	*p>.05*
	Conventional	110	2.92	-.006			
7. I prefer tasks that require hard work.	Online	133	2.47	-.827	241	.409	*p>.05*
	Conventional	110	2.58	-.829			
8. I love tasks that challenge me mentally and intellectually.	Online	133	2.83	-1.633	241	.104	*p>.05*
	Conventional	110	3.08	-1.637			
9. I set high and difficult goals for myself.	Online	133	2.79	-1.177	241	.241	*p>.05*
	Conventional	110	2.96	-1.181			
10. I like difficult and challenging tasks.	Online	133	2.85	1.379	241	.169	*p>.05*
	Conventional	110	2.65	1.391			
11. When I am focused on my work, I do not realize the lesson is over.	Online	133	2.60	.289	241	.773	*p>.05*
	Conventional	110	2.56	.279			
12. Learning new ideas and topics fascinates me.	Online	133	3.38	.569	241	.570	*p>.05*
	Conventional	110	3.30	.568			
13. I put in extra effort and do more work than what the teachers ask for.	Online	133	3.06	2.526	241	.012	***p< .05***
	Conventional	110	2.71	2.540			
14. Learning new things fascinates me.	Online	133	3.13	-1.013	241	.312	*p>.05*
	Conventional	110	3.27	-1.019			

15. I share my knowledge with other students.	Online	133	3.65	.661	241	.509	*p>.05*
	Conventional	110	3.55	.659			
16. I love to learn different subject(s).	Online	133	3.03	-.042	241	.966	*p>.05*
	Conventional	110	3.04	-.043			
17. I love learning even if it is not graded.	Online	133	3.12	2.183	241	.030	***p< .05***
	Conventional	110	2.79	2.180			
18. When I am engaged in learning, time flies away unnoticeably.	Online	133	2.84	-1.591	241	.113	*p>.05*
	Conventional	110	3.09	-1.587			
19. I look for other sources if the information is not available in textbooks.	Online	133	2.59	-1.764	241	.079	*p>.05*
	Conventional	110	2.84	-1.742			
20. I enjoy the questions in the examination.	Online	133	2.64	-.586	241	.558	*p>.05*
	Conventional	110	2.73	-.585			
Overall	**Online**	**133**	**3.0008**	**-1.858**	**241**	**.064**	***p>.05***
	Conventional	**110**	**3.0541**	**-1.864**			

There is a significant difference in items 1, 2, 3, 4, 13, and 17. When compared to students in conventional education, students studying through online mode have significantly higher mean scores in items 1, 4, 13, and 17. Conversely, there is a significant difference in the favor of the students with conventional education mode in items 2 and 3. Except for these items, the academic motivation of the students does not differ significantly between the two modes of education. Additionally, there is no significant difference in the overall mean scores of the students based on the mode of education. Thus, H_1 is accepted.

3.2. Gender-based Analysis of Academic Motivation of Online and Conventional Education Students

To test the second hypothesis which tries to find whether the academic motivation of the students differs between the two education modes based on gender, a t-test was utilized. The results of the t-test are given in Table 3.

TABLE 3: Gender-based Analysis of the Academic Motivation of Online and Conventional Education Students

Gender		Mode of Education	N	Mean	*t*	df	Sig. (2-tailed)	Sig. Level
Female	Overall	Online	67	2.983	-2.305	140	.023	**p< .05**
		Conventional	75	3.069				
Male	Overall	Online	66	3.019	-.054	99	.287	p>.05
		Conventional	35	3.021				

As seen in Table 3, there is a significant difference (p<.05) between the mean score of female online education students (m=2.983) and female conventional education students (m=3.069) although there is a slight difference between the groups among female students. It can be inferred from this result that female students are more motivated in face-to-face lessons than online ones.

On the other hand, when the academic motivation of male students is compared according to the education mode, male students who attended online education (m=3.019) and the ones who attended conventional education (m=3.021) have nearly the same score, and the difference is not statistically significant (p>.05). This shows that the academic motivation of male students does not differ according to the education mode they are in. Thus, H_2 is accepted.

3.3. Age-based Analysis of Academic Motivation of Online and Conventional Education Students

To test the third hypothesis, a t-test was utilized to find whether the academic motivation of the students differentiates according to education mode based on age. In it, online and conventional education students from the same age group are compared using a t-test. The results are given in Table 4.

TABLE 4: Age-based Analysis of Academic Motivation of Online and Conventional Education Students

Age of the Students		Mode of Education	N	Mean	t	df	Sig. (2-tailed)	Sig. Level
18-20	Overall	Online	3	2.800	-1.951	83	.054	p>.05
		Conventional	82	3.063				
21-23	Overall	Online	107	2.998	-0.349	131	.728	p>.05
		Conventional	26	3.014				
24-26	Overall	Online	23	3.041	-0.915	23	.370	p>.05
		Conventional	2	3.225				

Table 4 shows that although the academic motivation levels of conventional education students were slightly higher than those of online education students, the differences were not statistically significant. Thus, H_3 is accepted.

4. Discussion and Conclusion

Academic motivation is one of the most important factors in determining students' academic performance, quality of work, mental and emotional well-being, and overall success (Soenens & Vansteenkiste, 2005; Hustinx et al., 2009; Ning & Downing, 2010; Sakineh & Ali, 2020; Malik & Akkaya, 2021). Academic motivation of the students may vary depending on the socioeconomic background, academic level, and mode of education (Hardré et al., 2006; Sengodan & Iksan, 2012; Isik et al., 2018; Malinauskas & Pozeriene, 2020; Malik & Akkaya, 2021). There have been some studies comparing the academic motivation level between conventional and online students; however, they show mixed results, suggesting a need for further research in different contexts and settings.

This study compared the academic motivation of the university students who studied through conventional and online education modes in Pakistan. The findings show that when it came to the overall mean score for academic motivation, there were no statistically significant differences between conventional and online education students. While conducting a study about academic motivation, Stewart et al. (2010) also found that the differences between the two modes of education were not statistically significant.

A closer inspection reveals a more complicated and interesting picture. Out of the six items in which significant differences were found (1, 2, 3, 4, 13, and 17), four showed higher academic motivation levels for online education students. Something that the literature has been saying repeatedly (Rovai et al., 2007; Wighting et al., 2008; Malinauskas & Pozeriene, 2020). However, though not statistically significant, the overall mean was slightly higher for conventional students. It suggests that there is no clear tilt toward any group.

When it came to gender and age-based differences, the results were different. Gender-based analysis revealed that the differences were more prominent with female students studying through a conventional mode reporting higher academic motivation levels than the females studying through an online mode of education. These differences were also statistically significant. Multiple studies have found female students with higher levels of academic motivation (Brouse et al., 2010; Bugler et al., 2015). However, some other studies did not find any significant gender-based differences in academic motivation (Malinauskas & Pozeriene, 2020; Malik & Akkaya, 2021). When it came to age, the differences were statistically insignificant.

It is important to note that when it comes to gender and mode of education (conventional and online)-based differences in academic motivation, literature shows mixed results. It may have something to do with the fact that academic motivation is a highly complex phenomenon. Many other variables and factors can influence it such as the school and classroom environment, academic support, the infrastructure available at home and school, attitude of the teachers and fellow students, students' socioeconomic background, emotional and psychological conditions, interest in the

particular subject(s) and physical well-being. Many of the studies focus on a few of those variables and overlook others. It may be one of the reasons behind mixed findings for academic motivation.

Similarly, when it comes to online education, there are so many variables that can make a difference such as type (synchronous or asynchronous), availability and quality of online resources and systems, the expertise of the teachers, the quality of materials, basic infrastructure required for online education (electricity, internet connection, etc.) and many others. Many studies investigating online education (especially in the context of academic motivation) tend to ignore those factors. As a result, it appears that the students studying through online education in one institution are highly motivated, but others studying in the other one are not. The studies then tend to link it to the mode of education, overlooking context and other contributing variables.

Despite all the mixed results that the literature has shown over the years, one theme is dominant: academic motivation plays a vital role in not only students' academic success but also their overall well-being. Consequently, both the teachers and the institutions should develop students' interest, and try to cultivate a culture where they are motivated for their studies so that they can not only perform well academically but may also become stress-free, motivated, and productive human beings.

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A Study of the Covid-19 Pandemic from the Perspective of Effects on Mental Health

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Abstract
The world has faced excessive losses of human lives and the economy due to the COVID-19 Pandemic. Consequently, many psychological and mental health problems have occurred among the people of the world. This study focuses on identifying the effects of COVID-19 on mental health in terms of depression as well as anxiety symptoms. The content of previous research, news, and editorials about the 14 countries like China, the UK, Germany, Austria, Iran, India, Israel, Italy, Japan, America, Russia, France, Brazil, and Pakistan was analyzed. Google, Google Scholar, and Doaj.org databases were the sources for the search of the literature in this study. However, the search period was from the outburst of COVID-19 to July 31st, 2021. The study reveals that depression and anxiety symptoms prevail in the population of 14 countries. Such symptoms have a separate ratio and vary from country to country. Brazil has the highest anxiety and depression symptoms among the 14 countries. Few studies identified the mental health effects of COVID-19 more on females and youngsters. The imposition of lockdown, fear of economic losses, and strict measures to prevent the spread of the infection are identified as the reasons for the anxiety and depression.

Keywords: *Covid-19 Pandemic, mental health, psychological health, depression and anxiety symptoms.*

1. Introduction

This pandemic has proved to be a global challenge. It is a universal challenge for the healthcare systems, social values, and economic prosperity. We are not aware of when this situation of pandemic will end and also cannot estimate what number of people will be influenced by this virus. Besides, it is also difficult to say how many lives will be claimed by the virus (Mamun et al., 2020). COVID-19 is not only a threat to physical health. It additionally endangers mental as well as psychological health. The psychological and mental health of a human being is a condition of well-being whereby he or she understands his or her capacity to handle the usual stress of life. The mental health impact owing to COVID-19 is extensively witnessed (Lima et al., 2020). Nonetheless, as the world appears to pay attention to the infectious part of the COVID-19 pandemic, an ascent has been seen in mental health disorders. New terminologies appeared in the media, scientific, and academic papers. Such terminologies are social distancing, quarantine, and social isolation (Brooks et al., 2020). Later on, the world took this situation of the pandemic as a serious problem. The people used such terminologies in their daily discourse. The governments introduced the system of lockdown under their respective powers. Fear of death and transmission of Coronavirus from person to person has become common in societies throughout the globe. Furthermore, due to lockdown financial issues, fear of losing employment caused many psychological and mental health problems. The Academia, media, and other surveying bodies reported the impacts of COVID-19 in terms of panic, anxiety, depression, sleeping disorder, stress, psychological distress, frustration, anger, and emotional exhaustion. However, depression refers to a prevalent mental health problem. A persistently low mood, a decline in enjoyment, or a lack of interest in activities are all signs of depression. According to the National Institute of Mental Health (n.d.), depression is a serious but common mental illness. In addition, anxiety is a natural feeling that can manifest itself in physical signs like sweating and trembling (Felman, 2023). According to the American Psychological Association, anxiety is a type of emotion featured by body tension, anxious thoughts, and physical changes such as high blood pressure.

The coronavirus pandemic carries novel difficulties for individuals. The virus not only spreads infection, and illness and becomes a cause of mortality, but in addition, it also influences on behavior and social and mental conditions of the human being (Pahore et al., 2021). The disease-controlling measures consisting of social distancing, isolation, and quarantine have been adopted. Such measures affect human behavior and lead them toward psychological, emotional, and social disorders including suicide, depression, fear, and anxiety (Pedrosa et al., 2020). Forced quarantine and lockdowns in order to fight against COVID-19 further intensified the situation, as it caused server types of panic, nervousness, anxiety, fanatical practices and depression, and post-traumatic stress disorders (PTSD) over the long time. This in addition provided power by an “infodemic” spread by means of various foundations of web-based media (Dubey et al., 2020).

As the COVID-19 pandemic quickly spread throughout the world, it is actuating an extensive level of dread, stress, and worry in people everywhere and among specific groups specifically, like more old age persons, care providers, and individuals with feeble medical issues. As far as mental health is related, the important psychological influence of COVID-19 is an increase in stress and anxiety

rates. The new measures which have been introduced have affected the routine life and livelihoods of the people. It has caused depression and loneliness. People use drugs and harmful alcohol in order to relieve their stress. Self-harm such as suicidal behavior also ensued due to these special measures for controlling COVID-19.

The impacts in terms of psychological and mental health vary from country to country as every country has its own different social, economic, political, and cultural conditions. Eventually, in this study data regarding the mental health indicators and their level have been collected from secondary sources regarding the 14 countries i.e. China, United Kingdom, Germany, Austria, Iran, India, Israel, Italy, Japan, America, Russia, France, Brazil, and Pakistan. So, the following aims and objectives have been designed.

1.1 Aim and objectives

The study aims to mention an overview of the mental health impacts of COVID-19 as shown in previous research, news, and editorials. This study also has the objective of knowing symptoms of anxiety, and depression, and their rate caused due to COVID-19.

2. Methods

The content analysis method was used. Previous research, news, and editorials regarding the 14 countries including China, the UK, Germany, Austria, Iran, India, Israel, Italy, Japan, America, Russia, France, Brazil, and Pakistan were searched to ascertain the impacts of COVID-19 on mental health. However, Google, Google Scholar, and Doaj.org databases were utilized for the search of the literature spending from the outbreak of the COVID-19 Pandemic to July 31st, 2021. While searching the content for this study, the objectives of the study were kept in mind. A total of 33 researches, news, and editorials were searched and included in this analysis.

3. Results

The data have been described in two parts. In the first part, the content related to the impacts of the coronavirus on mental health especially concerning anxiety, depression, loneliness, and psychological disorders has been described. While in the second part special focus has been given on the level of anxiety and depression among the 14 selected countries and shown in the tabular form.

According to Ran et al. (2020) during COVID-19 prevalence of psychological symptoms has increased. Severely affected areas had higher numbers of GHO (General Health Questionnaire) i.e. anxiety and depression symptoms. The risk of higher cases was due to larger family members and common outdoor visits. In some affected areas, extra uptake care and protection measures caused mental illness. The pandemic of COVID-19 first erupted in China. Many studies were carried out to identify the different influences of this pandemic on Chinese society. In this regard, our focus is the study carried out by Wang et al. (2020). In this study, the researchers involved 1210 respondents from 194 different cities in China. This study identified the depression ratio in the Chinese

population due to COVID-19 as 16.5% in terms of moderate to severe. While the anxiety ratio was reported as 28.8% under the same conditions of moderate to severe.

Knolle et al. (2021) examined that in European countries like the United Kingdom and Germany, people had faced worsening psychological, mental, anxiety, and depression symptoms respectively. It is observed that pandemic effects relating to mental health have increased in the population of both countries, but a higher rate of mental disorders like anxiety and depression have occurred in Germany as compared to the United Kingdom. Respondents from the United Kingdom had a higher clinical ratio and higher prevalence rate. Regarding the percentage of the United Kingdom population regarding depression and anxiety indicators Jia et al. (2020) in their study identified that 64% of respondents had symptoms of depression and 57% had symptoms of anxiety. Additionally, about the symptoms of anxiety and depression in Germany, Bäuerle et al. (2020) discovered in their study a noteworthy surge in the prevalence of the ratio of symptoms of anxiety, depression along with psychological distress and fear about COVID-19. The ratio individually is 44.9% anxiety, 14.3% depression, 65.2% psychological distress, and 59% fear about COVID-19. In this study, this ratio of anxiety and depression was identified to be higher in younger people and females.

A longitudinal study conducted by Pieh et al. (2021) revealed that Austria received the first case of Coronavirus on 25th February 2020. In March 2020, the Government of Austria levied a lockdown. This resulted in mental health issues and such issues increased in the general population at some scale. Later on, a comparison was made between Pre and after-lockdown. It was found that depressive anxiety symptoms were more than previous records. So, this study has discussed the impacts of lockdown in Austria and also compared the same pre and after-lockdown conditions. A study by Vahedian-Azimi et al. (2020) was conducted as a general cross-sectional survey in Tehran, the capital of the Islamic Republic of Iran from February to March 2020 involving four groups of participants. This study reports the occurrence and compares the rigorousness of stress, anxiety, as well as depression. This study further showed COVID patients and medical students had higher rates of stress along with anxiety, and depression in the comparison of other groups of this study. Furthermore, depressive cases were higher in female medical staff and community populations as compared to male members of the medical staff and community. Another research conducted by Shahriarirad et al. (2021) from the Iranian perspective shows the prevailing depression and anxiety symptoms in the Iranian population as 15.1% and 20.1% respectively. However, this study shows such symptoms were more common in female respondents in comparison to male participants.

A meta-analysis and systematic review were conducted by Singh et al. (2021) who stated that COVID-19 spread rapidly in overpopulated cities of India. Mental health problems and psychological disorders hit general public health and Health Care Workers. The ratio of the occurrence of stress among the study population as per this study is 60.7%, anxiety 34.1%, depression 32.7%, and sleep disturbance 26.7%. This study showed different reasons for the mental problems during the times of the prevalence of COVID-19 in HCWs. Such elements as per this study are higher work hours, direct contact with patients, and fear of spreading the disease to their family members.

Amit et al. (2021) in the perspective of Italy and Israel examined that Italy and Israel have similar health service models. Both countries have the most developed and advanced health facilities as well. Despite these facts, very severe measures were taken regarding COVID-19 in Italy as well as in Israel in the month of March 2020. COVID-19 viral situations in both countries were greatly different. Before the epidemic, the Italian data from the National Statistical Institute indicated an anxiety rate of 4.2% and depressive symptoms occurrence of 5.4%. After the epidemic, it became 29.7% depressive symptoms and 23.2% anxiety level in the general population. In Israel, data from the Israeli Central Bureau of Statistics shows before COVID-19 the existing ratio of anxiety was 3.6% and depression was 10.5 to 12%. In April 2020 results suggest one-third of the adult Israeli population became the victim of mental disorders. Regarding the impacts of COVID-19 in Japan Nagasu et al. (2021) studied that COVID-19 has drastic effects on psychological distress in the general population. It is mainly due to socio-economic status (SES) and lifestyle factors. More than half participants felt psychological distress. In this context, Stickley et al. (2020) carried out a survey and included 2000 Japanese adults as participants. This study reveals that the occurrence of the anxiety in Japanese adult population due to COVID-19 is 10.9%, while 17.3% of adults showed symptoms of depression.

About the United States of America, Bhattacharjee & Acharya (2020) in their study have discussed Coronavirus as a public health emergency as declared by Health and Human Services (HHS). Enormous deaths of Americans almost 100,000, created fear in the minds of the general population in America. 72% of Americans were of the view that their lives have been affected by the onset of COVID-19 which resulted in many psychological disorders i.e. depression and stress. Moreover, dubious information about disease transmission has been proven to be another major cause of the ill mental health of Americans. Lockdowns in the country increased the unemployment rate and slashed down the economy of the country. In this context loss of employment and fear of losing employment proved to be leading elements of mental disorders. However, Liu et al. (2020) involved 898 U.S adults in an online survey and the results of this survey revealed that the participant's depression level was 43.3%, PHQ-8 score $\geq$ 10, and anxiety level was 45.4%, GAD-7 score $\geq$ 10 due to COVID-19 in the U.S.A. Whereas, from the Russian perspective, Karpenko et al. (2020) explained that COVID-19 heavily influenced the mental health of the Russian people. The first case of the pandemic in Russia appeared on 2nd March 2020 in Moscow. Consequently, the Russian president declared a holiday in the country. Citizens were restricted to their houses from 30th March 2020 to 12th April 2020. In this regard, they were only allowed to go to the nearest shops, and visits to nearby or far-distance travel were not allowed. Violation of rules prescribed to be punished with a penalty of 4000 roubles (US$57) for each violator. These circumstances created mental health problems among the population. Such mental problems were observed to be depression, anxiety, and psychological distress. Regarding the prevailing anxiety and depression levels among the Russian population a study conducted by Mosolova et al. (2021) on healthcare workers (HCWs) whereby 2195 HCWs were involved, it was revealed that in the Russian population rate of anxiety and depression was 32.3%, and 45.5% respectively.

Ramiz et al. (2021) discussed that the Coronavirus outburst in France was observed in March 2020. This simple appearance of COVID-19 in French society altered the daily routine of French people and caused mental disorders including sleep disorders, anxiety, and depression. The situation further deteriorated with the imposition of the lockdown whereby masses were put into quarantine. They were only allowed to go outside to cater to basic needs and for medical purposes. The occurrence of anxiety level in French people according to this study is 20.1% and depression is 27.6%. In Brazil, heavy influences of COVID-19 were observed on mental health as provided by Goularte et al. (2021). This study examined that in Brazil COVID-19 as the result of the appearance of the first case, the government announced a health emergency on 3rd February 2020. Almost by 19th May 2020, COVID-19 spread in all areas of Brazil. Most psychiatric and mental illnesses during the prevalence of COVID-19 in Brazil according to this study were identified to be anxiety 81.9%, anger 64.5% depression 68%, somatic symptoms 62.6%, and sleep problems 55.3%. Such psychological problems seemed to be common and with a higher ratio in youngsters, less educated people, and persons with less income.

Relating to Pakistan and COVID-19, Khan et al. (2020) state that in February first case of coronavirus appeared in Pakistan. As an increase in the positive cases, the government in Pakistan followed the culture of lockdown. Strict measures were introduced to prevent the spread of the disease. The survey indicates that the lockdown created psychological problems in the general public of Pakistan. The salaried class of people in Pakistan was affected heavily. Almost 30 million had lost their jobs during the shutdown of the country. 68% of the population was revealed to be afraid of transmitting the disease. More than half of the population was significantly affected by social media and news channels spreading fear which causes mental disorders. Amin et al. (2020) identified from the Pakistani perspective the level of anxiety and depression among Pakistani doctors and this was 43% individually. Moreover, Baloch et al. (2021) observed minimal to moderate, severe, and most extreme levels of anxiety among their participants at 25.3%, 9.1%, and 6.9% from the Pakistani perspective.

Masterson (2021) tells about the point of view of Audrey Kearney, Liz Hamel, and Mollyann Brodie from the KFF survey team who state how the pandemic affects mental health. Such ways are worry and stress about the spread of the virus, fear of losing of job, child care loss, and loss of a loved one when they die due to the pandemic. Similarly, Zandifar & Badrfam (2020) in a letter to the editor cited Xiang et al. (2020) and stated that pandemics and epidemics cause serious reservations such as death fear and a rise in the ratio of patients. When people are quarantined a feeling of anger and loneliness is generated among the population. Salari et al. (2020) pointed out the potential and power of COVID-19 in affecting mental health and stated that the virus has the potential to affect the mental health of various communities. So, it is necessary to protect the mental health of individuals and an intervention may be developed which may improve the mental health of groups with the definition of vulnerability.

4. Discussion

This study aims to analyze the content of previous research, news, and editorials, about 14 countries comprising China, the UK, Germany, Austria, Iran, India, Israel, Italy, Japan, America, Russia, France, Brazil, and Pakistan from different databases to identify the impact of COVID-19 on Mental Health. Therefore, in this second phase of the data analysis special focus has been given first to mention the dates of the first COVID-19 case occurrence in the abovementioned countries. Secondly, under Table 2 anxiety and depression symptom levels among the population of the above countries are discussed. Data regarding anxiety and depression levels have been collected as a secondary from different sources.

Table 1. Showing the date of the first case of COVID-19 appeared in different countries

First Case of Corona (Covid19)	Country Name
17th November 2019	China
31st January 2020	United Kingdom
27th January 2020	Germany
25th February 2020	Austria
19th February 2020	Iran
27th January 2020	India
21st February 2020	Israel
31st January 2020	Italy
16th January 2020	Japan
31st January 2020	United States of America
2nd March 2020	Russia
27th December 2020	France
26th February 2020	Brazil
26th February 2020	Pakistan

It is revealed that the first-ever case of COVID-19 in the world occurred in China on 17th November 2019. This first-ever occurrence of the case caused long-term impacts on the world in almost all aspects of life, including social, economic, political, and health (both physical and mental health). The data further shows that on 16th January 2020 cases of COVID-19 appeared in Japan. The United States of America which has the world's first-class health services observed the first case on 31st January 2020. While in Pakistan COVID-19's first case appeared on 26th February 2020. After, this date governments including federal as well as provincial imposed lockdowns in Pakistan. Such lockdowns left numerous effects on the mental health of the Pakistani people as well.

Table 2. Showing Anxiety and Depression Symptoms Levels in different countries

Country Name	Anxiety Symptoms Level	Depression Symptoms Level	Study
China	28.8%	16.5%	Wang et al., 2020
United Kingdom	57%	64%	Jia et al., 2020
Germany	44.9%	14.3%	Bäuerle et al., 2020
Austria	19.7	21.6%	Pieh et al., 2021
Iran	20.1%	15.1%	Shahriarirad et al., 2021
India	34.1%	32.7%	Singh et al., 2021
Israel	1/3 Adult Population	1/3 Adult Population	Amit et al., 2021
Italy	23.2%	29.7%	Amit et al., 2021
Japan	10.9%	17.3%	Stickley et al., 2020
USA	45.4%	43.3%	Liu et al., 2020
Russia	32.3	45.5%	Mosolova et al., 2021
France	20.1%	27.6%	Ramiz et al., 2021
Brazil	81.9%	68%	Goularte et al., 2021
Pakistan	43%	43%	Amin et al., 2020

Coronavirus is a contagious disease. It has an important effect on mental and psychological health as exposed by many studies conducted in the different parts of the world. Feelings of anxiety, worry, and stress have been reported by the studies as the manner of the effects of COVID-19 on mental health. Every government throughout the world introduced lockdown as an effort to control the spread of the virus. Due to lockdown, quarantine, and self-isolation, enormous people faced mental disorders just as anxiety, stress, depression, psychological distress, anger, frustration, and sleep disorders. Besides, due to mental health problems masses suffered economic losses too.

This study, in this context, indicates the mental health problems as such symptoms of anxiety as well as depression across 14 countries i.e. China, UK, Germany, Austria, Iran, India, Israel, Italy, Japan, America, Russia, France, Brazil, and Pakistan. The content analysis of the secondary sources in the shape of research articles, news reports, internet sources, and editorials is being made. The data of the above-mentioned countries are shown in Table 2. This revealed that in China, anxiety symptoms are 28.8% and depression symptoms are 16.5%. In contrast with other countries, the United Kingdom and Germany both have higher medical facilities and technologies but in the United Kingdom anxiety symptoms are 57% and depression symptoms are 64%. However, in Germany, 44.9% anxiety and 14.3% depression symptoms are observed from the content analysis of the different sources. In Austria, anxiety symptoms are 19.7% and depression symptoms are 21.6%. Anxiety and depression symptoms in Iran are recorded from different sources are 20.1% and 15.1% respectively. In India, anxiety, and depression levels are collected as 34.1% and 32.7% individually. Our data express that in Israel 1/3 adult population showed

symptoms of anxiety as well as depression during the days of COVID-19. While, in Italy, the ratio is 23.2% relating to anxiety symptoms and 29.7% regarding depression symptoms. In Japan, anxiety, and depression symptoms are 10.9% and 17.3% respectively. In the USA, anxiety and depression symptoms are counted as 45.4% and 43.3% respectively. In Russia anxiety and depression symptoms are 32.3% and 45.5% due to strict restrictions by the Government created mental illness. In France, anxiety, and depression symptoms are 20.1% and 27.6% due to changes in the daily routine of French people. The main symptoms were sleeping disorders. In Brazil the highest anxiety and depression symptoms are reported i.e. 81.9% and 68%, this is due to social distancing, financial issues, less education, and a history of psychiatric illness. In Pakistan anxiety as well as depression symptoms are 43% individually in the population of doctors. However, generally, anxiety and depression were also revealed in the Pakistani population in a good proportion. It is due to poverty, people who depend on their salaries and daily wages lose their jobs, and they are afraid of transmitting disease. Besides, social media and news channels are found to be a powerful source of spreading fear and anxiety in the Pakistani population.

5. Conclusion

This content analysis is about the impacts of COVID-19 on mental health especially the symptoms of anxiety and depression due to COVID-19 among different categories of population (Male, Female, Doctors, and Youngsters) of 14 countries. The data for this study were searched from previous research, news reports, and editorials which were available on Google, Google Scholar, and Doaj.org. The study concludes that the symptoms of anxiety and depression prevailed among the population of the countries selected for this study i.e. China, UK, Germany, Austria, Iran, India, Israel, Italy, Japan, America, Russia, France, Brazil, and Pakistan. Such symptoms have a separate ratio and vary from country to country. Moreover, the highest percentage of anxiety (81.9%) and depression (68%) symptoms were discovered in Brazil. However, the results of the previous studies show that these studies were either conducted on the general population or the special categories of populations such as males, females, doctors, and youngsters. Few studies revealed that the symptoms of anxiety and depression due to COVID-19 were more in the female participants. Besides, a few studies identified that this ratio is higher in females as well as younger populations. Few studies compared the anxiety and depression levels among their participants before and after the outbreak of the pandemic. The imposition of lockdown and measures to control the spread of the virus is identified to be the major reasons for anxiety and depression. Besides, fear of economic losses and jobs is also one of the reasons for anxiety and depression as identified by this content analysis. It is clear from this study that pandemic not only affected the population of the underdeveloped countries but also the population of most developed countries has been equally affected.

It is recommended that more studies on this pattern of knowing the symptoms of anxiety and depression due to COVID-19 be conducted. We saw a huge literature present on the different databases about different countries. Therefore, in this context, the prevailing symptoms of anxiety, depression, and other psychological impacts may be discovered on a large scale by adopting

different methodologies. Besides, such studies on a regional basis are suggested to be conducted. Especially, from the perspective of South Asian countries. Additionally, recommended that the world should introduce methods of controlling pandemics like coronavirus which may least affect the mental health of people and may not cause economic losses to the public.

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STEAM Education: A Pathway to Enhance Critical Thinking in Dynamic Elementary Classrooms

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Abstract
Developing 21st century skills is crucial for our future leaders. One effective way to foster these skills is through STEAM education, which combines Science, Technology, Engineering, Arts, and Mathematics to promote critical thinking and competency in learners. In this study, we conducted individual-based action research in a school located in Karachi, Pakistan to explore the incorporation of STEAM education in the country's education system. Our goal was to create a constructivist classroom environment that would promote experiential learning. The study involved 20 Grade VII female learners, who were studying Science and Mathematics. Over a period of 4 months, we applied STEAM activities in 2 cycles comprising of 9 lessons. We collected data through the application of the STEAM approach in the classrooms, using various tools including interviews, online quizzes, padlet, jam boards, and concept cartoons. We also used qualitative research methods such as field notes, anecdotal records, and rubrics to analyze the data. Despite facing challenges such as limited resources, lack of previous exposure to STEAM, limitations of the curriculum, and a shortage of professionally qualified teachers, we were able to achieve satisfactory results at the end of both cycles. The learners became more technologically adept, independent, and intrinsically motivated to learn. In conclusion, incorporating STEAM education in the Pakistani education system has the potential to create a more dynamic and engaging classroom environment that promotes critical thinking, creativity, and problem-solving skills in learners the STEM education is actually need of the students for todays world.

Keywords: *teachers' teaching techniques, teachers' assessment strategies, students' reading attitude and performance in English subject.*

1. Introduction

Critical thinking is an essential skill for students to develop to succeed in the 21st century. This assertion is supported by research, such as the comprehensive study by Dwyer et al. (2014), which emphasizes critical thinking as a crucial competency for navigating complex global challenges**.** However, traditional teaching methods may not effectively promote the development of critical thinking skills. The traditional teaching model often employs rote memorization and standardized testing, which may not engage students and foster the development of critical thinking skills (Wong & Wong, 2017). This limitation of traditional methods is further corroborated by Abrami et al. (2015), who found that explicit and purposeful critical thinking instruction is more effective than implicit approaches. One approach that has gained increasing attention in recent years is the integration of STEAM (Science, Technology, Engineering, Arts, and Mathematics) education into the curriculum. Teachers can create an environment that encourages critical thinking and problem-solving skills by fostering dynamic elementary classrooms using STEAM frameworks. This aligns with the findings of Perignat and Katz-Buonincontro (2019), who observed that STEAM education enhances students' cognitive flexibility and innovative problem-solving abilities**.** On the other hand, the STEAM framework provides an interdisciplinary approach that emphasizes inquiry-based learning, creativity, and problem-solving skills (Choi et al., 2017). This interdisciplinary nature of STEAM is particularly effective in developing critical thinking, as noted by Henriksen (2014), who argues that integrating arts with STEM subjects cultivates more holistic and creative problem-solving approaches**.** STEAM education aims to promote critical thinking skills by allowing students to explore real-world problems through hands-on activities that require them to apply knowledge from multiple disciplines. This approach is supported by the research of Land (2013), who found that engaging students in authentic, real-world problem-solving significantly enhances their critical thinking abilities**.** Science, Technology, Engineering, Arts, and Mathematics (STEAM) education has become increasingly important in the global workforce, where proficiency in these subjects is becoming a necessity (National Science Foundation, 2019). This trend is further emphasized by the World Economic Forum (2020), which predicts that 85 million jobs may be displaced by a shift in the division of labor between humans and machines by 2025, while 97 million new roles may emerge that are more adapted to the new division of labor between humans, machines, and algorithms**.** As the world continues to become more technologically advanced, the need for individuals who can apply STEAM skills in their careers is only going to increase. In Pakistan, where the economy is rapidly growing, there is a need for a skilled workforce in these areas, particularly among the youth (Pakistan Economic Survey, 2021). This need is further highlighted by a study from the Asian Development Bank (2019), which found that Pakistan faces a significant skills gap in STEAM fields, with only 16% of university graduates in these disciplines. Therefore, it is crucial for secondary schools in Pakistan to offer STEAM education to their students to equip them with the skills they need to be successful in the future. In Pakistan,

where the economy is rapidly growing, there is a need for a skilled workforce in these areas. According to the Pakistan Economic Survey (2021), the government of Pakistan has identified the development of human capital as a key driver of economic growth, and STEAM education is a crucial component of this. This aligns with global trends highlighted by UNESCO (2019), emphasising the importance of integrating STEAM subjects to foster innovation and problem-solving skills essential for addressing complex global challenges. Furthermore, a study by the Lahore University of Management Sciences (LUMS) found that students with access to STEAM education were more likely to pursue careers in STEAM-related fields and had better employment prospects (LUMS, 2020). This emphasizes the importance of STEAM education in providing students with the skills and knowledge necessary for success in the workforce. Secondary schools in Pakistan are currently facing a significant challenge in preparing their students for the workforce of the 21st century. The traditional education system in Pakistan has been criticized for focusing on rote learning and memorization rather than promoting creativity, innovation, and critical thinking skills (Ali & Razzaq, 2021). This approach to learning may leave students ill-prepared for the demands of a rapidly changing global workforce, particularly in STEAM-related fields (Khalid & Ahmad, 2019). Therefore, there is a need for secondary schools in Pakistan to adopt a STEAM education approach to prepare students for the challenges of the future. This need is further emphasized by the Higher Education Commission of Pakistan (HEC) (2019), which stresses the importance of integrating STEAM education into the curriculum to produce skilled professionals who can meet the demands of the 21st-century workforce**.** In light of the above local and international research, it is clear that there is a need for secondary schools in Pakistan to adopt a STEAM education approach to prepare students for future challenges. By providing students with hands-on, real-world experiences that encourage creativity, critical thinking, and problem-solving skills, STEAM education can help develop a skilled workforce in STEAM-related fields, which is crucial for Pakistan's economic growth and development. This approach is supported by a meta-analysis by Abrami et al. (2008), which demonstrated that active learning strategies, central to STEAM education, substantially positively affect students' critical thinking development. Despite the potential benefits of STEAM education, there is limited research on the specific ways in which it can foster dynamic elementary classrooms and enhance critical thinking skills in the Pakistani context. Therefore, this study aims to explore the relationship between STEAM education and the development of critical thinking skills in elementary classrooms in Pakistan. Specifically, the research objectives are to investigate how STEAM education can provide learners with opportunities for life-long learning experiences with problem solving attitude.

1.1. Research Objective and Questions

- To examine how STEAM education can engage learners in critical thinking processes and inquiry-based learning.

- To assess how STEAM education can prepare learners for twenty-first-century challenges and contribute to their future success.
- To explore pedagogies and strategies teachers can use to incorporate STEAM into their daily science and mathematics lessons.
- To provide insights into student-cantered classrooms' benefits and how STEAM learning develops competent individuals in Pakistan.

By addressing these objectives, this study seeks to contribute to the development of essential skills among learners and promote a student-cantered learning environment in Pakistani schools. This would ultimately enhance the quality of education and prepare students for the handling the challenges of the today's world.

2. Literature Review

Integration of across multiple disciplines in education and embedding these with the 21st century skills makes room for innovation in a nascent mind. Knowledge, understanding of STEM education are important factors to be on this track. Using context for STEM is a challenge as the focus here is not only to get an understanding of terms, but to understand the issue to find its solution. "It is a challenge to understand that STEM is not just a slogan; its education does have a purpose. (Bybee, 2013)". Previously, Science, Technology, Engineering, and Mathematics were represented by the acronym SMET. The main purpose of introducing it was to enhance critical learning power and to get an advantage in the job market in comparison to those who didn't get exposure to STEM. It was first used in the field of engineering for the revolution in technology, such as the bulb, automobiles, etc.

As technology and engineering are the higher-level fields and incorporating them at a school level is quite a challenge. At this level it is required that along with the integration of all four fields in STEM and then Art (STEAM), a curriculum should also include; Evaluations that are more process-based than product-based; Teaching techniques to generate social constructivist and inquiry-based activities; inclusion of digital and tech aided methods like involving robotics augmented project-based learning. STEAM education can achieve a variety of outcomes, including the enhancement, development and improvement of 21st century skills. Although fostering love and interest for a variety of fields STEAM brings a creative element to learning while it's happening but still there are some limitations too and those can be stated as it consumes time, is costly, different curriculum is required, it is difficult to understand without training, and multiple resources are needed. (Kanadlı, 2019). It is believed that the Arts incorporated into STEM cause creativity, problem-solving capability, and build critical thinking ability. Through this approach, new kinds of questions and their diverse answers are coming forward. It makes a child developed while considering the required links in transition from school education and higher education. It fosters some practices like simulation, problem solving, and metacognition. The arts in education

concepts promotes the creative and artistic side of the students thinking which facilitate them to pursue their career in arts field.

STEAM provides a learner with new experiences and opportunities to explore and survive in a diverse world like through imagery and photography, science in schools can be incorporated by teaching optics, biomolecules etc and through films making and movie clips manipulation desktop tech- tool can be used in class. Traditional teaching styles are not helpful in making children capable of problem solving. STEAM will help to eliminate these obstacles. The traditional teaching methods only promotes the limited learning focused on books whereas the modern teaching methods which includes ICTs in education and STEM education promotes the creative side of the students learning process which facilitate students as well as teachers.

The student-centred classrooms cause the engagement of learners, which leads to the learners' autonomy, interest, and inclusion of all learners. During the research, researchers discovered that one of the limitations to STEAM education is that a teacher does not understand what the term "Arts" means. They mostly incorporate any fine arts activity, starting with music and dance, which is not delivering the purpose and is diluting the real concept. The teacher must deliver the same concept through a different approach, like any art activity that further emphasises the topic or content (Park, 2021). Furthermore, the teacher needs to understand that the art education is actually a field which facilitate us to get a good understanding of arts education concepts and practical approaches, theoretical concepts and practice as well.

Although it seems like easy incorporating STEAM into teaching is a strategy that promotes innovation for various other countries, Pakistan has faced certain challenges and limitations in its application. The education system is not fully prepared for its incorporation. Hence, teachers are facing difficulties in several schools, especially public schools. It was observed that there was a lack of infrastructure (laboratories, technology labs, and other resources) which play crucial rule in STEAM teaching. The training of young graduates to handle and use the existing to optimum level should be included in the practice. The presence of some governmental policies, good educational infrastructure, and a curriculum can help in the successful implication of STEAM in Pakistani schools (Hali, Aslam, Zhang, & Saleem, 2020). This is the only way to work on the implementation of STEM education in the Pakistan education context.

This research was conducted for the application of STEAM in Karachi's schools. After data collection, it was inferred that teachers should have first knowledge of what STEAM is, then there should be proper training for the teachers to incorporate the targeted pedagogy in schools. STEAM in classrooms is seen as the future of our generation. STEAM helps a learner think outside the box, which is an important ability in the 21st century (Hammad & khan, 2021).

Another study discusses the inclusion of STEAM concepts in the curriculum, rather than just in the classroom. The addition of all five components to the curricula can meet the growing demand for innovative ideas and talents. For example, STEAM action research as conducted for Slum Schools in Islamabad includes all the five phases of identifying problems in the community,

resolving them through the making and incorporating of STEAM-based lesson plans, and its post survey. After that research it was reported that learners were able to solve their community problems on their own. They were able to apply newly acquired skills and knowledge to the practical problems and challenges they faced. It was only because of the STEAM projects that incorporated skills in them. (Kiyani, Haider, & Javed, 2020)

According to Capraro, Capraro, and Helfeldt (2016), STEAM education can significantly enhance critical thinking skills in elementary school students. Their study found that students who participated in a STEAM program demonstrated significant improvements in their critical thinking abilities compared to those who did not. In a study by Khalid and Ahmad (2019), it was found that STEAM education can promote creativity, innovation, and problem-solving skills among students. The study suggested that the integration of STEAM education in the curriculum can lead to an increased interest in STEM fields and better employment prospects for students. Furthermore, the teacher could create the unique course outline in order to teach the basic concepts of the STEM education in the school, college and university level in the higher education by considering the need of the students as well. It's really important to work on need analysis and knowledge gap. There is the need to work on the development of the unique course outline for STEM education as well.

Furthermore, a study by Lee, Kim, and Kim (2020) found that the integration of STEAM education in the curriculum can help students to develop their communication and collaboration skills, which are essential components of critical thinking. A study by Khalid, Gul, and Bashir (2018) found that the integration of STEAM education in elementary classrooms in Pakistan can enhance students' problem-solving and critical thinking skills. The study also suggested that STEAM education can promote creativity and innovation among students. In another study by Siddiqui and Ahmad (2019), it was found that the integration of STEAM education in the curriculum of primary schools in Pakistan can help students to develop their problem-solving and critical thinking skills. The study suggested that the use of STEAM frameworks can create a dynamic learning environment that engages students and promotes the development of these skills. Additionally, a study by Khan and Raza (2020) found that the integration of STEAM education in the curriculum of elementary schools in Pakistan can promote the development of critical thinking and problem-solving skills among students. The study suggested that STEAM education can enhance students' creativity, innovation, and communication skills.

The research studies suggest that the integration of STEAM education in elementary classrooms can foster a dynamic learning environment that promotes critical thinking and problem-solving skills. Both international and local studies have found that STEAM education can enhance students' creativity, innovation, communication, and collaboration skills, which are essential for success in the 21st century workforce. Further research is needed to explore the specific ways in which STEAM education can be effectively integrated into elementary school curricula in both local and international contexts to enhance critical thinking skills.

3. Methodology

3.1 Setting

My action research was conducted in a small private sector school, "ABC Academy" which is in Federal-B area; one of the most densely populated areas of Karachi. My target audience were the learners of Grade 7 which were 20 in number. The course was taught in correspondence to the National Curriculum using the Sindh Textbook of Science and Sindh Textbook of Mathematics. The faculty were experienced and supportive and parents were involved in supporting learners in their homework. The Zeal Academy is a two-story building and the class I taught was on the 2nd floor. However, the classroom dynamics consisted of a traditional setting of tables and chairs. The classrooms were small and did not have the capacity to accommodate and allow for any group activities and no proper connection for using multimedia. The school has a reasonable computer lab consisting of 10-12 PCs, but there was no science laboratory for carrying out scientific experiments and there was no proper play area but only a small open ground.

3.2 Action Research Cycles

a. Reconnaissance

To identify a particular problem to conduct research on, I went to a school named the Zeal Academy and observed several lessons in Science and Mathematics for class 7. I gathered data through field notes, reflections, and discussions with my mentor and critical friend. During my observations, I came across some major issues the learners were facing in learning.

- Mostly learners in the class were engaged, as they were very responsive and raised their hands when participating in the class. They got excited when they had the activity of solving questions on the board.
- Learners gain interest when provided with a challenge. A few learners were very quick at answering mental Math questions and remained quiet and sat free while others completed their tasks. Other learner wasted their time in talking as they didn't have other tasks to do.
- When an interesting topic of Science was taught through a simple reading pedagogy, learners were yawning in the class and were blank when asked questions about the topic after reading.
- Back benchers find Science classes as their free period in which they can draw sketches as the teacher talks more in the class and they get a lot of unnoticed gaps. They also disturbed other learners and play with their stationary.
- During Science classes the knowledge was limited to textbooks, in the topic of germination of seeds learners were only having long reading and had no experiment. Later when they had a hand-on activity they had a lot of questions and smiles on their faces which showed how fascinated they were to do germination themselves.

- A few of the learners have the habit of asking questions in class. They have that curiosity to ask why for everything. Sometimes this makes the teacher annoyed, as a result the teacher ignored them and asks them to sit silently instead of answering or engaging them.
- I was intrigued by the responses of some learners when they connected the classroom activity with their childhood memories. This refined their ability to reflect critically and build connections.
- The learners were mixing the concept of algebra with rounding off, which shows that the previous concepts are not clear, and learners have many misconceptions.

After multiple observations, I figured out that the learners were lacking something that would keep them backward in this rapidly developing world, and the reason was traditional teaching methods. Looking at the capability of learners to work and their enthusiasm, it was establishing that experiencing technology and hands-on activities can polish their talents and develop their skills. In addition, to explore more and to collect some more concrete evidence, I decided to co-teach with a Science teacher. As Science and Mathematics are my focus areas, I acted as a supporter in the classroom and helped learners solve their misconceptions about the topic of electrons and shells. The learners in the class were highly active and responsive, which shows that they possess sharp cognitive skills. There was a learner who asked some questions during the copy work but was stopped by the teacher. This shows that the completion of work is more important than the clear understanding of a concept. When the learners were provided with strings to make shells and beats to show electrons, the learners got excited and started working efficiently. They started to help each other during work and were happy to do activities. It seems like they were waiting for an activity-based classroom. After this activity, the teacher asked learners to write answers to the questions in their notebooks. Some learners tried to answer in their own words, which I believe is an achievement, however the teacher stopped that individual and forced them to copy from the textbook. It felt like learners express themselves more and understand concepts better when allowed to work with manipulatives and have freedom of expression. This is a common misunderstanding that they have to be controlled all the time. During my reconnaissance, I identified that learners felt considerable difficulty in understanding the concepts in traditional teaching and that gave rise to errors. The issue was that the teaching was based on a teacher-centre approach, whereas a constructivist classroom environment was missing. During observation, I had short conversations with learners in which I asked questions like: which activity interests them most? Which is their favourite class and why? What they like to learn in a classroom and what difficulties they faced? Through this, I tried to learn about their needs and about their learning styles, which I could cater to during my research. I looked through the available literature and came up with the idea of incorporating STEAM education to make them competent. After considering the structure of schools, the standards of the curriculum, and the background of learners, I made an action plan to incorporate STEAM education, knowing that the school context

was different from the literature I found. In my action research, I hope to expose learners to experiential learning, which is a critical need in the twenty-first century.

3.3 AR Cycle 1

Cycle one was based on a total of six lessons. Four lessons are from the science subject, and two are from the mathematics subject. The duration of each lesson varied between 35 and 45 minutes, but some lessons lasted an hour as well. In science, a domain of chemistry was covered, and the topics were isotopes and their uses, chemical bonding, and chemical formulas. On the other hand, two mathematics lessons were delivered in the same class on exponents and profit and loss. All the lessons were prepared with the inclusion of a minimum of three elements of STEAM. Secondly, multiple videos and online tasks were provided, which needed internet access and a device to attempt those tasks individually. Hands-on and mind-on activities were embedded in each lesson. Moreover, a list of resources was asked by the learners to bring to each class, such as UHU, computer papers, scissors, and proper stationary. Learners must identify after every day which component of STEAM is used in the lesson and what its purpose is. They must establish links between each component and write reflections.

3.3.1 Implementation of the plans

- In lesson 1, to incorporate this new approach, a brief introduction of each component of STEAM was provided to the learners. The first step was to give insight about the integration of STEAM and highlight the importance and benefits that would help them learn more effectively without judging or criticizing the methods and approaches through which they were previously learning. Since this is a new concept, I needed to present all the components of STEAM first so that I could include it more extensively in the classroom. Moving on, the development phase of the class in which learners became engineers and created their cubes of isotopes by writing their understanding of the reading. Whereas some of the learners said, "it seems more like an art class." As it was new for them to do in class, apart from making diagrams in their notebooks. Learners were very careful and focused when joining and folding the sides of the cube, as proper measurement is required for a perfect look. Learners found it challenging to read from the book and comprehend themselves, although the reading was limited to one page. Due to the lack of reading habits, the learners were unable to comprehend, and as a result, the outcome was not achieved. The class went on, but no time was left for an explanation of the content. Furthermore, HW was provided to learners to write reflections and summarize their learning on a pallet link. As learners were not aware of this website, I made a tutorial for their guide.
- Lesson 2 was the continuation of the same topic. The learners were unable to perform the task on Padlet as the link was not forwarded to them by their teacher. However, they remembered the task and were keen to attempt to give me motivation to proceed. I heard

learners talking about STEAM with their peers and were discussing their experience of creating cubes and reading about isotopes. The explanation of the content using the formative assessment strategy of questions and answers grabs learners' attention and enhances their understanding of the concept. The learners were able to write answers on their own in the concept cartoon. Now the learners were reading as the explanation was simpler and with cartoon characters. Some learners have an interest in comics, so they enjoyed the task more. The learners were thinking and building connections with their daily lives. They were working in pairs and then discussed their answers in small groups.

- Lesson 3 was based on chemical bonding. First, I used technology to show learners a video about bonds and how they form. The good part was that every learner was much focused and was watching the video. They did raise questions, which were then answered by me. Learners were happy to see an animated video for learning a concept, as they had never seen this approach in class before. I was happy that they took a keen interest in the video and asked questions, but on the other hand, I faced some difficulties too. I didn't find any sockets in the class to connect to. No multimedia was there, so I bought my laptop, but unfortunately, there was no place to put it so that it would be visible to all. But I managed it somehow and the class went on. The purpose of the video was served, which was to my benefit. Secondly, there was a ball activity in which different coloured balls were provided to the learners with symbols of elements written on them. The learners must see those symbols, think about their valence shell and their valency, and lastly, find a pair with whom they can make a chemical bond. To get stable in their elements, they were roaming around the class purposefully, finding the pair for themselves, asking everyone about their valence and looking for a suitable element partner. I was amazed that different chemical bonds came up that I also didn't think of. They were so engaged in that activity and were actively doing it. The class wasn't disciplined, sitting quietly, but they learned in the chaos. The main motive was learning, and that occurred. Learners not only learn the new concept, but they remember it, and every learner actively participated in the class. Moreover, a homework task was also given for the reinforcement of the topic. It was to find different elements from the periodic table and find their suitable elements with whom they could bond. They can choose any element and make as many bonds as they can in their copy.
- Lesson 4 was on the topic of chemical formulas. The lesson was initiated by the story, which included the concept of covalent and ionic bonds. The learners were able to identify the theme and the motive of that story. After that, I explain on board using flash cards the difference between compound molecules and elements through on-going questions and answers. The learners were raising questions to clear up misconceptions. A few learners came on board to write the difference as well. Secondly, the learners were given autonomy to make their own pairs for the activity. They were excited as the charge was given to them so that they could become future leaders and take decisions for themselves. The activity

was to cut out the elements from the list and arrange them to make chemical bonds. Besides, they have to stick that on another sheet and differentiate between molecules, compounds, and elements' formulas. Furthermore, the learners learned collaboratively and were deeply engaged in the process. Learners also work on jam boards as homework and write their reflections about the learning in class and which areas stand out for them. The learners started working as a whole group, then in pairs, and then moved towards individual tasks. They were learning and supporting each other, debating about the concepts, and the most amazing part was when a learner critiqued their formation of bonds and was trying to make them in a new pattern. On the other hand, there was a learner who was connecting the formula with chemical bonds, which shows that the learners were learning.

- Lesson 5 was about mathematics based on the topic of exponents. Now that learners are quite familiar with the incorporation of STEAM, they were excited to study mathematics from a different lens. The learners were provided with some scientific facts that have values written in exponents. The learners in the group of four discussed the similarities between all the scientific facts about the earth. They came up with the response that all the facts have some connections in respect of their number of patterns. Through this, the topic exponent was connected to scientific studies. The learners then understand the mathematical solving of exponents. They identified the benefits of it. Furthermore, they solved a puzzle by solving the sums of exponents. The hands-on activity engaged learners throughout the class, and they were solving each sum to find the right puzzle. After that, as a homework task, the learners were asked to solve a quiz on Kahoot and share their reflections in the next class. Their reflections demonstrated critical understanding and in-depth thought on the subject.
- Lesson 6 was on the profit and loss topic. To begin with, the learners were divided into two large groups and were provided with materials like cloth, utensils, Jewelry and some stationary. They were also provided with the money as small chits. The learners divide their roles as different professions among them to trade with other groups. The condition was to sell all the items within the given time and earn as much money as possible. While trading, they negotiated with the money. They applied multiple strategies to sell all their items. To do this, they plan strategically and cooperatively. Moreover, the topic of profit and loss was introduced to learners, and formulas were taught by me. The learners then solve the sums in their textbooks using the formulas. Finally, the learners created their own problems, reflecting on the first activity, and then applied the formula to solve these problems. The learners had hands-on experience and connected the topic of mathematics to daily life.

3.3.2. Analysis

Success Indicators	**Unsatisfactory Results**

-The learners' work on padlet, jam board, and online quizzes showed their familiarity with the technology to some extent, which was a major barrier for them at the start. -Half of the learners started building connections between the classroom learning and their daily lives, which is evident from their classroom participation and worksheets. -Ten percent of the learners started to reflect critically, which can be seen through their reflections on padlet. -A few of the learners started to solve their problems and become self-directed learners, which can be shown through their extra efforts and worksheets. -Learners have experienced fewer misconceptions when starting learning with STEAM and doing activities in peer and group settings, as evident from their own written reflections.	-Technology was only used as a tool for assessment and was not incorporated into the lessons in the development phase to enhance the conceptual understanding of learners. -One of the major components of STEAM, which is engineering, is missing in most of the lessons that can help to make learners critical learners. -There is a lack of group tasks and inquiry-based assignments to foster decision-making and problem-solving skills among learners. -Learners were unable to connect mathematical understanding with science, and the bar was very low in linking scientific knowledge to mathematics.

3.3.3 Rationale

It is shown from the results that improvements have been made and the objective of enhancing conceptual understanding and creating a constructivist classroom has been achieved up to 35 percent. However, there are many areas that need improvement to achieve the objective and get a better result. In order to raise the bar, I decided to make improvisations and plan lessons for cycle 2.

3.4 AR Cycle 2

Cycle 2 was based on two lessons. One lesson was for mathematics and the other was for science. These lessons were made by doing amendments in pedagogy. In cycle 2, the focus was to use technology to develop an understanding and scaffold the concept. Secondly, using hands-on methods to embed engineering skills in learners.

3.4.1 ***Implementation of plans***

Lesson 1 of Cycle 2 was about science, which was based on the topic of the transformation of energy. This topic lasts for two units. The learners were asked to write about what they knew about energy on the jam board link provided to them. Before class, 50 percent of the learners wrote answers on the jam board. The learners went out of the class and were asked to write down the forms of energy they could identify from the environment. After five minutes, when the learners came back, they observed very critically. Learners discussed how energy can be converted after discussing the different types of energy. To explain the law of energy to the learners, I divided the learners into five groups. Instead of making their own groups, I gave them the charge of selecting their own groups because they must work in their groups for one week. Moreover, the learners were provided with the task of creating a model to show the transformation of energy. They were guided to use any available video or research to make their model. A rubric was also provided for this, so that they are aware of what they are expected to do. The learners were excited to work and create models as they were wearing the hats of engineers to explore the science concepts. However, they were allowed to work either in the class or outdoors. They can use their free periods as well to complete the task. In the second class, after two days, the learners came up with amazing creative models. Some showed the transformation of energy through the making of a plastic bottle car and connecting it with rubber bands. Likewise, one group used potatoes to convert energy to light energy. There was one group that used wires and sockets to show the conversion of energy. There was one learner who said, "I will never forget the topic energy now," while the other said, "I wish only this chapter would come on the exam." I was overwhelmed by the responses. The learners worked hard, took responsibility for their learning, and this gave them a life-long learning experience.

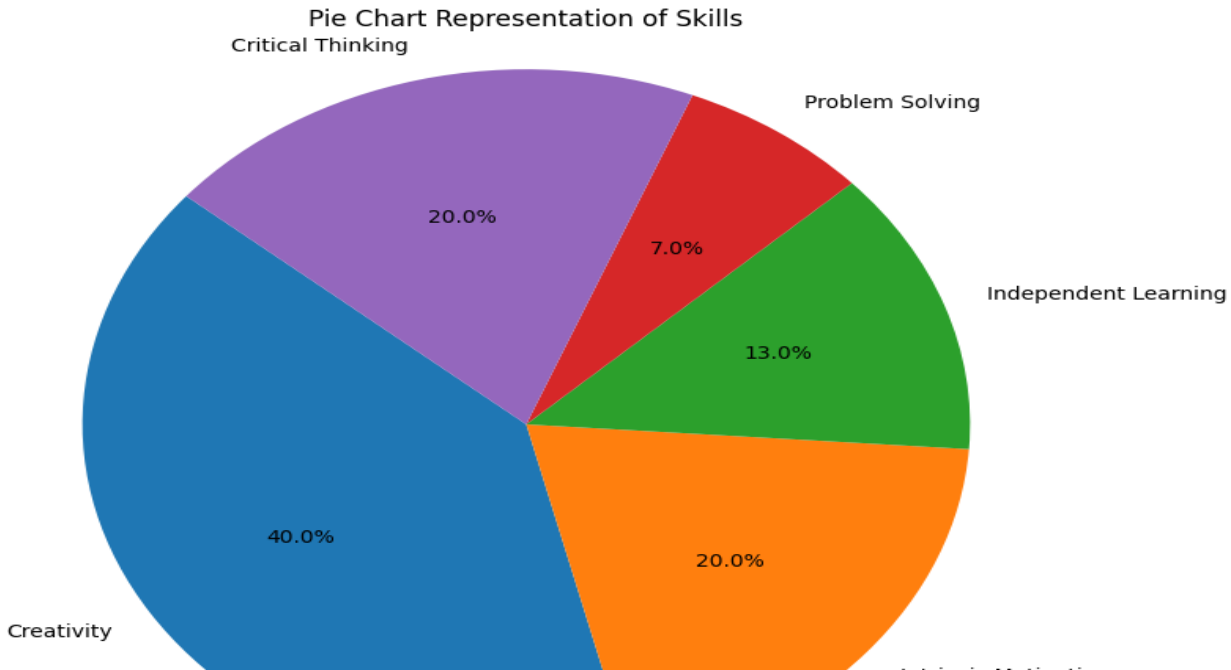
The second lesson for cycle 2 was about mathematics. As this subject required more attention and development of a concept, However, to incorporate technology into the development of mathematical concepts, I asked the cooperating teacher to facilitate with me. To initiate the topic, the learners were divided into groups of four. They were provided with ice cream sticks of different sizes through which they had to make triangles. Each group made different triangles according to the provided sticks. The learners then describe the properties of their triangles. They were encouraged to give angles as well. Some groups guessed the angles, and some used the protector to measure their triangles. After that, to scaffold a concept, I used 3 bug sticks and formed different types of congruent triangles on the board to show them the difference. There were two laptops in the class, so I divided the class into two groups. One was led by me and the other by the cooperating teacher. The learners were provided an opportunity to learn with simulations. In PHET simulations, learners change values and explore more about triangles. They were amazed by the application and were enjoying using it. When the video on math antics was played, the learners interacted with the video, and this cleared some misconceptions that could have been raised on the topic. Lastly, the learners solved the questions from their textbooks. I was glad to see that learners were solving the sums independently.

3.4.2 *Data Analysis*

Success Indicator	Areas for Improvement
1. Creating models of science in groups promotes cooperative learning and is evidence of learners performing higher-order tasks. Collaborative learning cause exchange of ideas and promotes critical thinking and gives opportunity to learners to engage in group discussions. (Gokhale, 2005) 2. Using simulations in mathematics provides most of the learners with a deeper understanding of the concept as well as makes them techno-friendly individuals, which is the need of the 21st century. 3. The creative models and tasks performed on PHET show the effectiveness of teaching and the active involvement of learners in the classroom. 4. More than half of the learners enjoyed learning with a STEAM approach, as they have written in their reflections. One of the learners says, "I want to learn math and science more as it is now exciting and does not need memorization."	1. More collaborative activities are required to develop team-building and decision-making skills. 2. Some learners need higher-order tasks to become competent and to think creatively. 3. Science and mathematics require more activities to enhance critical thinking skills to a greater extent. 4. Exposure to technology in the understanding of science and mathematics concepts is still needed to make learners independent to a higher extent. **5.** Activities such as robotics and abacus are required to improve mental mathematics and create connections with scientific knowledge.

4. Results and Discussion

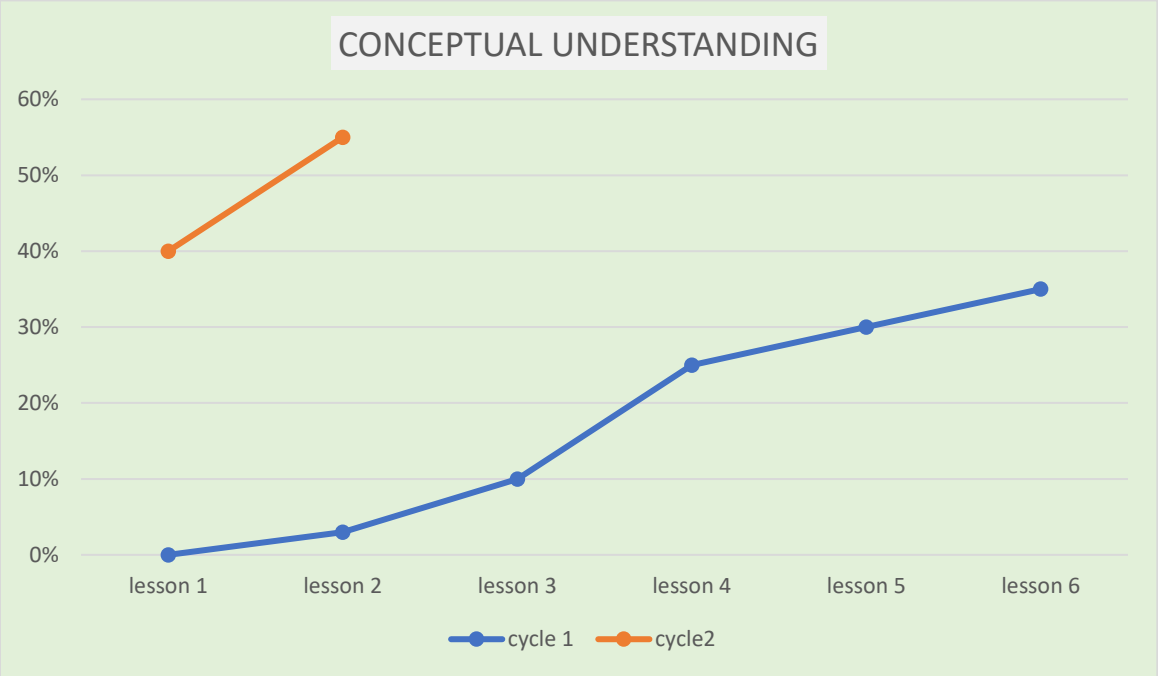
Figure 1



Interpretation

According to the pie chart in Figure 1, the results indicate that 40% of the learners develop creativity in them because of STEAM education. 20% of the learners develop intrinsic motivation in them and become critical thinkers. 13% of them became independent learners and worked on their own. 7% of them solve their daily life problems.

Figure 2



In cycle 1 (Figure 2), it was observed that conceptual understanding after lesson 1 was 0%, but after further lessons it gradually increased to 3%, then 10%, then 25%, 30%, and after the 6th lesson it increased to 35%.

In cycle 1, the results were not fully obtained, so two more lessons in cycle 2 were delivered (Figure 2). It was observed that conceptual understanding did increase by 40% in lesson 1 and by 55% in lesson 2.

4.1 Limitations

- There was a lack of resources, such as laboratories to perform experiments in science.
- lack of multimedia and technological equipment for learners to use the STEAM approach in developing conceptual learning.
- The curriculum standards were not according to the STEAM curriculum.
- Learners demonstrate a lack of reading and comprehension skills, so it was difficult to build from scratch.
- Misconceptions about prior knowledge led to difficulties in building on new knowledge.
- The traditional classroom seating arrangement hampered group activities.

5. Conclusion

It was aimed to create a constructivist classroom through the incorporation of STEAM education, which was not achieved to a greater extent because of several limitations, but it did have an impact on learners' lives. 55% of the learners built conceptual understanding and they did try to build connections between the concepts taught and their daily life problems. The learners got bored in a teacher-centred class, but after having a student-centred class, intrinsic motivation was generated among them. They began to enjoy subjects that they had previously avoided. STEAM contributes to the development of different 21st century skills like decision-making, creativity, critical thinking, and teamwork. According to Barkatsas & Bertram (2016), 21st century skills are those skills which prepare learners to be creative, productive, technology-friendly, and challenge-acceptors, which are important for living in the 21st century. Moreover, if the limitations are overcome in the future, STEAM will show its effect to a much greater extent, and this experiential learning can become lifelong for the learners.

6. Recommendations

According to the results of this study or research Some suggestions are as follow:

- Encourage STEAM education from an early age to develop a learner's critical thinking and problem-solving skills.
- STEAM education is to be included not only in primary schools, but also in elementary and secondary schools.
- Teachers are expected to incorporate STEAM education into their practise to make the class constructivist and for the lifelong learning of learners.
- Resources for incorporating STEAM education need to be provided as it is the greatest limitation in the path of STEAM education.
- Educational programmes and teacher training must be organised to include STEAM in a proper and professional manner.
- Awareness is necessary, and for that, seminars and conferences are required to be organised to get most people aware of STEAM education.

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A Study of Prevalence and Problems of conducting Science Quizzes at Elementary Level

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Abstract
Quizzes are used as significant tools for science learning, because these support science learning, facilitate assessment, help for the retention of information, provide timely feedback, identify misconceptions, prepare students for examinations, motivate learning, and help for the instructional adaptation. This research study aimed to investigate the prevalence and problems of conducting science quizzes at elementary level. Survey method was used for this study. The population of the study was all science teachers working at elementary level in public school of District Rawalpindi. 105 science teachers working during 2019 at elementary level in public school of tehsil Kallar Syedan, District Rawalpindi were the sample of this study. A self-developed questionnaire was used for data collection from the teachers. The finding of the study showed that most of the teachers do not conduct science quizzes. Only 37% teacher's conduct quizzes and out of these only 19% conduct quizzes weekly, however, 15% conduct oral quiz contest daily. The present research also revealed that most of the teachers do not conduct quizzes due to shortage of time, less resources to conduct quizzes, lack of training, discipline problem in overcrowded classes and work overload. It is recommended that workload of teachers may decrease and facilities must be provided to science teachers for conducting frequent quizzes. It will resultantly increase students' performance at end of course exam. The study do suggested that future researcher may take up the issue of prevalence of science quizzes at various others level as well.

Keywords: *Assessment, Quizzes Prevalence, Science Teaching, Science Learning*

1. Introduction

In a teaching learning process, quizzes have a very significance value. Educationists are of the view that quizzes are very useful tools that increase student learning and retention of course concepts and content. Regular quizzes enable students to recall the concepts and practice them for better understanding. Timely quizzes provide feedback to the students to improve their learning. Quizzes also have encouraging effects on the learning of students (Gholami, 2013). If quizzes are framed on the taught content, and are regularly planned, these may add a fulfillment of accomplishment and improve practice and consequently lead to students' achievement (Johnson & Kivinema, 2009). Quizzes can be carried out daily, on weekly basis or on monthly basis. These can be oral or written. There are many advantages of oral quiz competition. Quizzes are interesting, motivating, interactive and useful. Students make themselves ready for quiz and participate actively (Davi, 2014). Assessments help learners to find out what they need to improve. Most importantly, quizzes assist the teachers in using assessment to get better learning rather than just to evaluate it (Clymer & William, 2007).

Daily quizzes are an effective way to persuade students to go over the subject material. Another advantage of daily quizzes is that students are encouraged to go on practicing for the examination (Tanck, et al. 2013). Quizzes are supportive learning aids which facilitate students to achieve better score on course assessment (Kibble, 2007). As an example, a study in which students' perception was found out regarding major functions of unannounced quizzes (pop quizzes). The study showed both positive aspects to the pop quizzes. Pop quizzes encourage students to attend classes regularly and improves their academic performance on the positive side (Cicirello, 2009). Researchers acknowledged that the quizzes made the students practice and retain the content as it was exposed to them repeatedly (McDaniel, et al. 2011). There are several benefits of regular quizzing. Administration of quiz at the start of day can drift learners directly into the topic and provides quick review of previously learnt material. Regularly scheduled quizzes are a way of helping teachers to know if topics have to be taught again or not (Fries, 2009). To promote learning, it is necessary to involve learners and assess them. Thus, assessments are used to give feedback on material learned and to direct teaching. Quizzes are used to measure performance of an individual in a particular subject. As quizzes are associated with desired result, so a study was conducted to find out the prevalence of science quizzes at elementary level by using a survey method.

1.1 Rationale of the Study

In many science classes, attitude of science teachers towards quizzes is highly negative. Teachers merely focus on teaching and don't timely assess students which lead to lack of interest and as a result they show poor performance. In public schools, classes are overcrowded and teachers focus less on assessment. Resultantly, students are not motivated to learn. This study was conducted to explore prevalence of quizzes whether the quizzes are being conducted or not, to check the quiz frequency and to find out problems associated with administration of quizzes and to find out the reason of not administering quizzes frequently.

1.2 Statement of Problem

In Pakistan, education system is mostly teacher centered. The teaching is mostly done through lecture method. Most of the time of science teachers is spent in delivering science content. In the teacher centered approach, there is no room for the continuous improvement of the learner and teachers don't focus on students' assessment (Shah & Rahat 2014). The learning of science students is assessed at the end of term. Resultantly, students are not motivated for learning and they are not informed timely about their progress and weaknesses. Lectures are not sufficient for learning science. So, there is a need of assessment for learning which can involve students and improve their learning. According to researchers, quizzes are one of many ways that motivates students towards learning. Quizzes are not being used frequently for science learning in the schools. Therefore, the present study found out the prevalence and problems of conducting science quizzes at elementary level in public sector schools of Rawalpindi, Pakistan.

1.3 *Objectives of the Study*

Research was intended to achieve following objectives:

1. To find out types of science quizzes being conducted by science teachers at elementary level.
2. To find out frequency of science quizzes being conducted by science teachers at elementary level.
3. To find out problems encountered by science teachers while conducting quizzes.

1.4 Research Question

1. Which types of quizzes are preferred by science teacher?
2. What is the most common frequency of conducting quizzes?
3. Which problems teachers face regarding quizzes?
4. What are the reasons given by science teachers for not conducting quizzes?

1.5 Significance of Study

The findings of this research will help science teachers how much they are concerned with learning of their science students. The findings of the study will be helpful for stakeholders to make provisions of opportunities so that science teachers can assess students learning timely. It will also highlight problems of teachers regarding quizzes. Resultantly, learning of science students will be improved. The results of the study will be helpful for the students to retain their interests resulting in better understanding of science concepts. The science students will be motivated and they will put more emphasis on problem solving through quizzes; as a result their performance at the end of course exam will be improved.

2. Review of Related Literature

It is imperative to assess the progress of learning in the students during the teaching process. Quizzes are one of many ways to assess students. Quizzes are an important technique to gauge the impact of teaching at various stages of the learning process. First use of the word "Quiz" can be spotted back to 18th century and by mid-19th century it had gained the current meaning of tests. Various studies have been conducted to confirm the efficacy of this technique and its different methodologies in educational field. Quizzes can be advantageous in numerous ways. First of all, quizzes provide the motivation for learners to attend class regularly. In a study, the effect of random quizzes was examined on student attendance in an undergraduate course on the psychology of learning. The results pointed out that student attendance improved by 10 percent when the quizzes were in place (Wilder, 2001). A study proved effectiveness of regular quizzes on Iranian EFL learner' s understanding and creation of English idioms. 120 male and female students were divided into four groups. The students who were included in the study, were language learners. Quizzes were given once a week to one group, the second group received biweekly quizzes, third group received one quiz in 30 days and last group was given no quizzes during teaching period. The results showed that regular quizzes lead to notable result on the understanding and creation of idioms. This study also proved that quizzes given twice a week were the most effective quizzing rate both in understanding and creation of idioms (Zarei, 2015). In a study, it was observed that weekly quizzes improved test scores of students in the midterm and final term examinations (Masoumeh, et al. 2017). A researcher in his study observed that in order to make the most of classroom learning, quizzes should be conducted most often and early (Glenn, 2007). Posselt et al (2022) found that student's learning outcomes can also be strengthened through quizzes. A study which was conducted to enquire the effect of quiz frequency on course performance. 183 participants were included in this research. They were separated into five groups. Each group was taught by the similar method but quiz frequency was different for each group. First group was not given quiz, second group was asked to take one term exam, third group was given quiz once per month, and fourth group received bimonthly quizzes whereas last group had quizzes on weekly basis. The study revealed that students of those groups attended classes on a regular basis, who were given weekly and bimonthly quizzes. Thus, a positive relationship was found between quiz frequency and class attendance. More frequently conducted quizzes notably raised class attendance. Study also showed that frequent quizzes also increased class performance (Zarei, 2008; Ahmed & Hashash, 2022).

In another study, an online daily testing was introduced to two huge university classes. Researchers examined improvements in academic performance and there was decrease in achievement gaps between upper and lower middle-class students in academic performance. Experimental group took daily online quizzes and they were provided with personalized and quick feedback whereas traditional class did not take any quiz. Experimental class outperformed on final achievement test (Pennebaker, Gosling, & Ferrel, 2013). Another study showed that daily quizzes enhanced students' performance in anatomy course. The results strongly bear the idea of using quizzes as a mean to persuade and observe progress of students. Daily quizzes lead to good

outcome as compared to weekly quizzes. The mass of students showed better academic progress. A decrease in exam anxiety was also observed. Quizzes served as great means for student instructor communication (Poljicanin, et al. 2009). If the quizzes are announced beforehand, these provide the students a chance to study in advance and thus they learn more (Azorlosa & Renner, 2006).

The quizzes can be administered on daily or weekly basis. Daily quizzes may face an initial resistance or disapproval from students but they tend to realize that these help in their learning. An Associate Professor working in University of Houston used to conduct weekly online test technique and arrived at the conclusion that these tests motivated the students and helped them to attain better results (Sporer, 2001). Another study exposed that students who were given regular quizzes do better than those who experienced no quizzes. Quizzes make easy learning and enhanced the achievement of the students. Discussion helped to make clear the conceptual errors of the students after taking quiz. The classroom quiz enhanced the students' achievement by regularizing their studies. Through regular and appropriate feedback, students came to know concerning their lacking areas and their misconceptions associated to the topics. It is also observed during the class discussion that when students made mistakes in the quiz, they listened the following discussions more carefully. It is logical to bring to a close that quizzes do have an important impact on exam performance (Shafiq & Siddiquah, 2011). Quizzes are supportive learning aids which facilitate students to achieve better score on course assessment (Kibble, 2007). A study was carried out to investigate whether the quizzes had an encouraging or discouraging effect on teachers and students. Study showed that quizzes had some disadvantages such as narrowing curriculum and rising student or teacher stress (Yildrirm, 2010). A lot of time is consumed in making, conducting, marking quizzes and reporting quizzes result.

Frequent quizzes also lead to a number of issues. Conducting and scoring quizzes are really time taking and it may take away the class time from efficient teaching (Marshall, 2007).

3. Methodology

It was a quantitative research design. Survey method was used to investigate prevalence of science quizzes at Elementary level. The research "A Study of Prevalence of Science Quizzes at Elementary Level" was delimited to science teachers working at elementary level 2019 of tehsil Kallar Syedan district Rawalpindi Punjab, province. The research was delimited to only one tehsil due to lack of time and limited resources.

3.1 Population and Sample of the Study

All science teachers working during 2019 at elementary level in public school of District Rawalpindi were the population of this study. There are seven tehsils in district Rawalpindi. One tehsil was selected as a convenient sampling. There were 105 science teachers working during 2019 at elementary level in public school of tehsil Kallar Syedan, District Rawalpindi (schools.punjab.gov.pk). Data were collected from all science teachers of this tehsil working at elementary level.

3.2 Research Instruments and Tools

A questionnaire about prevalence of science quizzes at elementary level was developed by the researcher. In Prevalence, types of quizzes (announced, unannounced and oral quiz contest), frequency of conducting quizzes (daily, weekly, biweekly,monthly,bimonthly) , problems faced by teachers regarding quizzes, and reasons for not conducting quizzes were found out. Respondent had to select one option amongst daily, weekly, biweekly, monthly, bimonthly, not at all and others. There were two open ended statement regarding to explore reasons for not conducting quizzes and problems faced by science teachers for quizzes. The research instrument was distributed personally to the teachers by the researcher. As the researchers intended to test pre-defined hypotheses, quantitative research was employed. Many studies in this area have also used the same research method (Wighting et al., 2008; Stewart et al., 2010; Malik & Akkaya, 2021). This study adapted a five-point Likert-type academic motivation scale (AMS) originally developed by Bozanoğlu (Bozanoğlu, 2004). The adapted scale has 20 items. Five questions about demographic and educational information were also added for the current study.

Table 1. Developmental Framework of Questionnaire Designed for Science Teachers

Sr. No:	Questionnaire Item No./ Constructs	Sources
1	1,3,5,7	(Azorlosa & Renner, 2006), (Kamuchi, 2007). (Talsenia, Barot, Chaudhari & Patel, 2015).
2	2,4,6,8	(Sporer, 2001), (Poljicanin, Caric, Vilovic, Kosta, Guic, Aljinovic & Grkovic, 2009). (Collier, Carol, Nichols, & Edmondson, 2016), (Masoumeh, Shams & Sadeghi 2017). (Ghulami, 2013). (Zarei, 2015)
3	9, 10	(Yildrirm, 2010), (Marshall, 2007)

Face validity and the content validity of the research instrument were done by experts of faculty of Education of Allama Iqbal Open University Islamabad. Many items were deleted as per experts' guidance. Reliability of research instrument was measured by pilot testing. There are seven tehsils in District Rawalpindi. Pilot testing was done on science teachers of tehsil Gujar Khan of district Rawalpindi. For reliability, internal consistency was assured during pilot testing.

3.3 Data Analysis

For the analysis of data, Statistical Package for Social Sciences (SPSS) had been used to analyze the data in the form of frequency and percentage.

Table 2. *Administration of Quizzes*

Conducting quizzes	Frequency	Percent
Yes	39	37.1
No	66	62.9
Total	105	100.0

Table 2 shows the prevalence of quizzes. 37.1% of teachers conduct quizzes whereas 62.9% teachers do not conduct quizzes. This indicates that most of the teachers do not conduct quizzes.

Table 3. Frequency of Administering Quizzes

Conducting quizzes	Frequency	Percent
Daily	8	7.6
Weekly	20	19.0
Biweekly	4	3.8
Monthly	5	4.8
Others	2	1.9
Total	39	37.1
Teachers who don't conduct quizzes	66	62.9
Total	105	100.0

As the table 2 shows that only 37.1% of teachers conduct quizzes. However, table 3 shows its breakup. Table 3 shows that out of 37.1% teachers who conduct quizzes, only 7.6% teachers conduct quizzes daily, 19.0% conduct weekly, 3.8% biweekly, 4.8% monthly and 1.9% teachers conduct quizzes in others schedule. From this table, it can be inferred that amongst 37.1% teachers who conduct quizzes, most of them prefer to conduct quizzes weekly.

Table 4. Administration of Oral Quiz Contest

Conducting oral quiz contest	Frequency	Percent
Yes	35	33.3
No	70	66.7
Total	105	100.0

Table 4 indicates that 33.3% of teachers conduct oral quiz contest whereas 66.7% do not conduct oral quiz contest. It is obvious from this table that most of the teachers do not conduct oral quiz contests.

Table 5. Frequency of Administering Oral Quiz Contest

Conducting quizzes (oral quiz contest)	Frequency	Percent
Daily	16	15.23
Weekly	4	3.8
Biweekly	4	3.8
Monthly	7	6.7
Others	4	3.8
Total	35	33.3
Teachers who don't conduct oral quiz contest	70	66.7
Total	105	100.0

Table 5 indicates that amongst teachers who conduct oral quiz contest, 15.2% teachers conduct quizzes daily, 3.8% conduct weekly, 3.8% biweekly, 6.7% monthly and 3.8% teachers conduct quizzes in another schedule. However, 66.7% of teachers did not conduct oral quiz contest. This analysis clearly shows that the teachers who conduct oral quiz contests, they conduct it daily.

Table 6. Reasons for not Conducting Quizzes

Reasons	Frequency	Percent
Focus on covering course content	24	22.9
Time shortage	16	15.2
Overcrowded classes, focus on covering syllabus, lack of time	21	20.0
Heavy workload	21	20.0
Busy schedule, lack of training	15	14.3
Lack of training, lack of time	8	7.6
Total	105	100.0

Table 6 shows the reasons given by teachers for not conducting quizzes. The focus of 22.9% teachers was to cover course content. While 15.2% teachers did not conduct quizzes due to shortage of time. Furthermore, 20.0% of teachers were of the view that classes were overcrowded so it was difficult to administer quizzes. Their focus was on covering syllabus and they had a lack of time. It is also surprising to see that 20.0 % didn't conduct quizzes due to heavy workload, 14.3% did not conduct quiz due to busy schedule and lack of training and 7.6% teachers could not conduct quiz due to lack of training and lack of time. Therefore, it is obvious from this table that most of the teachers who didn't conduct quizzes, their focus is on covering course content.

Table 7. Problems Faced by Teachers Regarding Quizzes

Problems	Frequency	Percent
Heavy workload, lack of time	61	58.1
Lack of students' interest	5	4.8
Lack of training, busy schedule	20	19.0
Lack of resources, short time	3	2.9
Overcrowded classrooms, lack of time, lack of parents attention	15	14.3
Cover a limited course	1	1.0
Total	105	100.0

Table 7 shows the problems faced by teaching regarding quizzes. It shows that 58.1% teachers face the problem of heavy workload and lack of time, 4.8% face lack of students' interest, 19% feel that they need training and have busy schedule, 2.9% face the problem of lack of resources and short time, 14.3% face the discipline problem in overcrowded classes, lack of time and lack of parent's attention and 1.0% teachers don't conduct quizzes as they cover a limited course.
It can be inferred from this table that most of the teachers believed they face heavy workload and lack of time is the major problem of not conducting quizzes.

4. Discussion

Quizzes are valuable tools in science learning because they facilitate assessment, support active learning, aid in information retention, provide formative feedback, prepare students for exams, motivate learning, and guide instructional adaptation. However, the findings of this study revealed that most of the science working in public sector schools do not conduct quizzes frequently. The study showed that the teachers who conduct quizzes prefer administering quizzes weekly. This finding is in line with other researches. As many researches proved that if quizzes should be conducted weekly, it will lead to improved results (Collier, Carol, Nichols, & Edmondson, 2016; Masoumeh et al; 2017). One main reason behind preference of weekly quizzes may be credited to class attendance; weekly quizzes make students' to attend class regularly. It can also be helpful to provide feedback for the improvement of students' learning. Quizzes are also helpful for the teachers so that they can adapt their teaching strategies accordingly. Quizzes also make students accountable of their own learning process so that they can gauge their progress with time. Studies have shown that a positive relationship exists between regular quizzing and class attendance (Kamuchi, 2007). Teachers who are conducting quizzes shared their problems. Despite of knowing the facts that quizzes are helpful for the students learning this study showed the teachers face problems to conduct the quizzes either daily, weekly, or monthly. According to the teachers the large number of classes is the main hindrance to conducting the quizzes. Moreover, teachers could not find time to conduct the queries due to shortage of time. Teachers were also of the view that this practice as a lot of time is consumed in preparing, administering, and marking of quizzes. This

finding is in line with the finding of study conducted by Marshall, 2007. Another reason of not conducting quizzes in time Is the resource constraints as many teachers like essential resources to implement quizzes effectively. It might also be due to the reason that teachers lack pedagogical training gaps to improve their Instruction. Literature also reveals that one of the reasons of not conducting quizzes in the schools is the resistance to change as teachers feels comfortable with established teaching methods and they are afraid of disrupting their learning environment due to the conduct of quizzes. And interesting finding from the literature movies that sometimes institutional policies also hinder the frequent quizzing for learning. That might be the case with this study as this study was conducted in public sector schools which have specific schedule to conduct classes and complete the coursework.

5. Findings

1. Among 105 teachers, 66 teachers do not conduct quizzes.
2. Among teachers, who conduct quizzes, whether announced or unannounced, teachers conduct quizzes on weekly basis.
3. Most of teachers do not conduct oral quiz contest. The teachers who conduct quiz contest, they conduct on daily basis.
4. Teachers prefer to written quizzes as compared to oral quiz contest.
5. Teachers told reasons for not conducting quizzes as their main focus is on covering course content, shortage of time, high strength, busy schedule and they also don't have training regarding quiz administration.
6. Teachers face the problems of heavy workload, time management issue, lack of students' interest in quizzes, lack of training, busy schedule, class management issue in overcrowded classrooms, lack of resources, and lack of parents' cooperation.

6. Conclusion

There is less prevalence of quizzes in the classes at elementary level. The present research also highlighted the problems teachers encountered while conducting quizzes like shortage of time, less resources to conduct quizzes, lack of training, discipline problem in overcrowded classes and work overload. Due to these reasons, quizzes are not frequently used in public schools. Researchers concluded that by conducting weekly short quizzes teachers can stimulate their students studying during the course rather than rote learning the night before the exam. It is hoped that by integrating this important component with teaching will play a significant role in our classroom prospectus.

7. Recommendations

1. Awareness must be given to the teachers for the benefits of quizzes.
2. Resources must be provided to the teachers so that they can effectively implement the quizzes in the classes. Higher authorities may provide teachers resources so that they can conduct quizzes easily.

3. Teachers must receive training to improve their pedagogical methods including the use of quizzes. Professional development opportunities can be varied and not all teachers may have the chance to get it. Therefore, all teachers must be given the training to use latest tools to develop and administer the quizzes in the classes.
4. Teachers must choose the student-centered teaching approaches.
5. Institutional policies must be flexible so that teachers can find time and opportunity to conduct the quizzes.
6. Quizzes can also be used to foster motivation and facilitate science learning.
7. Teachers' workload may be reduced so that they can get time for the preparation and administration of quizzes.

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Boarding Issues Faced By Higher Education Institute Girls Students During Academic Career: A Pareto Analysis

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Abstract
It is commonly believed that the boarding system is decorum, where students get a bundle of knowledge and experience. It is a precious time of life when the students live without their families with an anonymous one and gain an understanding of the struggle for survival ship. During boarding life, students face a lot of hurdles and problems. Boarding life taught me how to face challenges and pursue their career smoothly. The boarding system is a combination of values and culture. This study explores the major problems or hindrances faced by the boarder girls during their academic careers. Through a literature survey, ten problems are extracted and explored. The data for this study is collected from the higher education institutions in Pakistan. It was a quantitative study. A descriptive approach was used for the collection of data. The data was collected through a survey-based designed close structured questionnaire. One hundred responses were collected in this study. The analysis was done through a pie chart, bar chart, and Pareto analysis in SPSS. The results revealed that the most focusing problem faced by the girls living in boarding in higher education institutions was over occupancy. The number of girls' students struggling for the boarding facility was greater than the capacity available in the form of rooms. The second most highlighted issue was the transport availability followed by the furnished room. This study recommended that higher education institutionsshould redesign and revise their boarding policies and provide a better place for girls where they can live and study freely. It is the responsibility of higher education institutes to offer all the basic facilities to the female students who are living in boarding so that they can pay more attention to their studies.

Keywords: *Boarding, Academic Career, Pareto Analysis.*

1. Introduction

Higher education institutions are places where students start their academic careers. Higher education institutions can be pioneers in research and innovation, instructing and learning, and network commitment. They are proposed to be spaces where thoughts are communicated openly, ideal models are tested, inventiveness is advanced and new information is created (Moore, 2005). The term boarding is normally utilized for the habitation of understudies and explorers in certain nations, boarding during the academic career is considered as the inn. Many understudies live in the lodging (Memon et al., 2018). The boarding where a bundle of students stay belongs to various backgrounds. Pakistan has become an underdeveloped country, and only a small amount is kept in the budget for the education department; further education supports most of Pakistan's cities easily to reach development and massive (Memon et al., 2018). The boarding is the destination that gives shelter in the university to seek higher studies. It is the destination of grooming and making decisions independently (Dulal, 2019). In Pakistan, the boarding framework contributes a fundamental capacity to the scholarly greatness of understudies. Institutes are supporting to give private assets to understudies to keep up the improvement of studies. Understudies living out of their homes face a ton of issues and obstacles, for example, some financial emergencies, alteration issues, private issues and worries from family, changes in nourishment quality and dozing propensity, and numerous other various issues (Memon et al., 2018).

The purpose of this study is to identify and evaluate the boarding issues faced by girls during their academic careers. From the literature mentioned above, ten problems are randomly sorted, and the existence of these problems. The issues identified are Furnished Rooms, Uncooperative hostel staff, Low transport facility, Poor Internet facility, Low space for study, Hygiene Issues, Mess/ food issues, Overloaded girls' ratio, Unaffordable hostel expenses, and Security issues. According to the literature, there has been research on a variety of concerns regarding obstacles to or challenges with schooling. However, there needs to be more research conducted on the boarding issues of female students at a provisional level in Sindh province. Therefore, the purpose of this study is to identify and evaluate the boarding issues faced by girls during their academic careers.

2. Literature Review

An academic career is the most remarkable instructive and examine foundations that have been serving humankind at an all-inclusive scale as focuses where each sort of material and the profound issue is investigated and explored at the most elevated level and got with the crucial; they attempt to arrive at data straightforwardly, have a significant spot in the component of moving data. The principle capacities that an academic career should have been recorded as follows: (1). Completing logical research and thinking about; (2). Delivering answers for the issues of humankind and a nation; (3). Preparing the human power that a nation needs; (4). Showing data, aptitudes, feelings, and instincts which they acquire from others, making productions; (5). Setting models in each sector (Bireda, 2015; Macdonald et al., 2018). It argues that parents send the students to stay in boardings to provide their children with a sense of discipline, improve education, learn intra-personal and inter-personal skills, and prepare them for leadership positions (Dulal, 2019). Boarding place in higher education institutions or colleges is called a hostel; it is like a family of

students with the warden as the head. Students build up a sense of closeness and fellow impression. Students learn the value of regulation. It teaches them a good judgment of liability in matters of taking heed of books, clothes, and health (Maguire et al., 2021).

The boarding system aims to accommodate those who cannot able to come regularly from their homes. Bireda (2015) says that boarding is a place where students are under the administration of the provost or the warden. Nowadays, boarding has become a business lot of private hostels are inaugurated near university proximities (Maguire et al., 2021). This article examines the various challenges faced by students in weekly boarding at Chadiza Day Secondary School, including issues such as the considerable distance from their homes, insufficient materials and infrastructure, food collection processes, time management school fees, access to water and hygiene concerns, accommodation and rental situation, the educational levels of parents, peer pressure, guidance, and discipline, as well as the involvement of girls in intimate relationships. The study found that the long commute to school adversely impacted both genders, with female students encountering greater difficulties than their male counterparts (Mpolomoka et al., 2023).

Education serves as a powerful beacon of hope, capable of lifting girls out of poverty and empowering them to support their families and contribute positively to their communities. It equips them with the awareness needed to recognize and challenge various forms of abuse, including emotional, economic, physical, and sexual violence. As noted by Ananga (2011), the education of girls plays a crucial role in fostering both social and economic progress. It promotes intergenerational learning, enhances social equity, and ensures the sustainability of development initiatives. By investing in the education of girls, we not only uplift individuals but also pave the way for broader societal advancement. The "Education for All" initiative brought joy to many parents and schools due to its numerous benefits. For example, parents were relieved from the burden of paying high fees associated with boarding schools and other related expenses. However, it soon became apparent that day secondary schools faced several challenges that hindered the education of girls, particularly those in weekly boarding arrangements. Addressing these issues presents a threefold advantage: first for school administrations, then for the students themselves, and finally for the parents (Filmer et al., 2023). The guidance program aims to enhance learners' intellectual capabilities, foster a well-rounded personality, and develop a complete individual in terms of intellect, spirituality, morality, and social skills. The guidance and counseling program is designed to help students align their abilities, interests, and values, enabling them to reach their full potential. This indicates that with an effective guidance and counseling program in Day Secondary Schools, many issues faced by girls in weekly boarding can be addressed, leading to improved performance (Phiri et al., 2020). The findings revealed that students expressed concerns regarding instructional challenges in their classes. Successful institutions are recognized for employing collaborative strategies, such as taking responsibility for the learning environment and encouraging teachers to adopt suitable teaching methods. They set high yet realistic expectations for students, prioritize learning outcomes that align with disciplinary knowledge, demonstrate a strong commitment to students' well-being, and value the creation or development of new ideas. Therefore, the idea of supporting and nurturing children's development is emphasized as a key responsibility for both educators and educational institutions (Fook & Sidhu, 2015).

University education in Nigeria aims to offer post-secondary education to all qualified individuals. However, students in public universities need help with pursuing their academic activities across the country. The author discusses these issues, drawing on secondary data collected from printed materials and online sources. Key problems identified include insufficient infrastructure, a lack of lecturers, an inconsistent academic calendar, academic corruption, insecurity, financial difficulties, and limited involvement in university management. The author also provides several recommendations, suggesting that the government should increase funding for student service programs, improve infrastructure, hire more academic staff, ensure security on campuses, maintain a stable academic calendar, establish laws against sexual harassment, implement orientation programs to discourage cult-related activities, ensure effective supervision of teaching and learning, and provide scholarship grants to students (Jacob et al., 2020).

In Pakistan, the responsibility for education lies with the state, and following the 18th amendment, it is also shared by the provinces. Universities in Pakistan are tasked with providing higher education to all citizens without discrimination based on gender, caste, creed, ethnicity, language, or religion. Various political and religious organizations operate within universities, promoting their agendas and sometimes imposing them on students and university staff. This study focuses on the challenges faced by non-Muslim university students in Pakistan and how these challenges impact their self-esteem. Understanding the difficulties faced by Muslim students is also crucial for fostering an inclusive and supportive learning environment in increasingly diverse educational settings (Haider et al., 2024). Higher education offers individuals the chance to enhance their critical, social, economic, cultural, moral, and spiritual capacities. It plays a vital role in national development by spreading specialized knowledge and skills. Considering the rapid expansion of knowledge, higher education must be adaptable to meet the evolving needs and aspirations of students. This study aimed to identify the challenges faced by teachers and students involved in higher education institutions in the Jammu region. The primary issues identified for students included lengthy courses and curricula, significant distances between their homes and institutions, difficulty in expressing their ideas, limited or no financial aid or scholarships, poor communication skills, and financial difficulties within their families (Gupta et al., 2016). Thesis work is a crucial component of postgraduate medical education, acting as an initial step into the realm of scientific writing. However, students encounter several challenges during their research. The general problems identified include a need for more knowledge, experience, and commitment among students regarding their thesis work, time constraints, excessive workload, insufficient funding, and irregular meetings with supervisors. Additionally, issues related to the institutions include inadequate guidance and resources, the absence of a dedicated research cell and thesis writing formats (Titrek et al., 2016).

2.1. Boarding Problems

The major problems students commonly need help with are the quality of food, hygiene issues, transport facilities, internet facilities, and the greater number of borders than limits or space. During boarding life, students learn to compensate for the situation, but the most severe condition is when there are health problems due to improper food quality or hygienic food. According to

Iftikhar and Ajmal (2015), the second most occurring problem in boarding is a shortage of water or the improper supply of water. He said that an average of ten students drink water under one dispenser which is not enough accordingly. Safety and cleanliness are also an important factor. It performs an active part in a strong atmosphere. In that case, the cleanliness services are properly provided to students. In the boarding system, students have the twenty-four-hour First Aid administration with one emergency vehicle. During this case boarding is a superior situation because they need this office accessible constantly. Different elements decide the fulfillment of students in boarding. They are the structure, settlement, food, direction of instructors, learning conditions, and openings. In endeavoring to quantify factors identified 'fulfillment with their boarding and such factors are related to their scholarly presentation. Doygun and Gulec (2012) investigated that candidates meet both in the in-class and outside of their group condition, on and off the grounds, adding to instructive achievement and character development (Maguire et al., 2021). According to Mpolomoka et al. (2023), it is a very difficult time to live in a boarding without family for a timeframe, leaving some suffering encounters in life. In this new way of life, understudy figures out how to live autonomously and figure out how to bargain with different flatmates. Individuals accept that life uniquely affects an incredible example. Living in the lodging makes understudies socially and typically unique. Lodging life has a blend of various social foundations.

Moreover, they take in different information from partners who speak to various social characters (Shah, 2010). While, Mansoor et al. (2015) displayed the effect of boarding as there are diverse factors that decide the fulfillment. These components are settlement, therapeutic offices and the location of hostels, sports offices, nourishment offices, prisoner participation, Library offices, and well-being and security. Out of these seven variables, five factors affect the scholarly exhibition of the improvement of the student's performance. These elements are settlement, nourishment offices, detainee collaboration, Library offices, and well-being and security (Dulal, 2019). Deciding issues that Institutes face are moving from their assessments that will display significant criticism in the advancement of projects and administrations coordinated with youngsters (Lucas, 1993 cited by Gizir (2005). From the various research, it is suggested that in Pakistan the issues looked at by institutes youth today under four primary groups. These are nourishment and settlement, habituation and direction, stresses over the future, and calling and quality instruction (Doygun & Gulec, 2012).

3. Methodology

This study was based on quantitative research methodology. A descriptive approach was used to collect the data. The data for this study was collected from the border girls in various institutes/higher education institutions in Pakistan (Particularly from Sindh). The target population was boarder girls' students. The data is collected through a designed, fully structured questionnaire through random sampling. The sample size is n=100. The Questionnaire comprises ten variables with four Likert scales of 1-4 (Never occurred, rarely occurred, frequently occurred, and mostly occurred). The variables are Low Furnished Rooms, Uncooperative hostel staff, Low transport facility, Poor Internet facility, Low space for study, Hygiene Issues, Mess/ food issues, Overloaded

girls' ratio, Unaffordable hostel expenses, and Security issues. (Channar et al., 2017) The author's primary goal is to describe the obstacles that girls students in higher education institutions confront, including those related to university infrastructure and services, transportation services, supervision issues, and fewer internet facilities. (Bireda, 2015)discussed that women are likely to study less than men, and major concerns during the studies for girls were found to be low particular space for students, uncooperative staff, and unaffordable expenses during the study (Iftikhar & Ajmal, 2015) The most occurring problems in the boarding are lack of security in the hostels, improper cleanliness services, and too many hygiene issues the students face. (Macdonald et al., 2018) identified that boarding education allowed students to achieve a dual goal of meaningful career pathways and improved health outcomes. However, they faced challenges unique to the Indigenous boarding school experience in terms of student self-concept, homesickness, food issues, overloaded ratio in the rooms, and racism. The tools used to analyze this data are Frequency Tables, bar graphs, and Pareto Analysis in SPSS 27.0.

4. Results

Analysis links between each component and write reflections.

Figure 1

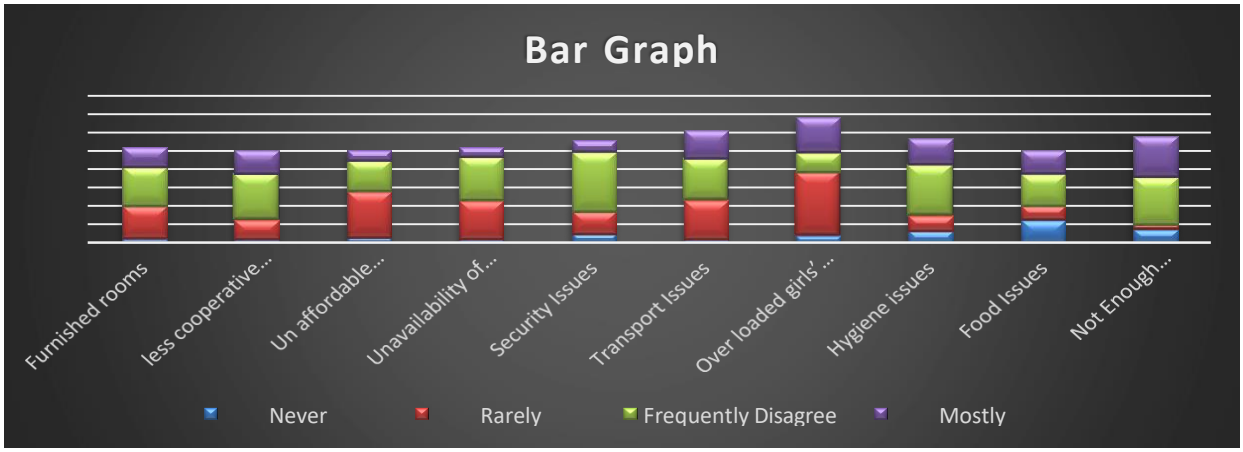

Fig.1 Shows the graphical presentation of data in the form of a bar chart. The bar shows the status of the occurrence of the problem. Ten bars show the ten problems discussed above. The blue color shows that the problem never occurred. The red color shows that the problem is rarely occurring. The green color shows that the problem frequently occurs, and the purple color shows the most occurrences of the problem. From the table, it is extracted that the most occurring problem is the overloaded girl ratio in a single room. The second biggest problem is not enough space. However, from the other side, the problem that is never occurring is the food problem.

Variable	Frequency
1. **Overloaded girls' ratio in a single room**	1. 1
2. **Transport Issues**	2. 2
3. **Furnished rooms**	3. 3
4. **Hygiene issues**	4. 8
5. **fewer cooperative staff**	5. 12
6. **Food Issues**	6. 12
7. **Security Issues**	7. 13
8. **Not Enough space for study**	8. 14
9. **Un affordable Expenses**	9. 15
10. **Unavailability of Internet**	**10.** 15

Table 1 shows the Frequency distribution table. Frequency is a degree of the quantity of incidences in a data. It is a technique of rearranging the data in a compacted shape by visualizing the sequence of ascending or descending series along with their frequencies. It is a column-based representation in which each column shows the frequency number of the variable or data set. To follow the frequency table second most common problem is transport issues than furnished rooms and so on. The problem that very rarely occurs is the internet facility.

4.1 Interpretation

Fig.2 Shows the Pareto analysis of the table. The Pareto analysis depends upon the Pareto principle. It is also known as the 80/20 principle. According to the principle, many defects or problems are caused by a small number of causes. Pareto's principle is frequently referred to as the 80/20 rule or 80/20 principle. This means 80% of the total imperfections are produced by 20% of the complications. A Pareto chart or diagram is designed in the shape of bars that show the amount and proportion of reasons separately, and the trend line shows the growing value. The above figure shows that out of ten problems, three problems are counted under 20% in Pareto analysis. That is the overloaded girls' ratio, transport issues, and furnished rooms. However, the remaining seven problems are counted as fewer than 80%. It shows that the root causes of the problem are these three problems. If higher education institutions resolve these three problems, the other seven problems are automatically resolved.

Figure 2

5. Discussion

This research provides a comprehensive overview of the challenges faced by border girls in higher education institutions in Pakistan. It highlights the significance of boarding life as a formative experience while also addressing the specific problems these students encounter. The introduction effectively sets the context for the study by emphasizing the role of higher education institutions in shaping students' academic journeys. These institutions should foster an environment conducive to learning and personal growth, which is crucial for students living away from home. In the exploration of the issues, there are primary challenges, which is a significant concern as it directly impacts the living conditions and overall well-being of the students. Following that, transport availability and the quality of furnished rooms are also critical issues that can affect students' academic performance and mental health. Recommendation for higher education institutions to revise their boarding policies is essential. By ensuring that adequate facilities and support systems are in place, institutions can create a more conducive environment for learning, allowing students to focus on their studies without unnecessary distractions or stress.

6. Conclusion

A university, college, or school is a place where students come across the region to get a better education. This study is an effort to judge the common problems girls face when they stay out of their homes and live in boarding. Literature was dug out in a deep, and various problems were figured out. Fom many issues faced by girls during the boarding period, ten problems were chosen to evaluate in the higher education institutes of Sindh province. The results revealed that all these ten problems exist in academic organizations but at different levels. The overall outcome of this study shows that three problems are mostly highlighted, i.e., overloaded girls' ratio, transport issues, and furnished rooms.

In order to provide a safe and healthy environment to the girl's students, institutions should pay drastic attention to the solution to these problems. For example, the first problem is the overloading of the girls ratio. They must have a strategy to select the girls for boarding on a first-come, first-serve basis, or they may arrange more space in order to facilitate more girls students on the campus. There are two main reasons why students prefer to live inside the campus in a boarding or hostel: one is the affordability, another one is the safety. Girls students feel more secure living inside the campus as compared to living outside the campus in private boarding or hostels. The second problem that we found during our study was the transport facility. The universities may provide transport facilities to the female students with minimal charges so that they can do their basic work easily, i.e., in and out of the campus or sometimes go grocery shopping or buy personal items. Finally, the third problem that is mostly faced by the girls living in boarding is the issue of furnished rooms. Sometimes the cupboards are broken, and someone steals the belongings of the girls. Sometimes they do not have proper bedding or electricity in the rooms so that they can study properly and take a rest. Our study suggests that higher education institutes provide the basic facilities to girls students who are living in boarding universities. They may ask for funding from the Higher Education Commission or any other government funding agency. Finally, this study suggests that academic institutes should either reduce the number of girls in single rooms and expand their capacity accordingly or only select the girls on a first-come, first-serve basis. As the boarding places are far from campuses the management should arrange proper transport facilities for the female students and provide all possible facilities in the room that fulfill the basic needs.

7. Recommendations

According to the results of this study or research, Some suggestions are as follows:

- Higher education institutions should provide more rooms for the girls students.
- Higher education institutions should provide the facility of transport at cheap rates to female students.
- Higher education institutions should provide furnished rooms along with basic needs like beds and clean water.
- Safety is the major reason why girls choose to stay at the boarding inside the campus, so it is the responsibility of Higher education institutions to provide the safety of belonging and honor,
- Higher education institutions can get funding from external agencies, i.e., HEC or Non non-government agencies, to provide the basic facilities in the boarding system.

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Vote of Thanks

We are really thankful to the members of editorial and advisory board for their valuable time, suggestions and initiatives made possible to publish this issue.

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