

EFFECT OF 21ST CENTURY SKILLS OF TRAINEE TEACHERS AND THEIR ACADEMIC ACHIEVEMENT

Dr. Tariq Saleem Ghayyur¹, Dr. Sahibzada Shamim-ur-Rasul², Dr. Abida Parveen²

¹Lecturer, Institute of Education, University of Sargodha, Sargodha

²Assistant Professor, Institute of Education, University of Sargodha, Sargodha

Abstract

The development of 21st-century skills is crucial for trainee teachers, not only for their academic achievement but also for their success in the teaching profession. Research indicates that these skills significantly contribute to the academic performance of trainee teachers. Teacher education programs in Pakistan are increasingly recognizing the importance of equipping trainee teachers with 21st century skills to enhance their pedagogical practices and prepare them for contemporary classrooms. The present study was aimed to examine the effect of 21st century skills on the academic achievement of trainee teachers. The study was quantitative and correlation in nature. The population of the study was comprised of trainee teachers of undergraduate and graduate programs of Teacher Education Department/Institutions of all the universities of the Punjab. Proportionate stratified sampling technique was used to collect data from 300 trainee teachers of undergraduate programs of education department/teacher education institutions of six public sector universities of the Punjab province. After detailed literature review, researchers developed a questionnaire namely (21stCSPT) 21st Century Skills of Trainee teachers to collect data from respondents. The study revealed significant differences in learning skills and literacy skills between male and female trainee teachers. Male trainee teachers had higher learning skills and literacy skills than their female counterparts. The study reveals no significant differences in learning skills, literacy skills, and life skills of trainee teachers for their residence. There were significant differences in 21st century skills among trainee teachers from different universities. PU, Lahore and GCU, Faisalabad trainee teachers scored higher in learning skills while LWCU, Lahore trainee teachers scored the lowest. It was recommended that policymakers should endeavor to incorporate 21st-century skills in the curriculum of teacher education programs to enhance total academic performance of trainee teachers.

Introduction

Developing 21st century skills is important not only for students but also for teachers, especially trainee teachers. Many studies show that these skills, such as critical thinking, collaboration and digital literacy, have a major impact on both academic success and professional growth. This research examines how these skills influence the learning outcomes of trainee teachers. Students today need to solve problems using creative thinking and technology. Education is changing, moving from simple learning to a cycle where students acquire knowledge, use it, and continue to contribute (Kamisah & Neelavany, 2010). Voogt and Pareja Roblin (2019) emphasize that teachers must be adaptable and constantly improve their professional skills. The National Education Policy

2017 highlights the need for digital skills and critical thinking to build a strong education system in Pakistan (Government of Pakistan, 2017).

Teachers need to communicate and work well with others because teaching often requires teamwork, whether it's with other teachers, students, or parents (Lai & Viering, 2012). Adding 21st century skills to teacher training is important to help future teachers succeed in today's classrooms (Pellegrino & Hilton, 2012). However, more studies are needed to see how these skills impact the academic success of new teachers. With the growing importance of 21st century skills, teacher education in Pakistan is expected to include more of these skills in the future. Policymakers and educational institutions need to work together to ensure that trainee teachers not only learn these skills but also get the support needed to use them well.

In today's world, both teachers and students face fast changes due to new technologies, globalization, and evolving job needs. Because of this, there is more focus on developing skills that go beyond traditional learning. These "21st century skills" include learning skills, literacy and life skills. These skills are vital for success in both personal and professional life (Kivunja, 2015). For beginning teachers, knowledge of 21st century skills is important not only for their academic success, but also for their teaching career. Studies show that critical thinking, teamwork, communication and digital literacy help improve educators' academic performance. However, developing these skills can be difficult due to a lack of training and access to technology. As education continues to evolve, it is important that teacher education programs focus on these skills and prepare future teachers for both academic and professional challenges. In Pakistan, teacher education programs are beginning to include digital literacy and teamwork, but challenges remain, especially in rural areas where technology and training are less accessible (Mahmood & Akhtar, 2020).

Defining 21st-Century Skills

The Partnership for 21st Century Learning skills can subdivide into learning/innovation skills (including critical thinking skills, creativity, communication and collaboration skills, information/technology skills and life/career skills. These are requirements for success in the information age and are imperative for processing and using information in the knowledge based economy (Griffin et al., 2017). Prospective teachers require these skills to address the needs of the learners who use technology and other information resources (Voogt & Roblin, 2012).

The Importance of 21st Century Skills for Teacher Trainers in Pakistan

The work done by Koehler, Mishra, and Cain (2019) makes it clear that engaging learning environments can be provided for teachers who understand the relationship between instructional technologies and educational practices. Applying technology resources in tackling teamwork and critical thinking is essential for patients' engagement as well as better performance. Teaching expertise encompasses a broader aspect than content knowledge to enable teacher educators to manage the complex context of practice visions for teaching. Technology integration also enhances teacher training BP 254 which is crucial for teachers being that learning is a lifelong process. Thus, teachers have to be flexible, and innovative and expand their knowledge during the whole working experience (Voogt & Pareja Roblin, 2019). Another advantage that comes with teachers possessing 21st Century Competency can also utilize ICTs to improve the outcome achieved by their students (Kivunja, 2018).

Skills and Academic Achievements of 21st-century trainee teachers

Research shows that the acquisition of 21st-century competencies has a direct and indirect effect on future educators' learning outcomes. While; |grades are measures of academic performance| 21st-century skills provide a realistic portrayal of success. In regards to Wagner's (2010) study,

pupils with greater 21st-century skills also earn higher academic achievements. For example, a study by Reyes et al. (2020) found that among preservice teachers, those, who had these skills, performed better in the lessons that required analysis and critical thinking. They received better academic results and these skills helped them comprehend complex instructional theories. Wagner (2010) extends that while, 21st-century talents expand the idea of success by not framing student success by how they engage with materials and subjects, not punitive grades.

In Pakistan traditional schooling overemphasizes rote memorization; when 21st-century abilities are introduced, students attain enhanced learning and performance. Jabeen and Rizvi believe that better performance in terms of class and methods of teaching is predictable in educators who have an outstanding demonstration of Teamwork as well as communication skills (Jabeen & Rizvi, 2019). This means that fostering these abilities is crucial for future teaching performance as well as academic achievement. According to Saavedra and Opfer (2012), it entails that these abilities help students better manage difficulties and use knowledge in real-life contexts. As such, high co-aspect existence was also useful to teachers in accomplishing goals, dealing with assignments, working in groups, lesson planning and concerning the classroom (Dede and Richards, 2017). Jabeen and Rizvi (2019) also stressed that in Pakistan the trainee instructors with higher levels of teamwork and communication skills provided higher levels of performance within both academic teaching practices and their applied practical experiences.

Statement of the Problem

For the teacher educators in Pakistan to better fulfill the requirements of today's classroom, 21st-century skills have to be introduced into teacher education. A teacher and learner must have skills beyond the measures of classroom knowledge because the world is changing so dynamically in the twenty-first century. Many competencies are competencies including as learning skills, literacy skills, and life skills among the 21st-century competencies relevant in both work and life. Although the importance of these abilities is recognized to a great extent, little is known about the transfer ability of these abilities and the effect they have on the trainee teachers' academic performance, particularly in Pakistan. System of education in Pakistan has relied much on education that tests learning traits and uses cramming techniques; these elements have lacked conspicuous fostering of such applicable skills (Malik, 2018). Thus, the present study intends to investigate the effect of 21st-century skills on the academic achievement of trainee teachers.

Research Objectives

1. To explore the level of 21st century skills among trainee teachers.
2. To examine the relationship between 21st century skills and the academic achievement of trainee teachers.

Research Questions

1. What is the current level of 21st century skills among trainee teachers?
2. Is there a significant relationship between 21st century skills and academic achievement among trainee teachers?
3. Which 21st century skills have the strongest impact on the academic achievement of trainee teachers?

Research Methodology

Research Design

The study was designed to explore 21st century skills among trainee teachers and their effect on their academic achievement. The study was quantitative and correlation in nature.

Participants

The population of the study was comprised of trainee teachers of undergraduate and graduate programs of Teacher Education Department/Institutions of all the universities of the Punjab. Multistage sampling technique was employed to collect data. At first stage, 6 public sector universities were selected randomly from 38 public sector universities of the Punjab. At second stage, Propionate stratified sampling technique was used to collect data form 300 trainee teachers of undergraduate programs of education department, it is the “process of selecting a random sample from subgroups or strata into which a population has been subdivided”. Fraenkal, Wallen and Hyun (2012) also suggested stratified sampling random sampling is “a process in which a certain subgroups, or strata, are selected for sample in the same proportion as they exist in the population. Therefore, 50% trainee teachers of final semester of BS Education/B.Ed Hons. (Undergraduate programs) and M.A Education (graduate programs) were selected through non-propionate sampling technique from the respective selected universities.

Research Instrument

After detailed literature review, researchers developed a questionnaire namely (21stCSPT) 21st Century Skills of Trainee teachers. Questionnaire contained 2 parts. First part of the questionnaire was comprised of demographic information (program of study, class status, area of specialization, CGPA, marks, gender, resident, name of university) and second part contained group of 3 skills of 21st century skills (learning Skills, literacy Skills, and life Skills). Second part of the questionnaire was graded by using 7 point scale including 1 NR: Not really 2 TME: To a Minor Extent 3 TME: To a moderate extent 4 TGE: To a great extent 5 TVGE: To a very great extent. For validation of the instrument, first of all peer consultation was sought and different changes were made to improve the instruments. Then opinion of five experts in field of teacher education was sought for the validation of the instrument. After incorporating suggestions of these experts, the instrument was pilot tested on 60 trainee teachers of Institute of Education, University of Sargodha that were further excluded from the sample. The Cronbach’s Alpha for seventy items was 0.964 that showed very high reliability of the research instrument.

Data Analysis

Data were collected through survey method and self-approach from teacher educators of five public sector universities of Punjab province. Data was analyzed by using Statistical Package for the Social Sciences (SPSS) version 23. The analysis includes both descriptive and inferential analysis.

Results

The findings are stated according to the sections in the questionnaire and some inferential analysis.

Table 1

Demographic information of Trainee Teachers

Sr. No.	Variables	Category	F(n)	Percentage %
3	Program of Study	MA Education	103	34.45
		BS Education	88	29.43
		B.Ed Hons	107	35.79
4	Class Status	Regular	258	86.29
		Self Support	41	13.71
5	Gender	Male	63	21.07

6	Residence	Female	236	78.93
		Urban	211	70.57
		Rural	88	29.43
7	Name of University	University of Sargodha (SU), Sargodha	48	16.05
		Punjab University (PU), Lahore	50	16.72
		University Of Education (UE), Lahore	50	16.72
		Lahore Women Collage University (LWCU), Lahore	49	16.39
		University of Gujrat (UG),Gujrat	52	17.39
		Government College University (GCU), Faisalabad	50	16.72

Table 1 shows that out of 300 trainee teachers sample the number of trainee teachers from M.A were 103 (34.45) the trainee teachers from B.S were 88(29.43) and the trainee teachers from B.ED Hons were 107 (35.79). Table 1 indicates that out of 300 trainee teachers sample the number of regular trainee teachers were 258 (86.29) and the number of self-support trainee teachers were 41 (13.71). Table 1 indicates that out of 300 trainee teachers, female students dominate the sample, making up 78.93% of the total, compared to 21.07% male students. This highlights a gender imbalance, indicating that the teaching profession in this context is more popular among females. Respondents were asked to provide their residential information that either they are from urban area or rural area. Majority of the trainee teachers come from urban areas (70.57%), while only 29.43% are from rural areas. This suggests that urban areas have a stronger representation in teacher education programs, possibly due to better access to higher education institutions. Table 1 indicates that the trainee teachers from university of Sargodha, Sargodha were 48 (16.05%) the trainee teachers from University of Punjab, Lahore were 50 (16.72%) the trainee teachers from University of Education, Lahore were 50 (16.72%) the trainee teachers from Lahore Women College University, Lahore were 49(16.39%) the trainee teachers from University of Gujrat, Gujrat were 52 (17.39%) and the trainee teachers from Government College University, Faisalabad were 50 (16.72%).

Table 2
Mean difference of 21st century skills of trainee teachers with respect to their gender

Variables	Gender	N	Mean	Std. Deviation	Std. Error Mean	T	p
Learning Skills	Male	63	72.94	11.294	1.423	2.933	.004
	Female	236	67.63	14.132	.854		
Literacy Skills	Male	63	89.73	14.651	1.821	2.599	.010
	Female	236	83.95	15.991	1.041		
Life Skills	Male	63	108.40	15.428	1.944	1.630	.104
	Female	236	104.66	17.987	1.171		

Table 2 reveals significant differences in learning skills ($t = 2.933$, $p = .004 < 0.05$) and literacy skills ($t = 2.599$, $p = .010 < 0.05$) between male and female trainee teachers. The mean score for learning skills shows that male trainee teachers ($m = 72.94$) have higher learning skills than female trainee teachers ($m = 67.63$). Similarly, male trainee teachers ($m = 89.73$) exhibit greater literacy skills than their female counterparts ($m = 83.95$).

However, the t-test reveals no significant differences in life skills ($t = 1.630$, $p = .104 > 0.05$) between genders. The mean scores indicate that male trainee teachers ($m = 108.40$) had slightly more life skills compared to female trainee teachers ($m = 104.66$), but this difference is not statistically significant.

Table 3
Mean difference of 21st century skills of trainee teachers with respect to their Residence

Variables	Residence	N	Mean	Std. Deviation	Std. Error Mean	T	P
Learning Skills	Urban	211	69.04	12.512	.861	.608	.544
	Rural	88	68.05	13.885	1.480		
Literacy Skills	Urban	211	86.01	15.815	1.089	1.427	.155
	Rural	88	84.65	15.782	1.682		
Life Skills	Urban	211	105.87	17.565	1.209	1.008	.314
	Rural	88	103.63	17.452	1.860		

Table 3 shows that the t-test reveals no significant differences in learning skills ($t = .608$, $p = .544 > 0.05$), literacy skills ($t = 1.427$, $p = .155 > 0.05$), and life skills ($t = 1.008$, $p = .314 > 0.05$) of trainee teachers for their residence. The mean score difference indicates that urban trainee teachers ($m = 69.04$) had slightly more learning skills than rural trainee teachers ($m = 68.05$). Similarly, urban trainee teachers ($m = 86.01$) had slightly higher literacy skills than rural trainee teachers ($m = 84.65$). Urban trainee teachers ($m = 105.87$) also had more life skills than rural trainee teachers ($m = 103.63$). However, these differences were not statistically significant.

Table 4
Mean difference of 21st century skills of trainee teachers with respect to their class status

Variables	Class Status	N	Mean	Std. Deviation	Std. Error Mean	T	P
Learning Skills	Regular	258	68.59	12.983	.808	-.524	.601
	Self-Support	41	69.73	12.596	1.967		
Literacy Skills	Regular	258	85.31	15.437	.961	.380	.704
	Self-Support	41	84.69	18.317	2.861		
Life Skills	Regular	258	105.11	17.801	1.108	-.235	.815
	Self-Support	41	105.80	15.927	2.487		

Table 4 demonstrates that the t-test reveals no significant differences in learning skills ($t = -.524$, $p = 0.601 > 0.05$), literacy skills ($t = 0.380$, $p = 0.704 > 0.05$), and life skills ($t = -.235$, $p = 0.815 > 0.05$) of trainee teachers for their class status. The mean score difference indicates that self-support trainee teachers ($m = 69.73$) had slightly more learning skills than regular trainee teachers ($m = 68.59$). Regular trainee teachers ($m = 85.31$) had slightly higher literacy skills compared to self-support trainee teachers ($m = 84.69$). Similarly, self-support trainee teachers ($m = 105.80$) had slightly more life skills than regular trainee teachers ($m = 105.11$). However, none of these differences were statistically significant.

Table 5
Mean difference of 21st century skills of trainee teachers with respect to their universities

Variables	SU (N=48)		PU (N=48)		UE (N=48)		LWCU (N=48)		UG(N=48)		GC(N=48)		Df	Mean Square	F	Sig.
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD				
Learning Skills	67.00	13.82	71.16	14.23	70.02	14.108	63.35	11.34	69.94	12.266	70.80	10.61	293.00	446.51	2.76	0.02
Literacy Skills	81.04	16.780	85.90	16.672	88.08	16.02	79.286	14.1083	84.1008	13.914	91.280	14.24	293.00	0.00	3.94	0.00
Life Skills	98.73	19.76	105.80	17.424	109.74	18.357	101.10	16.333	104.20	15.553	111.38	14.109	293.00	1168.74	3.993	0.002

Table 5 demonstrates that the analysis of variance reveals a significant difference in learning skills of trainee teachers with $F = 2.76$, $p = 0.02 < 0.05$. This indicates that there is a statistically significant difference in the learning skills of trainee teachers across different universities. The mean difference shows that trainee teachers from PU, Lahore ($M = 71.16$, $SD = 14.23$) and GCU, Faisalabad ($M = 70.80$, $SD = 10.61$) had higher learning skills compared to those from other universities, with LWCU showing the lowest mean ($M = 63.35$, $SD = 11.34$). The mean difference shows that trainee teachers of PU, Lahore showed a significantly high score in learning skills (71.16 , $SD = 14.23$) compared to other universities.

The analysis of variance shows a significant difference with $F = 3.94$, $p = 0.00 < 0.05$ for literacy skills of trainee teachers. This suggests a significant difference in literacy skills among trainee teachers from different universities. GC university, Faisalabad ($M = 91.28$, $SD = 14.24$) and UE, Lahore ($M = 88.08$, $SD = 16.02$) scored the highest in literacy skills, while LWCU, Lahore had the lowest score ($M = 79.29$, $SD = 14.11$). The mean difference shows that trainee teachers of GC university, Faisalabad showed a significantly high score literacy skills ($M = 91.28$, $SD = 14.24$) compared to other universities.

In terms of life skills, the analysis reveals a significant difference with $F = 3.993$, $p = 0.002 < 0.05$. This indicates that life skills significantly vary across universities. Trainee teachers from GC university, Faisalabad ($M = 111.38$, $SD = 14.11$) and UE, Lahore ($M = 109.74$, $SD = 18.36$) demonstrated the highest life skills, whereas SU, Sargodha had the lowest mean ($M = 98.73$, $SD = 19.76$). The mean difference shows that trainee teachers of GC university, Faisalabad showed a significantly high score in life skills ($M = 111.38$, $SD = 14.11$) compared to other universities.

Table 6
Effect of 21stCentury Skills of trainee teachers on their academic achievement

		21st Century Skills	Marks
21st Century Skills	Pearson Correlation	1	0.45
			0.00
	sig. (2-tailed)		1
Marks	N	299	299
	Pearson Correlation	0.45	1
	sig. (2-tailed)	0.001	
	N	299	299

Table 6 shows a significant moderate positive effect of 21st century skills on the academic achievement of trainee teachers as ($r=0.45$, $p=0.000<0.001$). This suggests that as trainee teachers' 21st century skills improve, their academic achievement tends to increase. The significance value ($p = 0.001$) is less than 0.05, which indicates that this relationship is statistically significant.

Findings

1. There are significant gender differences in learning skills ($t = 2.933$, $p = .004 < 0.05$) and literacy skills ($t = 2.599$, $p = .010 < 0.05$). Male trainee teachers demonstrate higher learning skills ($M = 72.94$) and literacy skills ($M = 89.73$) compared to female trainee teachers ($M = 67.63$ for learning skills and $M = 83.95$ for literacy skills). However, no significant differences were found in life skills between genders ($t = 1.630$, $p = .104 > 0.05$).
2. The t-test shows no significant differences in learning skills, literacy skills, or life skills based on the residence of the trainee teachers (urban or rural). Although urban trainee teachers had slightly higher means in all three skill areas, the differences were not statistically significant.
3. No significant differences were found in learning, literacy, and life skills between regular and self-support trainee teachers.
4. There are significant differences in 21st century skills among trainee teachers from different universities. PU and GCU trainee teachers scored higher in learning skills ($M = 71.16$ and $M = 70.80$, respectively), while LWCU trainee teachers scored the lowest ($M = 63.35$). For literacy and life skills, GC University scored the highest, with LWCU again scoring the lowest.
5. The Pearson correlation reveals a moderate positive relationship between 21st century skills and academic achievement ($r = 0.45$, $p = 0.001$). This indicates that trainee teachers with better 21st century skills tend to perform better academically.

Conclusion and Discussion

The results align with contemporary educational research highlighting the importance of 21st century skills—particularly learning, literacy, and life skills—in influencing academic success. The study concludes that 21st century skills, particularly learning and literacy skills, are significantly influenced by gender, as male trainee teachers possessed better skills than females. The results are consistent with previous research that suggests that boys typically demonstrate better academic and literacy outcomes due to differences in cognitive and educational experiences (Wang et al., 2020).

These skills did not present any significant difference based on place of residence. The lack of significant differences based on location suggests that 21st century skills are developed more

globally regardless of these demographic factors, possibly due to equal access to resources such as technology and standardized curricula (OECD, 2019). Furthermore, 21st century skills had a significant positive impact on the academic performance of trainee teachers, highlighting their importance to academic success. However, differences in skills across universities suggest that some may emphasize the development of 21st century skills or provide better opportunities to develop these skills.

But, using skills, differences across Universities indicate that some may offer better emphasis or provide better opportunity of developing the 21st-century skills. Some of these institutions seem to be better equipped to develop these hard skills possibly because of better education frameworks or resources and these include Government College University, Faisalabad, and the University of the Punjab Lahore. Finally, the positive correlation between 21st century skills and academic achievement supports the research on embracing the skills as valuable additions to present curriculums because they enhance students' academic results (Binkley et al., 2012).

As a result of the study, it is clear that there is a need for the continuous improvement of skill development in teacher education and also the need for detailing the programs to change in the education sector, this is with a view of preparing all trainee teachers to be fit for the current teaching practices. The needs analysis therefore implies that by targeting the presented gaps and building on the trainee teachers' strengths, educational institutions can accustom the profession to the training of educators that will be capable of addressing the future challenges of teaching and learning in the 21st century.

Recommendations

1. Educational institutions should offer solutions to the differences in gender in terms of learning and skills in literacy through the development of suitable programs meant for the enhancement of equal skills.
2. Learners in universities that are deficient in skill development such as LWCU should call for curriculum review and enhancement by borrowing strategies from GCU and PU that have enabled them to possess higher 21st-century skills.
3. Teacher Education Institutions should endeavor to incorporate 21st-century skills in the curriculum of teacher education programs to enhance total academic performance of trainee teachers because these skills have a positive correlation with their performance at their respective abilities.

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