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TEACHERS PERCEIVED PEDAGOGICAL PRACTICES REGARDING 21ST-CENTURY LEARNING AND INNOVATION SKILLS AT THE ELEMENTARY LEVEL: A DIAGNOSTIC STUDY

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ABSTRACT

The research examined the perceived pedagogical practices in terms of 21st century learning and innovation skills on creativity, critical thinking, communication, and collaboration among elementary teachers. The study design was qualitative descriptive survey and the sample size was 400 teachers, stratified random sampling method was also used in selecting the teachers who were picked randomly across the public and private schools of District Gujrat. A self-developed questionnaire (structured after completion) was used to collect data and the statistical analysis was done using descriptive statistics and gap analysis. The results indicated that communication was the area that had been worked on by the teachers most compared to all the other domains. Critical thinking was the least well-developed area. There was a moderate level of creativity and collaboration, with integration only partially taking place into classroom practices. Gap analysis also revealed high levels of differences between actual and ideal pedagogical practices, especially with regard to elements of critical thinking, collaboration and creativity. The variations between schools of different types and genders were not too important, meaning that special interventions are necessary across the board. On the basis of these findings, the study suggests professional development opportunities targeting the development of critical thinking, creativity, and collaboration as the effective ways of adopting 21st-century skills in early classrooms. The research can be useful to educators, policymakers, and school administrators and help them to enhance the teaching process in order to align it with the current needs of education.

Keywords: *21st-century skills, pedagogical practices, creativity, critical thinking, communication, collaboration, gap analysis.*

INTRODUCTION

The fast-paced evolution of the 21st century has transformed the priorities in education, to the point where schools must arm students not only with their lesson content, but also with the skills they need to succeed in life, living in an environment that is strongly interconnected, highly digital, and far more complex than ever before. The 21st -century learning and innovation skills, also known as the 4Cs (creativity, critical thinking, communication, and collaboration), are central to these priorities. These competencies are considered some of the most significant skills that help learners to solve problems, think critically, express ideas, effectively and work productively in teams (Trilling & Fadel, 2009; Binkley et al., 2011). Since elementary education is the start of lifelong learning, it is crucial to ensure that the teachers embrace pedagogical practices that foster these skills at earliest levels of learning.

Teachers have a central role to play in determining the learning and innovation abilities of the students they interact with, since their teaching

approaches determine their classroom activities and mastery of skills. Using researched information, study-based education, discovery-based training, group work assignments, and technology integration are among some of the best instructional techniques resulting in students as creative and critical thinkers (Voogt & Roblin, 2012; Saavedra & Opfer, 2012). Nevertheless, the magnitude of the perception of teachers in the realization of such practices differs in educational settings. Self-perceptions provide a valuable diagnostic instrument to help teachers address their weaknesses as well as their strengths, and are as such an important means of enhancing the quality of instruction.

The education system in most of the developing countries including Pakistan is yet transitioned toward student-centered pedagogies as compared to the traditional teacher-centered approaches that still have the focus on innovation and higher order thinking. Such challenges as large classes, a lack of opportunities to train, curriculum restrictions, and an absence of resources could negatively affect the ability of elementary teachers to effectively implement 21st -century instructional methods (Iqbal et al., 2023). Interpreting what teachers think they are doing can therefore give pertinent information on the gap that exists between the expectations of policy and the realities in the classroom.

Numerous global frameworks, including the ones introduced by the Partnership for 21st Century Learning (P21) and UNESCO, harmonize the idea that creativity, critical thinking, communication, and collaboration should become a core of the teaching and learning process (Voogt et al., 2013; UNESCO, 2020). However, although it is generally acknowledged that these skills are critical, empirical evidence shows that teachers do not feel sufficiently equipped to employ new pedagogies that promote these skills (Schleicher, 2018; Greenstein, 2017). Consequently, it is necessary to evaluate the perceived practices of the educators to determine the professional developmental needs and to develop intervention work that is consistent with the vision of 21st century education.

Statement of the Problem

The 21st-century demands necessitate the schools to raise students with creativity, critical thinking, communicating, and collaborating abilities. Whereas curriculum frameworks and educational reform efforts in Pakistan stress these competencies, their application to classroom practice at the elementary school level is largely traditional and teacher-centered thus providing scanty chances of innovation and higher order learning. The role of teachers in the development of such skills is vital; however, some of them are still challenged by the lack of the necessary training, resources, and by the uncertainty regarding the best pedagogical practices. Although it has been pointed out that teachers play a central role in enhancing 21st-century learning and innovation skills, there is scarce empirical evidence on how they perceive their practices and engage in promoting 21st-century learning and innovation skills. Without this type of diagnostic information, policies and professional development programs fail to respond satisfactorily to classrooms. This paper thus attempts to research on the perceived pedagogical practices of elementary teachers in relation to the 4Cs, gaps and ways of improving teaching to the 21st century learning environment.

Research Objectives

1. To explore the perceived pedagogical practices of elementary teachers with reference to 21st-century learning and innovation skills with particular reference to creativity, critical thinking, communication, and collaboration.
2. To establish the gaps between the actual pedagogical practices of elementary teachers and the standards of 21st -century learning, and innovation skills, which include creativity, critical thinking, communication, and collaboration.

Research Questions

1. What are the perceptions that elementary teachers hold in respect to their pedagogical practices concerning 21st century learning and innovation skills including creativity, critical thinking, communication and collaboration?
2. What are the deficiencies between the current pedagogical practices of elementary teachers and the perfect standards of 21st -century skills and innovations in learning?

Literature Review

The theme of education in the 21st century compliments with the ability to provide the learning community with skills that extend beyond content knowledge; in order to respond to fast changes in technology, social and economic

changes. Most frequently acknowledged framework is the one that lays stress on four major learning and innovation skills (the 4Cs): creativity, critical thinking, communication and collaboration (Binkley et al., 2011). These are the competencies said to be critical to the development of problem-solving capacity, innovation, group work, and lifelong learning.

This is where teachers come in centrally, since their teaching approaches will determine the way in which learners acquire and use knowledge in the real world. Nevertheless, introducing 21st-century skills would likely necessitate a change in teachers' pedagogy towards student-centered learning models, taking place of traditional lecture-based teaching (Saavedra & Opfer, 2012). Analyzing the attitude of the teachers towards their own practices is therefore essential since perceptions determine the degree to which the practices are implemented in the classroom.

One can describe creativity as the ability to generate novel and worthwhile ideas that are original. In education, it means nurturing students who are inquisitive, experimental, creative and original in their modes of thought in problem solving and creation of knowledge. Examples of teaching methods used by educators who employ creativity in their curriculum are open-ended questions, brainstorming, the use of the arts, and project-based work (Beghetto, 2021).

The literature does indicate, however, that creativity is seen by a significant proportion of teachers to be incompatible with the demands of rigorous curriculum and assessment systems. Elementary school teachers appreciated the value of creativity and yet were unable to embrace this due to overemphasis on examinations and overcrowded learning classes. The perceptions of teachers, in that sense, therefore, cite the disconnect between the importance of the concept of creativity as compared to its practical implications in daily instructions (Davies et al., 2013).

Cognition Critical thinking is the capacity to analyze, evaluate and synthesize something, logical judgment. This means questioning assumptions, comparing point of view and involving students in problem-based learning in classrooms. Efficient pedagogical approaches towards achieving critical thinking involve an inquiry-based conversation, challenge and debate, and application to real-world problems (Facione, 2011).

Teachers frequently report that teaching critical thinking skills is not easy because of too many requirements in the curriculum and a lack of professional development. The research in South Asia has shown that a teaching profession often views the concept of critical thinking as an abstraction without ever integrating it into subject delivery (Rehman et al., 2025). This emphasizes the diagnostic potential of investigating the perceptions of the teachers to detect the misconceptions and domains that they need professional assistance in.

Communication is one of the keys 21st century skills, including the skills of expressing ideas, listening, and utilizing the wide range of means of expression, including digital technologies. Hands-on activities such as group discussions, presentations, role plays and peer feedback and technology to stimulate expression are also the instruction practices used by the teachers to cultivate communication skills (Anderson-Levitt, 2023).

It has been concluded that most of the teachers see classroom time, large student-teacher ratios and examination pressures as some of the obstacles to full implementation of communication-oriented strategies. In Pakistan, studies point out that, communication activities tend to take the form of mere recitation or question-answer process instead of actual dialogic teaching (Malik, 2019). Perceptions of teachers, hence, can offer very useful information about the misalignment between policy intent and classroom practice.

Collaboration relates to the skill to work in teams and be responsible and make positive contributions to group work. Some pedagogical practices that support increased collaboration or collaboration include cooperative learning, peer tutoring, group project tasks and collaborative technology. A teacher that feels that collaboration is of importance is likely to incorporate these strategies in their teaching (Greenstein, 2012).

However, it has been demonstrated that most teachers have difficulties with collaboration encouragement owing to the classroom design, time constraints, and individual performance focus. Shuaib et al., (2025) discovered that teachers in elementary schools considered collaboration to be valuable and yet they received no training on how to organize group work. It is important to understand such perceptions as a way of designing

teacher training programs that favor collaborative pedagogies.

Self-perceptions of teachers are diagnostic tools of the self-confidence and boundaries of 21st -century skills implementation (Van de Oudeweetering & Voogt, 2018). The perception of their ability to embrace the innovative pedagogies gives the teachers higher chances to apply it in the classrooms with consistency. On the other hand, difficulties in efficient implementation may be impeded by negative/ uncertain perceptions disregarding policy dictates.

In the case of Pakistan, literature notes that, although teachers recognize the relevance of 21st -century skills, their teaching methods are generally unchanged because of institutional barriers like inflexible curriculum, focus on exams, and few professional developments provisioning (Rehman et al., 2025). Thus, evaluating the perceived pedagogical practice of teachers can be used to draw a diagnostic picture of the gaps and administration of measures that resonate with the views of modern education.

The literature paints the importance of the 4Cs in equipping students with the 21st century challenges. Nevertheless, the research demonstrated that teachers appear to be underrecognizing the skills and struggling to transfer them to the classroom practice to the point of not teaching them at all. In Pakistani context where the elementary education forms the base, it is vital to interrogate the perceptions of teachers to diagnosis the state of practice, guide professional development, curriculum reform and policy choices. This paper helps to fill this gap as it examines systematically the perceived pedagogical practices of elementary teachers in the subject matter of 21st century learning and innovation skills.

Research Design

The quantitative design adopted in this study was a quantitative descriptive survey research design, which sought to investigate the perceived pedagogical practices of elementary teachers in reference to the 21 st century learning and innovation skills (Creativity, thinking, communication and collaboration). As the design was diagnostic, the main aim was to determine the present level of practices among teachers and to illuminate the dissimilarities between the policies and the classroom practices. Response to the study was done using a self-scoring composition devised and its results interpreted using descriptive statistics. The population included was all elementary school teachers working in Gujrat district in both the public and private schools. The sampling was taken in terms of 400 teachers using stratified random sampling which preserved a balanced representation of school types in this population. The procedure made the findings more reliable and generalizable.

Instrumentation

The data were gathered by a self-developed questionnaire, the aim of which was to measure teachers perceived pedagogical practices related to 21st -century learning and innovative skills. The tool went around the four fundamental areas of the 4Cs, namely creativity, critical thinking, communication, and collaboration. The validity of the questionnaire was carried out by having experts review the questionnaires to determine the relevance of the content and clarity. A pilot study was used to test reliability where it was observed that the instrument had good internal consistency given that Cronbach's alpha was above the recommended number.

Data Analysis

The descriptive statistics were applied to analyze the data accumulated in the frame of this study: frequencies, percentages, means, and standard deviations were used to demographics information and identify the overall level of each of the 4Cs: creativity, critical thinking, communication, and collaboration. To look at differences in opinions along demographic lines, including gender and school. A gap analysis was also done by comparing the mean observed scores with the ideal level to determine component areas that need change and professional development. In cases that correlation could be applied, Pearson r or Spearman rho was used to investigate the relationship between demographic variables and perception by the teachers.

Table 1: Descriptive Statistics of Teachers' Perceived Pedagogical Practices

Skill	N	Minimum	Maximum	Mean	Std. Deviation

Creativity	400	1.10	4.80	3.36	0.46
Critical Thinking	400	2.00	4.33	2.66	0.54
Communication	400	1.00	5.00	3.79	0.44
Collaboration	400	1.67	4.75	3.12	0.58

As shown in table 1, communication is on the absolute front based on a mean score of 3.79 (SD = 0.44) among other 21st-century skills teachers perceive about their ability to foster the skill in classrooms. The skills that demonstrated moderate levels were creativity (Mean = 3.36, SD = 0.46) and collaboration (Mean = 3.12, SD = 0.58), which implies that those skills are partly inculcated into pedagogical practices. Critical thinking has the lowest score (Mean = 2.66, SD = 0.54), which shines a light at a subject that needs lots of improvement. The overall findings indicate that although teachers do alright in terms of nurturing communication, they should do more to ensure the other required skills such as critical thinking, creativity, and collaboration can be achieved well to meet the demands of the 21st -century learning and innovation skills.

Table 2: Descriptive Statistics of Teachers' Perceived Pedagogical Practices by School Type

School Type	Skill	N	Minimum	Maximum	Mean	Std. Deviation
Public	Creativity	200	1.10	4.80	3.38	0.51
	Critical Thinking	200	2.00	4.17	2.64	0.54
	Communication	200	1.00	5.00	3.81	0.48
	Collaboration	200	1.67	4.75	3.16	0.64
Private	Creativity	200	2.50	4.50	3.34	0.40
	Critical Thinking	200	2.00	4.33	2.67	0.53
	Communication	200	2.00	4.82	3.77	0.39
	Collaboration	200	2.42	4.42	3.08	0.52

The descriptive statistics in table 2 suggests that the mean scores of creativity, communication, and collaboration are slightly higher among public school teachers than the private school teachers with values obtaining 3.38, 3.81 and 3.16 as opposed to 3.34, 3.77 and 3.08 respectively. Critical thinking demonstrates almost identical average scores in the public schools (2.64) and private schools (2.67), which indicates as the poorest skill on either of the two school types. The standard deviations imply that the views of public-school teachers are a little bit more scattered, especially in the area of collaboration (SD = 0.64) and creativity (SD = 0.51), whereas those of the private schoolers are less variable. In general, it is possible to suggest that the participants feel rather strong in the sphere of communication and they need to develop some other skills (such as critical thinking, creativity, collaboration) as a way to meet the goal of inculcating 21st-century skills of learning and innovation.

Table 3: Descriptive Statistics of Teachers' Perceived Pedagogical Practices by Gender

Gender	Skill	N	Minimum	Maximum	Mean	Std. Deviation
Male	Creativity	200	2.80	4.80	3.36	0.44
	Critical Thinking	200	2.00	4.17	2.61	0.51
	Communication	200	3.00	5.00	3.80	0.40
	Collaboration	200	2.58	4.75	3.11	0.57
Female	Creativity	200	1.10	4.60	3.36	0.48

	Critical Thinking	200	2.00	4.33	2.70	0.56
	Communication	200	1.00	4.91	3.79	0.48
	Collaboration	200	1.67	4.67	3.13	0.60

The results in Table 3 indicate that there is no significant differences in the reported creativity (both male and female have the average of 3.36) and communication (Male =3.80, Female =3.79) scores indicating higher similarity in the self-perceptions of the teachers in relation to the creativity and communication areas. Critical thinking is scored marginally higher in female teachers (2.70) as compared to the male teachers (2.61), whereas collaboration indicates close values (Male = 3.11; Female = 3.13). The standard deviations show that are a little bit higher variability diversity among female teachers, especially in critical thinking (SD = 0.56) and collaboration (SD = 0.60)). The data indicate that both genders of teachers view communication as a strength, and critical thinking, creativity, and collaboration are the areas that can be improved to foster the 21st -century learning practice.

Table 4: Gap Analysis of Teachers' Perceived Pedagogical Practices

Skill	N	Minimum	Maximum	Mean	Std. Deviation
Creativity	400	0.20	3.90	1.64	0.46
Critical Thinking	400	0.67	3.00	2.34	0.54
Communication	400	0.00	4.00	1.21	0.44
Collaboration	400	0.25	3.33	1.88	0.58

Table 4 shows the gap analysis of perceived pedagogical practices conducted upon the teachers in concerns to the 21st century learning skills. The maximum gap is observed in the area of critical thinking (Mean = 2.34, SD = 0.54) implying that this area has to be worked upon most. The mean of the collaboration (Mean = 1.88, SD = 0.58) and creativity (Mean = 1.64, SD = 0.46) indicate moderate gaps and partial integration of the skills into the teaching practice. The minimum gap (Mean = 1.21, SD = 0.44) is observed in communicational stage, which demonstrates that teachers feel rather strong in this aspect. On the whole, the analysis drives attention to the directions where the professional development should be prioritized, especially, the abilities to engage in critical thinking, collaboration and creativity in order to be more focused on the achievements of 21st century learning.

Table 5: Gap Analysis of Teachers' Perceived Pedagogical Practices by School Type

School Type	Skill	N	Minimum	Maximum	Mean	Std. Deviation
Public	Creativity	200	0.20	3.90	1.62	0.51
	Critical Thinking	200	0.83	3.00	2.36	0.54
	Communication	200	0.00	4.00	1.19	0.48
	Collaboration	200	0.25	3.33	1.84	0.64
Private	Creativity	200	0.50	2.50	1.66	0.40
	Critical Thinking	200	0.67	3.00	2.33	0.53
	Communication	200	0.18	3.00	1.23	0.39
	Collaboration	200	0.58	2.58	1.92	0.52

In Table 5, the gap analysis of teachers perceived pedagogical practices in regard to school type is shown. The widest gap in both public (Mean = 2.36, SD = 0.54) and in private school students (Mean = 2.33, SD = 0.53) shows critical thinking as the most important skill that should be developed. Collaboration presents a moderate difference between the public and the private schools (1.84 and 1.92, respectively), and in creativity, there is a slightly larger difference between the schools (1.66 and 1.62 in the case of privately and publicly run schools, respectively). Public and Private schools

have the narrowest gap in the area of communication (Public = 1.19, Private = 1.23) which demonstrates the comparative strength of both schools in that area. Altogether, the analysis indicates that evidence-based decision-making and collaboration, creativity, and inquiry are the areas that need most improvement in the professional development, but communication is relatively effective across the types of schools.

Table 6: Gap Analysis of Teachers' Perceived Pedagogical Practices by Gender

Gender	Skill	N	Minimum	Maximum	Mean	Std. Deviation
Male	Creativity	200	0.20	2.20	1.64	0.44
	Critical Thinking	200	0.83	3.00	2.39	0.51
	Communication	200	0.00	2.00	1.20	0.40
	Collaboration	200	0.25	2.42	1.89	0.57
Female	Creativity	200	0.40	3.90	1.64	0.48
	Critical Thinking	200	0.67	3.00	2.30	0.56
	Communication	200	0.09	4.00	1.21	0.48
	Collaboration	200	0.33	3.33	1.87	0.60

Table 6 shows gender-based gap analysis of the perceived pedagogical practices by the teachers. The largest discrepancy between male (Mean = 2.39, SD = 0.51) and female teachers (Mean = 2.30, SD = 0.56) is evident in critical thinking, thus making it the main area to be intervened upon. The skills that show a modest gap are collaboration and creativity, and the means are almost the same (Creativity = 1.64; Collaboration: Male = 1.89, Female = 1.87). The gap between the constructs is also least when it comes to communication (Male = 1.20; Female = 1.21); this indicates that teachers feel rather competent in this area. In general, the results suggest that most communication management scores are strengths regardless of gender whereas critical thinking, collaboration and creativity need specific professional training to improve the learning and innovative capacities associated with the 21st century.

Conclusions

The results of the pedagogical practices perceived by teachers in relation to 21st-century learning and innovation skills showed that the skill of communication stands out as the most developed one among the elementary teachers and that they feel confident to apply it in classroom work. Moderate rates were observed in the domains of creativity, collaboration, which means some integration but, at the same time, the domain of critical thinking appeared as weak. Disaggregated analysis by types of school revealed there were slight differences with teachers in public schools being more creative, communicating, and collaborating than their counterparts in the private schools. The gender-wise outcome also showed very insignificant variations with the female teachers scoring better on critical thinking. On a whole, these results suggest that teachers consider themselves quite capable communicators, but their abilities in other areas, mainly critical thinking, have to be enhanced.

The gap analysis has revealed the pedagogical practices where the self-perceptions of the teachers differed with the ideal pedagogical practices. Critical thinking exhibited the biggest gap followed by collaboration and creativity, and communication had the smallest gap and thus it is the area of relative strength. When the gap analysis was carried out by school type and gender it showed regular results with critical thinking being a core need form improvement. The results underline the importance of specific professional upbringing, first of all, in the area of critical thinking, then the adoption of collaboration and creativity, to coordinate the classroom practice with the goals of the 21st century learning and innovation skills.

Discussion

The analysis of the answers of the teachers concerning their feelings of pedagogical practices show significant trends of implementing 21st century skills into their practice in educational environments. Communication was the most developed skill as the teachers complained they were confident they could apply the skill in the classroom. This is in line with the current literature that indicates communication skills as a major focus point in modern learning (Kara et al., 2020).

The highest rated domains were creativity and collaboration which identified them to be partially integrated whereas the lowest rated domain was critical thinking. These findings resonate with other studies that point out critical thinking is not well focused on in teacher preparation programs and can lack a significant emphasis in the classroom (Kara et al., 2022; Kuloğlu & Karabekmez, 2022). The fact that very little variations were detected between male and female teachers further denies gender any impact on how proficient these skills are perceived to be and thus universal approach to the problem of upgrading critical thinking in the teaching staff is vital.

Gap analysis shows the mismatch between the self-report of competencies by the teachers with their ideal effective standard in the 21st century teaching criteria. The greatest gap was on critical thinking whereas the least gap showed on communication. This indicates that despite the fact that teachers themselves regard themselves as relatively competent with regard to communication, they still require considerable professional training in the areas of critical thinking, collaboration and creativity. The uniformity of these gaps across school type as well as across gender helps to show that these issues are universal to any school or gender and any school or gender. It is vital to fill these gaps since it is necessary to ensure that students are equipped to handle the complexity of the 21 on the globe (Kara et al., 2022). Developing special professional development programs in these areas can help fill the existing gaps and overall pedagogical effectiveness of teachers.

Recommendations

Targeted training programs should be driven by schools so that the teachers could develop lessons and activities that would encourage the critical thinking skills of students. Teachers can be assisted in incorporating strategies of higher order thinking in their teaching by workshops, seminars and joint lesson planning. It will be desirable to encourage teachers to utilize novel teaching styles, including project-based learning, problem solving challenges, and creative assignments to inculcate in students their creativity. The schools can help by contributing resources, examples, and mentorship to ensure that creative pedagogical practices become part of their efforts. Collaborative learning should be promoted by schools in terms of learning among teachers in the form of professional learning communities and among students in group activities. Partner-based training may also enable the instructors to form effective approaches to encouraging collaborative work and solving problems within the teaching environment. Communication has been identified as a relatively strong area, and schools can use it as a basis to incorporate other 21st -century skills. Teachers can structure the activities requiring a combination of communication with critical thinking, creativity, and collaboration, and the latter strategy will imply a more comprehensive approach to the development of the skills.

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