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IDENTIFICATION OF ACADEMIC CHALLENGES TO PROMOTE ACADEMIC QUALITY AT WORKERS WELFARE SCHOOLS IN PUNJAB, PAKISTAN-EXPLORATORY FACTOR ANALYSIS (EFA) OF THE INSTRUMENT

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ABSTRACT

This study conducted an Exploratory Factor Analysis (EFA) on an instrument named "Identification of Academic Challenges to Promote Academic Quality at Workers Welfare Schools." The instrument was developed for the Punjab Workers Welfare Fund Government of the Punjab. It was tested on various stakeholders, including principals, teachers, and students of workers welfare schools. The instrument's reliability was confirmed with a Cronbach's α of .876. Its validity was supported by 10 domains encompassing 24 items. The Kaiser-Meyer-Olkin (KMO) measure verified the sampling adequacy for the analysis (KMO = .828). The study recommends using this scale in future research. It also suggests further psychometric testing within Pakistan and other countries to enhance its reliability and validity. This instrument is expected to provide a reliable and valid tool for identifying academic challenges and promoting academic quality in workers welfare schools.

Key Words: Academic Quality, Exploratory Factor Analysis, PWWF.

1. Introduction:

The notion of academic quality in Workers Welfare Schools centers on providing high-quality education to children from marginalized backgrounds. This involves ensuring that students receive education that meets rigorous standards, fosters holistic development, and prepares them for future success.[1]

Researchers have defined academic quality in Workers Welfare Schools as the attainment of specific educational objectives, the development of critical thinking and problem-solving skills, and the creation of a supportive and inclusive learning environment[2]. Few scholars[3] emphasize that academic quality at Workers Welfare Schools extends beyond mere academic performance. It encompasses factors such as equal access to education, personalized support for diverse student needs, and cultivating a positive school culture that values each student's potential.

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Achieving academic quality at Workers Welfare Schools poses significant challenges due to factors like limited resources, diverse student backgrounds, and potential language barriers.[4] Addressing these challenges requires tailored strategies and interventions to meet the unique needs of students in workers' communities[5]. An essential aspect of promoting academic quality at these schools is providing continuous professional development opportunities for teachers. Ongoing training and support enable teachers to enhance their instructional practices, integrate innovative teaching methods, and meet the specific needs of students from diverse backgrounds.[Smith, J., et al. "Experiential Learning Model: A Conceptual Framework for Promoting Academic Quality at Workers Welfare Schools." *Journal of Experiential Learning* 49, no. 4 (2022): 221.]

One crucial aspect of promoting equitable education is providing adequate resources and infrastructure. Researchers[6] highlights the significance of well-equipped classrooms, libraries, and laboratories in Workers Welfare Schools. These resources enhance students' learning experiences and create an environment conducive to academic excellence. Additionally, workers welfare schools should ensure access to technology and internet facilities to bridge the digital divide and promote digital literacy among students.[7]

Lack of specialized facilities for practical subjects, such as science laboratories, computer labs, or workshops, can hinder students' hands-on learning experiences and skill development. Inadequate access to necessary equipment and resources can limit students' ability to explore and apply theoretical concepts practically, impacting their overall academic growth.[8]

Dilapidated buildings, faulty electrical systems, inadequate lighting, or substandard furniture can create a detrimental learning environment. Physical infrastructure in disrepair can negatively impact students' concentration, safety, and overall well-being. It can also affect the perception of the school environment and contribute to a lack of motivation among students.[9]

Limited access to recreational spaces, such as playgrounds or sports facilities, can hinder students' physical and social development. The absence of opportunities for physical activities and sports can adversely affect students' health, engagement, and overall well-being. Recreational spaces are essential for promoting a balanced and holistic learning experience.[10]

The Punjab Workers Welfare Fund (PWWF) is a non-profit corporation established in 2019 under the Punjab Workers Welfare Fund Act, enacted in response to Pakistan's 18th constitutional amendment.[11] The PWWF is chaired by the Secretary of the Punjab Government's Labor and Human Resource Department and governed by a Governing Body comprising government, labor, and industry representatives. PWWF provides a comprehensive package of services to industrial personnel, including Marriage Grants, Death Grants, Talent Scholarships, the establishment and management of Workers Welfare Schools, and the development and maintenance of labor Colonies.

The Directorate of Education has developed a network of 69 Workers Welfare Schools (65 functioning and 04 non-functional) from Rahim Yar Khan in the south to Rawalpindi in the north. These schools are located in 20 different districts and provide free education to approximately 45,400 boys and girls in grades K through 12. The Directorate of Education also provides free education to enrolled workers, along with free uniforms, shoes, stationery, books, and transportation. The Directorate of Education continues to expand its reach by upgrading existing schools and establishing new ones to offer higher levels of education

2. Literature Review:

2.1 Definitions of Academic Quality

2.1.1 Smith & Johnson (2020) define academic quality at Workers Welfare Schools as the extent to which educational programs meet established standards and contribute effectively to students' intellectual, social, and emotional development. It involves not only acquiring knowledge and skills but also fostering critical thinking, creativity, and a love for learning.[12]

2.2.2 Anderson and Ramirez (2021) describe academic quality in Workers Welfare Schools as a comprehensive approach that goes beyond academic achievement. It focuses on developing well-rounded individuals with strong character traits, social skills, and ethical values.[13]

2.2.3 According to UNESCO, academic quality refers to the standard of education provided by a school to ensure students acquire necessary knowledge, skills, and competencies. It encompasses various dimensions such as curriculum relevance, teaching and learning strategies, assessment practices, teacher-student relationships, and the overall learning environment.[14]

2.4 Role of Infrastructural Facilities in Promotion of Academic Quality

Infrastructural facilities play a crucial role in promoting academic quality in Workers Welfare Schools. The availability and quality of infrastructure significantly impact students' learning experiences, engagement, and overall academic achievement. Limited classroom space can lead to reduced student engagement, increased noise levels, and difficulties in maintaining discipline.[15] Adequate furniture and equipment are also essential for students' comfort, posture, and concentration during class. The scarcity of necessary resources such as projectors, computers, or laboratory materials can hinder hands-on learning experiences and skill development. Dilapidated buildings and substandard facilities create a detrimental learning environment, impacting students' concentration, safety, and overall well-being.[16] Addressing these infrastructural challenges is vital to ensure a conducive and enriching learning environment in Workers Welfare Schools.

2.5 Role of Physical Facilities

The condition of physical infrastructure also plays a vital role in academic quality. Dilapidated buildings, faulty electrical systems, inadequate lighting, or substandard furniture can create an unfavorable learning environment.[17] When the physical infrastructure is in disrepair, it negatively affects students' concentration, safety, and overall well-being. Additionally, it can contribute to a lack of motivation among students, affecting their perception of the school environment.[18] Addressing these infrastructural challenges is essential to ensure a conducive and positive learning atmosphere for students in workers welfare schools.

3. Objectives of the Study:

1. To perform an exploratory factor analysis (EFA) on the tool called "Identification of Academic Challenges to Promote Academic Quality at Workers Welfare Schools."
2. To assess the strengths and weaknesses/limitations of the mentioned research instrument.

4. Research Methodology (Population, Sample and Procedure)

The research had an instrumental nature, focusing on providing a reliable and valid instrument/scale for current and future studies. The study's target population included principals, teachers, students, and parents from all workers welfare schools in Punjab. The Multistage cluster sampling technique was employed to select the participants. The instrument/scale's validity was ensured through exploratory factor analysis (EFA), and reliability was measured using Cronbach's Alpha values. Population size information was obtained from the official website of the Workers Welfare Fund Punjab, and the entire population of workers welfare schools in Punjab was divided into four clusters. The study's sample consisted of 18 principals, 359 teachers, 360 students, and 36 parents, randomly selected from a cluster in Southern Punjab, resulting in a total sample size of 773. For data collection, the researcher developed questionnaires for principals, teachers, and students, all containing the same items. These self-developed survey questionnaires included demographics and closed-ended questions. The data were collected through questionnaires, with the researcher personally distributing and collecting them. In some cases, a mailing system was used for data collection when appropriate.

5. Data Analysis (Findings)

6. Reliability of the Scale by using Cronbach α Values

Table 1 *Factor wise and Total Scale Reliability*

Domains	Items Yielded	Cronbach α
TLP	6	0.827
IF	2	0.779
PF	4	0.456
SI	2	0.676
MS	1	0.695
ECE	3	0.783
SE	2	0.538
C	1	0.786
ES	1	0.453
LP	2	0.881
Total	24	0.873

7. Validity of the Scale Using EFA (Exploratory Factor Analysis)

The researcher employed construct validity to validate the questionnaire, utilizing exploratory factor analysis (EFA) in SPSS. The suitability of the sample for EFA was confirmed by the Kaiser-Meyer-Olkin (KMO) test, yielding a value of .828, and by Bartlett's test of Sphericity with a p-value of 0.000. The range of variance (Eigenvalues) observed in the instrument was from 1 to

11.873, and the items' commonalities were required to be above 0.4. Upon analyzing the EFA results, it was determined that retaining ten factors was appropriate. Items failing to meet a saturation threshold of (< .40) were slated for removal. Items were loaded on ten factors shown in the table below. Factor 1 yielded 6 items. Factor 2 yielded 2 items. Factor 3 yielded 4 items. Factor 4 yielded 2 items. Factor 5 yielded 1 item. Factor 6 yielded 3 items. Factor 7 yielded 2 items. Factor 8 yielded 1 item. Factor 9 yielded 1 item. Factor 10 yielded 2 items. So, in total 24 items were yielded by the ten factors.

Table 2 *Construct Validity by using EFA*

Rotated Component Matrix[a]

Items	Component									
	1	2	3	4	5	6	7	8	9	10
ES03	.60									
ES02	.59									
ES01	.58									
SE05	.56									
SE04	.55									
ES04	.54									
IF03		.58							.	
IF04		.58								
ECE04			.87							
ECE03			.86							
ECE05			.84							
ECE02			.77							
SI01				.67						
SI02				.51						
IF09					.49					
TLP02						.69				
TLP03						.66				
TLP01						.65				
LP04							.64			
LP05							.64			
ECE01								.68		
PF03									.60	
LP02										.58
LP01										.55
Eigenvalues	8.5	3.3	2.5	2.1	1.6	1.6	1.5	1.4	1.3	1.3
% of Variance	19.9	7.8	5.9	4.9	3.9	3.8	3.6	3.3	3.2	3.0

Cumulative % of Variance	59.7

The process of extraction utilized Principal Component Analysis, while the Rotation Method employed Promax with Kaiser Normalization. The rotation process reached convergence within all ten iterations.

8. Discussion

The focal point of our discussion pertains to the scale presented here, concerning the Identification of Academic Challenges and Formulation of Guidelines for Teachers. Our objective was to construct a well-structured framework or tool that would furnish students, educators, teachers, policy makers, and researchers with dependable and valid data. Moreover, this scale could serve as a robust measure of academic quality if employed by governing bodies.

A comprehensive review of existing literature was conducted to adapt the current scale to the unique context of worker welfare schools in South Punjab, Pakistan. In the initial draft of the manuscript, a selection of 10 domains/factors with a total of 60 items was chosen for the instrument. However, through subsequent application of exploratory factor analysis (EFA), all 10 domains/factors were retained, and the instrument was refined by eliminating redundant items, resulting in a final set of 24 items.

The effectiveness of EFA was established through the Kaiser-Meyer-Olkin (KMO) test, indicating sufficient data for successful analysis (KMO = 0.806), along with a statistically significant Bartlett's test of Sphericity (P = 0.000). Eigen values greater than or equal to 1 were obtained, and communalities ranged from 1.30 to 8.56, with item commonalities exceeding 0.40. The EFA findings supported the retention of ten factors, indicating items with saturation below 0.40 would be excluded. Ultimately, the scale retained a total of 24 items across these ten factors, thereby establishing a satisfactory factor structure.

The scale's reliability was confirmed to be within acceptable parameters, with a total scale alpha (α) of 0.873 and subscales including TLP (α = 0.827), IF (α = 0.779), PF (α = 0.456), SI (α = 0.676), MS (α = 0.695), ECE (α = 0.783), SE (α = 0.538), C (α = 0.786), ES (α = 0.543), and LP (α = 0.881). Importantly, all factors demonstrated internal consistency values exceeding 0.40.

To elaborate on the factor loading results:

i. Factor TLP pertains to the teaching-learning process, constituting the first factor.
ii. Factor IF signifies infrastructural facilities, being the second factor.
iii. PF stands for physical facilities, making up the third factor.
iv. SI represents special incentives for workers' children, composing the fourth factor.

v. Factor MS denotes the monitoring and supervision system, forming the fifth factor.
vi. Factor ECE symbolizes early childhood education, representing the sixth factor.
vii. SE signifies the school environment, constituting the seventh factor.
viii. Factor C stands for the curriculum, being the eighth factor.
ix. ES represents the evaluation system, forming the ninth factor.
x. Factor LP signifies the leadership pattern, completing the list as the tenth factor.

9. Conclusion

A comprehensive scale, designed as a rationalized tool (referred to as an instrument), has been developed for worker welfare schools in Punjab. This scale encompasses ten distinct domains or factors, resulting in a total of 24 items. The creation of this instrument involved a meticulous process by the researcher, drawing insights from an extensive body of literature. To establish the instrument's credibility, exploratory factor analysis (EFA) was conducted to confirm its validity, while Cronbach's Alpha values were employed to assess its reliability.

It is strongly recommended that this scale be employed in both ongoing and future studies. Stakeholders within the Punjab workers welfare fund, as well as across Pakistan and other nations, are encouraged to utilize this scale. This is particularly pertinent when seeking dependable and valid data pertaining to academic quality at the school level. The scale's applicability extends to a variety of contexts, underlining its potential to contribute to educational assessment endeavors on a broader scale.

10. Recommendations

The analysis demonstrates that the present scale offers optimal methods and valuable insights within the realm of the educational system. The objectives of this scale need to be identified and shared widely. Educational institutions, educators, and scholars engaged in researching Academic Quality at the school level should be acquainted with the current scale and its application. Schools, principals, teachers, students, parents, and administrators should collectively assess its reliability and validity concerning standardized test scores and academic achievements, thereby fostering the constructive evolution of the current scale.

This particular scale should be employed to pinpoint challenges related to academic quality and establish guidelines for teachers in worker's welfare schools across Punjab, with the potential for broader implementation throughout Pakistan. On both national and local scales, policymakers, the general populace, administrators, educators, and parents can employ this scale to substantiate their evaluations of academic quality in schools and to gauge the proficiency of teachers and students in attaining their educational goals. Additionally, it aids in comprehending the extent to which schools uphold academic quality and in identifying areas necessitating enhancement through thorough evaluation.

11. Strengths and Weaknesses of the Instrument (Study Limitations)

Like any research endeavor, our study is not without its limitations. While we conducted our study in the Punjab province of Pakistan, it's important to note that the applicability of this scale extends beyond our specific context. Other provinces within Pakistan can adapt this scale to their unique circumstances to identify academic challenges and establish guidelines for teachers aimed at enhancing academic quality at the school level.

Furthermore, this scale isn't confined to national boundaries. It holds potential for adoption in other countries as well. Through subjecting the scale to rigorous advanced statistical testing, foreign nations can fortify its reliability and validity. Involving external researchers who provide impartial assessments of the scale can also enhance its psychometric properties.

To ensure a continuous trajectory of improvement for this instrument, we wholeheartedly welcome any necessary refinements suggested by researchers, both within our nation and internationally. This collaborative approach guarantees a steady evolution of the current instrument, solidifying its utility and impact.

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