



INSTITUTE OF EDUCATION  
Faculty of Social Sciences




Ref. No. SU/IOE 1978  
Dated 24-12-2025

Subject: Conduct of Open Defense of PhD Education Thesis

It is hereby notified for all the concerned that an open defense of the thesis entitled "Association of Teachers' Pedagogical Competencies, Students' Mathematical Rigor and Mathematical Creativity at Primary Level in the Province of Punjab, Pakistan" of Dildar Hussnain, PhD Education scholar, Session 2021-2024 is scheduled to be conducted as per detail mentioned below:-

Dated: December 31, 2025  
Time: 10.00 AM  
Venue: Video Conference Hall, University of Sargodha.

Anyone desirous to participate in Open Defense may attend the same or join online through video conference.

  
Dr. Muhammad Uzair-ul-Hassan  
Director

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**ASSOCIATION OF TEACHERS' PEDAGOGICAL COMPETENCIES, STUDENTS'  
MATHEMATICAL RIGOR AND MATHEMATICAL CREATIVITY AT  
PRIMARY LEVEL IN THE PROVINCE OF PUNJAB, PAKISTAN**

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PhD (Education)  
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**Abstract**

The importance of teachers in the contemporary world has assumed novel manifestations due to the advent of the modern period. The main purpose of this research study was to investigate the association of teachers' pedagogical competencies, students' mathematical rigor and mathematical creativity at primary level in the province of Punjab, Pakistan. Study employs a quantitative design based on the idea that the sample characteristics are representative of the population parameter if the circumstances of the sampling methods match the behavior of the population that is being studied. A correlational research design was used in this study. The population of the study was all the mathematic teachers (male & female) of grade three at public primary schools in Punjab and multistage sampling technique was used for sample selection. The sample (1120) represents 30% of the accessible population. The self-developed Likert type questionnaires were used to obtain quantitative data. One questionnaire was about teachers' pedagogical competencies with 66 items and the second questionnaire was about students' mathematical rigor with 18 items and third questionnaire was related to students' mathematical creativity consisting of 19 items. An extensive review of literature and consultations with experts ensures the validity of the questionnaires. Additionally, these questionnaires underwent pilot testing. The reliability test was conducted using Cronbach's alpha. The total value of Cronbach's alpha for teachers' pedagogical competencies questionnaire was 0.96. The value of Cronbach's alpha for students' mathematical rigor questionnaire was 0.89, while the students' mathematical creativity questionnaire Cronbach's alpha was 0.92. The questionnaires were physically handed by the researcher to the math teachers at the primary schools. All the quantitative data collected was tabulated and independent sample t-test, Correlation, One-way ANOVA and Regression were applied. The findings revealed that most of the teachers perceived that they have good level of pedagogical competencies required to foster student's mathematical rigor and mathematical creativity. The distribution of the data suggests that there was a greater occurrence of general in-service training among the public primary school teachers rather than the specialized subject training in mathematics. The findings also showed that there is a strong positive correlation between teachers' pedagogical competencies and students' mathematical rigor ( $r=0.572$ ), while there is a moderate positive correlation between teachers' pedagogical competencies and students' mathematical creativity ( $r=0.338$ ). The coefficient for teachers' pedagogical competencies ( $\beta=0.704$ ) was positively and significantly associated with students' mathematical rigor ( $p < 0.001$ ). Whereas the coefficient indicating teachers' pedagogical competencies ( $\beta = 0.420$ ,  $p < 0.001$ ) was positively and significantly associated with students' mathematical creativity.

**Dr. Uzma Shahzadi**  
Supervisor