

SELF-REGULATION AS A CORRELATE OF PROBLEM-SOLVING SKILLS OF PRE-SERVICE TEACHERS IN TERTIARY INSTITUTIONS IN KWARA STATE

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Abstract

Effective teaching in Nigeria requires teachers who can self-regulate to solve problems independently. With this in mind, this study investigated self-regulation as a correlate of problem-solving skills among pre-service teachers in Kwara State. Two research questions were raised for the study, and two null hypotheses were examined in the study. The study employed a correlational research design. The multistage sampling method was used to select 432 pre-service teachers from the University of Ilorin and Kwara State University, Malete. Data was collected using adapted scales: The Self-Regulation Skill Questionnaire (SRQ) and the Problem-Solving Questionnaire (PSQ). Face and content validity were established by experts in early childhood and primary education studies. SRQ yielded a reliability index of 0.76, and the reliability index of PSQ was 0.77 using Cronbach's alpha. Descriptive statistics (frequencies, percentages, mean, standard deviation) and inferential statistics (Spearman's rank correlation) were used for analysis at a 0.05 significance level. Findings revealed that the majority of pre-service teachers exhibited a moderate level of self-regulation and problem-solving skill and there was a significant positive relationship between self-regulation and problem-solving skills. It can therefore be concluded that self-regulation is significantly linked to problem-solving ability in pre-service teachers. Based on these findings, it is recommended that teacher training programmes in Kwara State should explicitly integrate self-regulation strategy instruction into their curriculum to enhance pre-service teachers' problem-solving competencies.

Keywords: Self-regulation, Problem-solving Skill, Pre-service Teachers, Teacher Education, Kwara State

Introduction

People face a variety of problems in their daily lives that, although frequently disregarded, can have a big influence on their general well-being, productivity, and standard of living. Over time, challenges such as difficulty in managing stress from work or family obligations, financial strains, emotional exhaustion, difficulty managing time and digital distraction can accumulate. These problems could have more serious physical, mental and emotional repercussions if they are not appropriately addressed (Bukoye, 2017). Often, these problems linger due to a lack of organised methods for acquiring answers.

The detrimental effect of these prevalent issues might be mitigated by implementing an optimistic attitude and effective problem-solving strategies. The primary objective of education has consistently been to support students in their capacity building in problem-solving and critical thinking skills, which is a vital skill in the complex and rapidly changing world of today (Johnson & Njoku, 2024). According to Atoyeb and Babalola (2022), a problem is a circumstance in which an individual attempts to solve something using all one's innate skills, even though the individual is uncertain of the precise method.

Mehadi (2019) opined that the problem arises when a person wants to finish a task or reach a destination but is unsure of how to get there or close the gap between their current situation and their intended location in an effective manner. A problem is a situation in which there is a discrepancy, inconsistency or difficulty between the

present state and the intended outcome. Oftentimes, pre-service teachers are confronted with one problem or another, which can be an academic or personal problem. Teaching problem-solving skills is crucial to the academic competency of pre-service teachers as it promotes the development of 21st-century skills, such as creative thinking, critical thinking and logical thinking.

Pre-service teachers need to acquire essential competence in problem-solving skills, as these skills not only help learners succeed academically but also enable future educators to successfully address issues in the classroom and support learner development. These skills include the capacity to analyse complicated circumstances, design effective solutions, and adopt novel teaching approaches (Yakubu *et. al.*, 2024). Theresa *et. al.* (2025) opined that it is necessary to know the problem-solving ability of pre-service teachers as they would be responsible for nurturing the problem-solving competence of pupils at the early stage of their education. Problem-solving skills imply the proficiency to successfully address challenges that might occur in various phases of life.

Problem-solving is an intellectual process that focuses on accomplishing a goal for which students do not know the primary solution to the problem (Mehadi, 2019). According to Shweta *et al.* (2022) Problem-solving denotes students' ability to effectively resolve difficult and unforeseen issues. These skills encompass the ability to identify, analyse, and comprehend the underlying causes of problems, develop alternative solutions, and execute the selected solution. Problem-solving skills are crucial abilities that aid students in navigating complex issues through creativity, critical thinking, and logical thinking in today's modern world. Problem-solving activities can foster students' freedom to explore, investigate, and seek truth in their own ways (Atoye & Babalola, 2022).

Organisation for Economic Cooperation and Development (2019) asserted that problem-solving skills exceed academic fields and prepare learners for challenges in the real world, where adaptability and innovation are essential. In an era of rapid technological advancement, these skills help students analyse information, evaluate alternatives, and implement effective solutions (National Research Council, 2021). Enciso *et. al.*, (2024) also stated that Problem-solving skills are crucial for future learning, societal participation, personal activities, and the development of 21st-century skills like digital and socio-emotional skills. To develop problem-solving skills of pre-service teachers, the lecturers need to ask the students higher-order thinking questions, which will promote their critical and logical thinking skills. These skills would enable the pre-service teachers to integrate the learning experience to real life context.

Previous research had reported the significant impact of problem-solving skills on critical thinking and creative thinking of pre-service teachers (Yakubu *et. al.*, 2024). Obochi (2021) reported that problem solving strategy enhance the performance of the students and help them retain the learning experience. Despite the importance of problem-solving skill many pre-service teachers still find it difficult to inculcate these skills as a result of their low involvement in the teaching and learning process. Many often engage in rote memorisation, crack jokes during lectures, overreliance on digital tools and avoiding challenging tasks. This hinders intellectual growth and leaves students unprepared for challenging academic and real-world situations.

The development of problem-solving skills is closely connected to self-regulation, as students need to review and control their cognitive and emotional processes to effectively solve a challenge. Self-regulation is the ability of an individual to manipulate their emotions, actions, and thoughts in order to endure impulsive desires that could obstruct the achievement of long-term goals (Scherer *et. al.*, 2022). Self-regulation is the capacity to control one's emotional, behavioural, and mental states in ways that are acceptable to others and that contribute to the accomplishment of constructive objectives, including acquiring knowledge, general well-being, and sustaining positive relationships (Atoye & Babalola, 2022).

This involves maintaining self-control when feeling frustrated, concentrating on tasks, and making deliberate choices, all of which contribute to enhanced learning, greater well-being, and more robust relationships with others. According to Larrain (2022), self-regulation is a proficient potential which supports changes in conduct in response to circumstances. Competency in self-regulation enables an individual to make goal driven decision; this was buttressed by Scherer *et. al.* (2022), who stated that individuals exhibiting self-regulatory competence have the tendency to make goal-directed decisions and control impulsive behaviors which interfere with their long-term goals.

The concept of self-regulation is typically characterised by three fundamental components. The initial component is the adoption of certain standards related to thoughts, feelings, or behaviours that are cognitively recognised and tracked. The second component focuses on the motivation to lessen the inconsistencies between these standards and the current reality. The final component is the necessary capability to address these discrepancies, despite the presence of challenges and temptations (Baumeister & Heatherton, 1996; Carver & Scheier, 2012, as cited in Leyland, Rowse, & Emerson, 2019).

In addition, Scherer *et al.* (2022) opined that an individual's self-regulation abilities are likely to be influenced by internal factors, such as negative emotions or stress, which can weaken their determination or the resources available for self-regulatory behavior and external environmental influences, such as being situated in an area full of temptations for risky actions. The competence to self-regulate is essential for effective problem-solving, as it allows students to develop plans, monitor their progress, and regulate their approach in response to academic difficulties. As stated by Zimmerman and Moylan (2009), students who are involved in self-regulated learning tend to be competent in problem-solving by setting clear goals, employing systematic techniques, and reflecting on their accomplishments.

Students who do not have these skills may grapple with mental stress, frustration and impulsiveness, which can impede their ability to solve the problem. Broadbent and Poon (2020) affirmed that self-regulation improves metacognitive awareness, enabling students to assess their problem-solving procedure and alter the technique as required. Pre-service needs the skills in order solve their academic and personal issues. Furthermore, Panadero *et al.* (2018) reported that self-regulated learners utilise an advanced problem-solving approach by thoroughly planning the approach, constantly monitoring the progress, and adjusting tactics when obstacles occur. Jarvela *et al.* (2021) established that an individual who self-regulates participates effectively in group work by concentrating on the work, handling conflicts, and integrating peer feedback.

In addition, there is an inconsistency in gender difference on students' problem-solving skills. Gender is a variation in people, which can be male or female; this variation is a result of biological makeup. Research has confirmed that there are gender differences in students' problem-solving skills. Jessey (2023) reported that male students' performance in problem-solving is higher than that of female students. In many instances, the disparity in problem-solving skills between boys and girls is not significantly evident during the childhood stage; however, as they transition into adolescence, these differences start to emerge (Robinson & Lubinski, as cited in Jessey, 2023). Mefohet *al.* (2017) also revealed that Male teenagers outperformed female teenagers on the problem-solving activities. Understanding the interplay between self-regulation and problem-solving skills of pre-service is essential, as this enables the students to manage their learning and solve challenges with resilience and creativity. It is against this that this study investigated the relationship between self-regulation and problem-solving of pre-service teachers.

Purpose of the Study

The following objectives were raised to guide this study.

1. Determine the level of self-regulation skills of pre-service teachers in tertiary institutions in Kwara State
2. Determine the level of problem-solving skills of pre-service teachers in tertiary institutions in Kwara State
3. Examine significant relationship between gender and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State
4. Examine significant relationship between self-regulation and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State

To achieve the aim of this study, the following questions were raised.

1. What is the level of self-regulation skills of pre-service teachers in tertiary institutions in Kwara State?
2. What is the level of problem-solving skills of pre-service teachers in tertiary institutions in Kwara State?

Hypotheses

The following hypotheses were formulated and tested in this study:

Ho1 There is no significant relationship between gender and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State

Ho2 There is no significant relationship between self-regulation and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State.

Methodology

This study adopted a correlational research design; this would enable the researcher to show the relationship between the variables in the study. The population of this study comprised all pre-service teachers studying early childhood primary education studies in the University of Ilorin and Kwara State University, Malete. There are 488 pre-service teachers in the University of Ilorin, while in Kwara State University, there are 233 pre-service teachers. To draw the sample, the multi-stage sampling technique was used to select the sample. Firstly, the sample was divided into two strata. Thereafter, a simple random sampling technique was used to select 432 pre-service teachers based on research advisors, which stated that the recommended sample size for a population of 600 at a confidence level of 95% is 432. The instrument that was used for data collection consists of two adapted scales, titled Self-Regulation Questionnaire (SRQ) from Chen and Lin (2018) and Problem-Solving questionnaire from Ventura-León et al. (2025). The instrument consists of two sections A, B C. Section A comprised demographic variable of the respondents while section B consists 10 items on self -regulation on a four (4) point Likert type scale of Always (A) 4, Often (O) 3, Sometimes(ST) 2, and Never (1) while section C consists of 10 items problem solving skill on a four (4) point Likert type scale of Strongly Agree (SA) 4, Agree (A) 3, Strongly Disagree (SD) 2, and Disagree (SD). The instrument was validated by lecturers in the Department of Early Childhood and Primary Education Studies. Cronbach's alpha was used to establish the reliability coefficient, and the reliability coefficients of the two instruments were 0.76 and 0.77. Descriptive statistics (frequencies, percentages, mean, standard deviation) and inferential statistics (Spearman's rank correlation) were used for analysis at a 0.05 significance level.

Results

	Frequency	Percentage (%)	Valid Percent
Low	53	12.27%	12.27
Moderate	274	63.42%	63.42
High	105	24.31%	24.31
Total	432	100.0%	100.0

What is the level of self-regulation of pre-service teachers in tertiary institutions in Kwara State?

Table 1: Self-Regulation of Pre-Service Teachers

The Table above revealed that the majority of the respondents, 274 out of 432 (63.42%), demonstrated a moderate level of self-regulation skill. Only 105 pre-service teachers (24.31%) exhibited a high level of self-regulation skill, while 53 pre-service teachers (12.27%) fell into the low-level category. The result revealed that majority of pre-service teachers in kwara state have moderate self-regulation.

What is the level of problem-solving skills of pre-service teachers in tertiary institutions in Kwara State?

Table 2: Problem-Solving Skills of Pre-Service Teachers

	Frequency	Percentage (%)	Valid Percent
Low	7	1.62%	1.62
Moderate	380	87.96%	87.96
High	45	10.42%	10.42
Total	432	100.0%	100.0

The Table 2 above revealed that the majority of the respondents, 380 out of 432 (87.96%), demonstrated a moderate level of problem-solving skill. Only 45 pre-service teachers (10.42%) exhibited a high level of problem-solving skill, while 7 pre-service teachers (1.62%) fell into the low-level category.

Hypothesis One: There is no significant relationship between gender and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State

Table 3: Summary of Spearman's Rank Correlation of Gender and Problem-Solving Skills of Pre-Service Teachers in Tertiary Institutions in Kwara State

Variables	N	Mean	St.dev	R	Df	Sig	Decision
Problem solving skill	432	27.30	2.882				
				0.96	464	.003	Sig
Female	432	1.70	.460				

The result above showed that the p-value (.003) is less than 0.05. Hence the null hypotheses which stated that the null hypothesis states that there is no significant relationship between gender and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State is therefore rejected. Hence, it was revealed that there is a significant relationship between gender and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State

Hypothesis Two: There is no significant relationship between self-regulation and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State

Table 4: Summary of Spearman's Rank Correlation of Self-Regulation and Problem-Solving Skills of Pre-Service Teachers in Tertiary Institutions in Kwara State

Variables	N	Mean	St.dev	r	Df	Sig	Decision
Self-regulation	432	28.97	6.686				
				0.46	464	.002	Sig
Problem solving	432	27.30	2.802				

The result above showed that the p-value (.002) is less than 0.05. Hence the null hypotheses which stated that the null hypothesis states that there is no significant relationship between self-regulation and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State is therefore rejected. Hence, it was revealed that there is significant relationship between self-regulation and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State.

Discussion of Findings

The findings revealed that a majority (63.42 %) of pre-service teachers in Kwara State exhibit moderate self-regulation. This suggests that most of these pre-service teachers are still learning how to unlock the full potential within themselves and may not yet have enough hands-on experience to consistently use this skill on their own. This finding is similar to what the study of Onah *et. al.* (2022) found among Physics Education students at Enugu State University, where overall self-regulation scores largely fell into the moderate category after the scale was divided into low, moderate, and high levels. This finding is also in tandem with the study of Atoyebi and Babalola (2022), wherein it was reported that many of the undergraduates in Southwestern Nigeria were in the moderate self-regulation group, showing that moderate levels are common among Nigerian tertiary students. On the other hand, this finding opposes the study of Muhktaret. *al.*, (2023), where it was revealed that English undergraduates in Nigeria demonstrated high awareness and use of self-regulation strategies in their academic writing, which implies a high self-regulation level.

Another finding revealed that 87.96 % of pre-service teachers in Kwara State demonstrate a moderate level of problem-solving skill. One reason for this could be that their course of study places more emphasis on theory than on extended teaching practice, so they spend a lot of time learning concepts in lectures and only a short period in real classrooms where they might face a wider range of student behaviours and learning problems. This finding matches what was revealed in the study of Atoyebi and Babalola (2022), many undergraduates in Southwestern Nigeria were in the middle group after their problem-solving scores were split into low, moderate, and high levels. In the same way, this finding is in tandem with Otun and Njoku (2020), who reported that pre-service mathematics teachers showed only moderate performance on algebra problem-solving tasks before any special training. On the contrary, this finding disagrees with Okigbo and Ayegbusi (2024), whose study revealed high scores among NCE mathematics trainees on standard problem-solving tests. This finding also contradicts Jaja and Victor-Ishikaku (2023), who revealed that science teacher trainees achieved high problem-solving outcomes after exposure to a constructionist teaching approach.

It was reported in this study that there was a significant relationship between gender and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State. An explanation for this finding is that, beyond individual traits, both men and women in teacher education programmes follow the same curriculum, take part in the same classroom activities, and are evaluated by the same criteria, which helps even out any gaps in skill development. This finding supports Obunge (2021), who reported a significant gender gap in mathematics

problem-solving abilities among senior secondary students in Port Harcourt, with boys outperforming girls on quadratic equation tasks. However, another Nigerian research tells a different story. For instance, the findings of this study oppose Mefohet. *al.*, (2017) study in the University of Nigeria, where it was found that gender did not have a simple independent effect on heuristic problem-solving ability when students worked through tasks like the Tower of Hanoi

This study also revealed that there was a significant relationship between self-regulation and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State. This suggests that there is a link between how well trainees plan, monitor, and reflect on their own learning and their ability to work through teaching-related challenges. This finding agrees with Atoyebi and Babalola (2022), who reported, in their study, that there was a significant positive correlation between self-regulation and problem-solving skills among 1,426 undergraduates in Southwestern Nigeria. This finding, however, disagrees with Abdullah et al. (2022), who reported that emotional-intelligence factors, including self-regulation, did not significantly predict problem-solving skill on an algebraic task in Sokoto State.

Conclusion

The study examined the relationship between self-regulation and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State. It was found that the self-regulation and problem-solving skills of pre-service teachers are moderate, and there was a significant difference in problem-solving skills of pre-service teachers based on gender. The study concluded that there was a significant relationship between self-regulation and problem-solving skills of pre-service teachers in tertiary institutions in Kwara State.

Recommendations

The following recommendations were made based on the findings:

1. Teacher training institutions should include self-regulation training courses to help pre-service teachers develop stronger self- emotional control and learning skills.
2. School management should lay emphasis on active problem-solving instructions, such as project-based learning, case-based learning and simulations in order to move students from moderate to high competency.
3. Policy makers should organise gender-sensitive training programmes to address potential differences.
4. Pre-service teachers should attend training and workshops on self-regulation and problem-solving skills in order to enhance their teaching readiness.

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