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DEVELOPING PRE-SERVICE MATHEMATICS TEACHERS' MATHEMATICAL PROBLEM SOLVING-POSING SKILLS THROUGH SOLVE-REFLECT-POSE STRATEGY IN LAGOS STATE, NIGERIA

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ABSTRACT

Introduction: Problem posing activities in the classroom help in improving students' achievement, creativity, and expand their mathematical knowledge.

Purpose: The objective of this research is to examine the impacts of solve-reflect-pose strategy on pre-service mathematics teachers' achievement in problem solving-posing activities. Junior secondary school algebraic word problems was used in the research as a tool in observing the impacts of the intervention on pre-service mathematics teachers' in problem solving-posing skills.

Methodology: There were 92 pre-service teachers in total and a mixed method design with quantitative was used. Algebraic Problem Posing Skills Achievement Test and Interview Protocol were used to measure the pre-service teachers' mathematics problem solving-posing skills. The reliability test was measured using test-retest reliability techniques and the value of was calculated as 0.84. Data was evaluated using descriptive statistics, dependent sample t-test, independent sample t-test and Pearson Correlation for the quantitative data.

Findings: The findings showed that after being exposed to solve-reflect-pose strategy, the pre-service teachers displayed greater improvement in their problem solving and posing skills and they were able to pose and create quality solvable real-life problem.

Recommendations: It recommended that, solve-reflect-pose strategy could be a main instructional strategy in prospective teachers' methodology courses.

Keywords: Problem-posing, Problem-solving, prospective teacher, Solve-Reflect-Pose Strategy, Creativity, Complexity, Solvability



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PUBLIC INTEREST STATEMENT

There are growing concerns over the quality of teachers graduating from educational institutions as they are perceived to be lacking in skills required for the work of life, and their relevance to overall national and regional developments. Pre-service mathematics teachers are confronted with different theories of learning, various methods and strategies of teaching, and curricular issues in their teacher preparatory programmes. It is hoped that the research results would be relevant to the goals of helping pre-service mathematics teachers become problem poser professionals who are adaptive experts. The study on solve-reflect-pose approach would provide opportunities for teacher educators, in-service teachers, policymakers and researchers to get insight into natural differentiation of pre-service teachers' understanding of mathematical algebraic literacy, concepts and processes.

INTRODUCTION

The numerous benefits that could be derived from the knowledge of mathematical problem posing cannot be overemphasized. Problem-posing activities in the classroom help in improving students' achievement, creativity and expand their mathematical knowledge. One of the objectives of every great country is to produce mathematically creative problem solvers and posers in classrooms. Countries such as America, Australia, China, Japan, Korea, Singapore, Turkey and many other great societies see problem-posing skill as an indispensable skill and as an important component of Mathematics education (Arikan & Unal, 2013; Zakaria & Ngah, 2011). These countries see mathematics teachers as catalysts to creative thinking in mathematical classrooms. Mathematical problem posing activities have neither been given the needed attention in mathematics education research nor been a major focus in mathematics teachers' preparatory programmes in Nigeria.

Researchers have defined mathematical problem posing in various ways but without missing out its core values. Problem-posing activities are generally seen as learning activities where students are to reformulate mathematical problems using different situations such as real-life situations. Mathematical problem posing could be described as construction or creation or generation or reformulating new problems or real-world phenomena. Mathematical problem-posing could be free, partially-reformulated and totally-

reformulated (Cankoy & Darbaz, 2010). Many researchers have emphasized the importance and benefit that could be derived from posing problems. Many researchers perceive the ability to pose Mathematics problem as a prime component of learning of Mathematics. An experience that could be of benefit to students, prospective teachers, and in-service teachers is problem-posing skill. Problem-posing motivates students' interest and reduces students' Mathematics phobia; eliminate students' misconceptions and anxiety during learning of Mathematics (Cai, Moyer, Wang, Hwang, Nie, & Garber, 2012). Problem posing could reveal students' ability to integrate mathematical knowledge (Kılıç, 2017). Problem posing could be used to analyse students' achievement in Mathematics, conceptions and misconceptions, comprehension level, competencies, and areas of weakness (Singer & Voica, 2013). Problem posing could foster higher order thinking skills of the students (Cankoy, 2014). Problem posing skills could aid better problem solving skills in students (Brown & Walter, 2014).

The concern is that students should be able to create and formulate problems since this might boost their in-depth and higher order thinking skills. Teachers are said to be major factor in achieving the objective of impacting problem-posing skill in students (Arkan & Ünal, 2015). Problem-posing instruction impacts positively on students' understanding of Mathematics (Kılıç, 2017). Study conducted found significant connection between experience and problem posing skill

(Stickles, 2006). In Yuan and Sriraman's (2010) study to examine a correlation between creativity and problem posing potential, they found a connection between creativity and problem posing skill. Many researchers are of the opinion that the skill of posing problem could provide insights for teachers on how students create their knowledge and how teachers could use this as useful evaluation tool. Tichá and Hošpesová (2009); Toluk- Uçar (2009); and Kılıç (2013) in their studies found out that the ability to pose Mathematics problems contributes to and positively affect the level of pre-service teachers' knowledge. Lavy and Shriki (2010) suggested that problem posing teaching method could be used to motivate prospective Mathematics teachers. Otun and Olaoye (2019) examined the impacts of solve-reflect-pose strategy on prospective Mathematics teachers' algebraic conceptual knowledge, procedural knowledge, and flexible procedural knowledge. The result of the study found significant effects of the intervention on pre-service teachers' algebraic conceptual knowledge, procedural knowledge and flexible procedural knowledge (Otun & Olaoye, 2019). Therefore, prospective teachers of Mathematics should be exposed to problem-posing instruction.

STATEMENT OF THE PROBLEM

The dilemma at hand, according to literature, is in folds. First, pre-service teachers have no or low knowledge level of problem-posing skills; they have inadequate knowledge of problem-posing and; they encounter difficulties when posing Mathematical problems; what intervention could impact on pre-service mathematics teachers' problem posing (Otun, 2017). To achieve the desired mathematically creative classrooms in Nigeria, attention might be focused on the pre-service teachers that will shape the students of tomorrow. If pre-service teachers had adequately been exposed to problem posing skills and instruction during the pre-service period, these difficulties would have been overcome.

PURPOSE OF THE STUDY

The main objective of the study is not only to produce prospective Mathematics teachers who are talented in problem-posing but also to produce teachers who are trained to use problem-posing as method of instruction and as a means to produce good problem solvers and creative students. The study was specifically designed to investigate:

1. the effect of solve-reflect-pose strategy on the problem solving skill and problem posing skill of pre-service Mathematics teachers.
2. the effect of solve-reflect-pose strategy on the creativity, complexity, and solvability problem posing skills of pre-service Mathematics teachers' in algebra.
3. the effect of solve-reflect-pose strategy on the creativity, complexity, and solvability problem posing skills of male and female pre-service Mathematics teachers' in algebra.

RESEARCH QUESTIONS

1. What is the significant mean effect of solve-reflect-pose strategy on the problem solving skill and problem posing skill of pre-service mathematics teachers?
2. What is the significant mean effect of solve-reflect-pose strategy on the creativity, complexity, and solvability problem posing skills of pre-service mathematics teachers' in algebra?
3. What is the significant mean effect of solve-reflect-pose strategy on the creativity, complexity, and solvability problem posing skills of male and female pre-service mathematics teachers' in algebra?

HYPOTHESES

1. There is no significant correlation in problem-solving skill and problem-posing skill between pre-service mathematics teachers taught using solve-reflect-pose strategy.
2. There is no significant effect of solve-reflect-pose strategy on the

creativity, complexity, and solvability problem-posing skills of pre-service mathematics teachers in algebra.

3. There is no significant effect of solve-reflect-pose strategy on the creativity, complexity, and solvability problem-posing skills of male and female pre-service mathematics teachers in algebra.

METHODOLOGY

Research Design

The pre-test, post-test quasi-experimental method research design was employed. Quasi experimental design was considered most appropriate in this study since intact classes were used and no randomization was done in the selection of subjects. Pre-test and post-test of algebraic problem-posing skill of pre-service teachers in algebra scores were obtained before and at the end of treatment which lasted for seven weeks.

Population and Sample

The study involved 92 year two pre-service Mathematics teachers who were purposively selected from a state College of Education in Lagos State. The college of Education and the participants were purposively sampled from Lagos state of Nigeria in order to reduce the risk of the biases. The sample size was not too large in order to observe these subjects during their classes. The researchers tried to ensure that the subjects were representative of the pre-service teachers who majored in Mathematics and have undergone the initial levels of pedagogical content knowledge. The participants of the study were made up of 37 males and 55 females who were taught with the SRP.

Instrument for Data Collection

Algebraic Problem Posing Skills Achievement Test (APPST) was used for the quantitative data to find out the pre-service Mathematics teachers problem-posing skill on the selected algebraic concepts used in the study. The APPST was composed of 10-item tests requiring an hour of administration of pre-service

teachers' problem solving and posing skills. The APPST consisted of two sections A and B. Section A sought for background information from the subject. Section B comprised of 8 open-ended items presented in the form of either symbolic equations or word problems. APPST was developed by the researchers to cover all algebraic expressions. The items were aligned with problem-posing skill and ability of the pre-service Mathematics teachers to reformulate solvable algebraic expression. In order to establish content validity of the test, all items in the questionnaire were discussed with two teacher educators in College of Education and two-experienced JSS Mathematics teachers. The APPST test scoring were as follows: the performance was scored as "3" if the responses were *totally creative, complex and solvable*, the performance was scored as "2" if the responses were *totally solvable, complex but not creative; totally solvable, creative but not complex*, the performance was scored as "1" if the responses were *partly creative, complex and solvable*, the performance was scored as "0" if the responses were *totally wrong or there was no attempt*. The responses were scored and the reliability coefficient of the APPST was determined using a test-retest reliability method which was found to be 0.84.

Data Collection and Analysis

The quantitative data collected were analysed using descriptive statistics, mean, and standard deviation in order to organize and describe the characteristics of some of the data to be collected. Inferential statistics such as Pearson's Correlation Coefficient, paired T-test and Independent Sample T-test were used to test for statistical difference in the study at confidence level of 0.05.

Treatment Procedure

The study consisted of College of Education pre-service teachers who were exposed to solve-reflect-pose intervention. These participants were exposed to algebraic concepts through solve-reflect-pose strategy. The facilitator engaged the pre-service teachers in

algebraic concept tasks resulting from solve-reflect-pose group activities. In order to achieve the research objectives, the facilitator allowed the pre-service teachers to enjoy some freedom of action. The pre-service teachers were instructed to generate new problems or reformulate similar problems from given problems.

RESULTS

Research Question 1: What is the significant mean effect of solve-reflect-pose strategy on the problem solving skill and problem posing skill of pre-service mathematics teachers?

Table 1: Mean and standard deviation scores of problem solving and problem posing skills of pre-service mathematics teachers' in algebra

	Mean	SD	N
problem solving skill	81.8587	9.98964	92
problem posing skill	81.7717	9.72490	92

Table 1 shows the average problem posing skill score of the pre-service Mathematics teachers is (Mean=81.86, SD=9.99) and the average problem posing skill score of the pre-service Mathematics teachers is (Mean=81.77, SD=7.72). The result shows that the intervention greatly improved the pre-service Mathematics

teachers' problem solving and problem posing ability.

Research Question 2: What is the significant mean effect of solve-reflect-pose strategy on the creativity, complexity, and solvability problem posing skills of pre-service mathematics teachers' in algebra?

Table 2: Mean and standard deviation scores of the creativity, complexity, and solvability of the problem posing skills of pre-service mathematics teachers' in algebra

		Paired Samples Statistics		
		Mean	N	Std. Deviation
Pair 1	Post-creativity score	81.6304	92	7.69860
	Pre-creativity score	26.0870	92	6.52746
Pair 2	Post-complexity score	79.7609	92	12.33718
	Pre-complexity score	29.0435	92	5.15243
Pair 3	Post-solvability score	87.8152	92	5.09887
	Pre-solvability score	25.0652	92	4.89854

Table 2 shows that the average pre-test creativity score of the pre-service Mathematics teachers is (Mean=26.09, SD=6.53); the average post-test creativity score of the pre-service Mathematics teachers is (Mean=81.63, SD=7.70). Furthermore, from Table 2, it could be seen that the

average pre-test complexity score of the pre-service Mathematics teachers is (Mean=29.04, SD=5.15); while the average post-test complexity score of the pre-service Mathematics teachers is (Mean=79.76, SD=12.34). Moreover, from Table 2, the average pre-test solvability score of the pre-service Mathematics teachers is (Mean=25.07,

SD=4.90); but the average pre-test solvability score of the pre-service Mathematics teachers is (Mean=87.82, SD=5.01). Generally, this result shows great effect of solve-reflect-pose strategy on the creativity, complexity, and solvability problem posing skills of pre-service Mathematics teachers' in algebra.

Research Question 3: What is the significant mean effect of solve-reflect-pose strategy on the creativity, complexity, and solvability problem posing skills of male and female pre-service mathematics teachers' in algebra?

Table 3: Mean and standard deviation scores of the creativity, complexity, and solvability of the male and female of pre-service mathematics teachers' in algebra

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Pre-creativity score	Male	37	25.9459	6.32432	1.03971
	Female	55	26.1818	6.71673	.90568
Pre-complexity score	Male	37	28.4054	5.71771	.93999
	Female	55	29.4727	4.74090	.63926
Pre-solvability score	Male	37	24.9730	4.86191	.79929
	Female	55	25.1273	4.96676	.66972
Post-creativity score	Male	37	80.5946	6.41811	1.05513
	Female	55	82.3273	8.43725	1.13768
Post-complexity score	Male	37	75.9189	11.47310	1.88617
	Female	55	82.3455	12.32164	1.66145
Post-solvability score	Male	37	88.2432	4.54854	.74777
	Female	55	87.5273	5.45980	.73620

It can be seen from Table 3 that there is a significant difference in the post creativity achievement test of male (Mean=80.59, SD=6.42) and female (Mean=82.33, SD=8.44) indicating that the mean of the female pre-service Mathematics teachers' creativity achievement is greater than the mean of the male pre-service Mathematics teachers. Likewise, there is a significant difference in the post complexity achievement test of male (Mean=75.92, SD=11.47) and female (Mean =82.35, SD=12.32) indicating that the mean of the female pre-service Mathematics teachers' complexity achievement is greater than the mean of the male pre-service mathematics teachers. Furthermore, there is a significant difference in the post solvability

achievement test of male (Mean=88.24, SD=4.55) and female (Mean =87.53, SD=5.46) indicating that the mean of the male pre-service Mathematics teachers' solvability achievement is greater than the mean of the female pre-service Mathematics teachers as presented in Table 3. Generally, this results show a greater effect of solve-reflect-pose strategy on the creativity, complexity problem posing skills of female pre-service mathematics teachers, and a greater improvement on the solvability problem posing skills of male pre-service mathematics teachers in algebra.

Hypothesis 1: There is no significant correlation between problem solving skill using solve-reflect-pose strategy and problem posing skill between pre-service

Mathematics teachers' taught using solve-reflect-pose strategy.

Table 4: Significance Test of Pearson's Correlation between Pre-service Mathematics Teachers' problem solving and problem posing skills

		problem solving skill	problem posing skill
problem solving skill	Pearson Correlation	1	.985**
	Sig. (2-tailed)		.000
	N	92	92
problem posing skill	Pearson Correlation	.985**	1
	Sig. (2-tailed)	.000	
	N	92	92

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4 shows that pre-service Mathematics teachers' problem solving skill and problem posing skill were strongly correlated. There was a significant positive correlation between problem solving ability and problem posing ability ($r=0.995$, $N=182$, $p<0.001$). This implies that the pre-service Mathematics teachers' possession

of skill in problem solving may affect their skill in problem posing.

Hypothesis 2: There is no significant effect of solve-reflect-pose strategy on the creativity, complexity, and solvability problem posing skills of pre-service mathematics teachers' in algebra.

Table 5: The Significance Test of Dependent Sample Test in the Creativity, Complexity, and Solvability of the Problem Posing Skills of Pre-Service Teachers' in Algebra

		Paired Samples Test					t	df	Sig. (2-tailed)
		Mean	Paired Differences Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Post-creativity Pre-creativity	55.54	8.44	.88	53.80	57.29	63.16	91	.000
Pair 2	Post-complexity score - Pre-complexity score	50.72	13.31	1.39	47.96	53.47	36.54	91	.000
Pair 3	Post-solvability score - Pre-solvability score	62.75	6.86	.715	61.33	64.17	87.73	91	.000

Table 5 indicates that there was a significant difference in the pre-creativity problem posing skill and the post-creativity problem posing skill of pre-service Mathematics teachers' taught algebra using solve-reflect-pose strategy as an intervention (t-test: 63.16, $p < 0.05$). Furthermore, Table 5 also shows that there is a significant difference in the pre-complexity problem posing skill and post-complexity problem posing skill of pre-service Mathematics teachers' taught algebra using solve-reflect-pose strategy (t-test: 47.96, $p < 0.05$). Lastly, table 5 further shows that there was a significant

difference in the pre-solvability problem posing skill and the post-solvability problem posing skill of pre-service mathematics teachers' taught algebra using the intervention called solve-reflect-pose strategy (t-test: 61.33, $p < 0.05$). This implies that the hypothesis that states "there is no significant effect of the intervention (solve-reflect-post strategy) on the creativity, complexity, and solvability of the problem posing skills of pre-service mathematics teachers' in algebra" is rejected.

Hypothesis 3: There is no significant effect of solve-reflect-pose strategy on the creativity, complexity, and solvability

of the problem posing skills of male and female pre-service mathematics teachers' in algebra.

Table 6: The Significance Test of Independent Sample Test in the Creativity, Complexity, and Solvability of the Problem Posing Skills of Male and Female Pre-Service Mathematics Teachers' in Algebra

Knowledge of Problem Posing Skills	Levene's Test for Equality of Variance	t-test for Equality of Means							
		F	Sig.	T	df	Sig. (2-tailed)	Mean Diff	Std Error Diff	H ₀
Post-test of Creativity		4.884	.033	-1.06	90	.292	-1.7327	1.6358	Not rejected
Post-test of complexity		0.054	.818	-2.52	90	.013	6.4279	2.9492	rejected
Post-test of Solvability		1.415	.237	0.658	90	0.512	0.71597	1.08753	Not rejected

Table 6 shows that the effect of solve-reflect-pose strategy on creativity and solvability problem posing skills achievement of male and female pre-service Mathematics teachers is not significantly different. The Table further shows that the effect of the intervention on the complexity problem posing skill of male and female pre-service Mathematics teachers is significantly different. This means the hypothesis that states "there is no significant effect of the intervention on the creativity and solvability of the problem posing skills of male and female pre-service Mathematics teachers' in algebra" is not rejected. Furthermore, the

hypothesis that says "there is no significant effect of the intervention on the complexity of the problem posing skills of male and female pre-service mathematics teachers' in algebra" is rejected

DISCUSSIONS

This study explored effects of solve-reflect-post intervention on pre-service Mathematics teachers' creativity, complexity and solvability problem posing skills in relation to algebra. This result revealed that there is a differential effect of solve-reflect-post strategy on the pre and post test scores of pre-service

mathematics teachers' problem-solving and problem-posing skills scores in algebra. The result from this findings revealed that there was positively strong relationship between the pre-service Mathematics teachers' problem solving skill and their skill to pose creative, complex and solvable real-life problem situations. This finding is aligned with the findings of Yuan and Sriraman (2010). Otun (2017) posited that strong problem solvers are also strong problem posers.

The results from this study further show that, after intervention, pre-service teachers had higher mean score in their post-test scores compared to their mean score in the pre-test. The findings from this study revealed that there is a greater effect of solve-reflect-post on the algebraic problem posing skills scores of pre-service mathematics teachers in algebra. The results did show that the pre-service teachers had higher mean score in their post score test compared with their low mean score in the pre-test algebraic problem posing skills. The results show that the intervention (solve-reflect-pose approach and conventional method) are significant factors in pre-service teachers' algebraic problem posing skills scores in algebra and the effect on the results on the algebraic problem posing skills is significant. This finding supported those of (Akay, & Boz, 2010; Chen, Van Dooren, Chen, & Verschaffel, 2011; Isik, & Kar, 2012) who in different studies found out that pre-service teachers exposed to problem posing activities performed better than those in the control group. Previous studies showed that prospective teachers have insufficient and deficient problem-solving and problem posing skills (Isik, 2011; Isik, Isik & Kar, 2011). In agreement with the findings of this study, literature has it that if given the right opportunity, pre-service teachers would pose suitable mathematical problems (Akay & Boz, 2010).

The result also revealed that pre-service teachers benefitted from the use of solve-reflect-pose strategy. The findings show that, pre-service Mathematics teachers creativity skill; their ability to create complex questions;

and their ability to generate solvable real-life problem situations was initially below average. But there was a great improvement in the creativity, complexity and solvability of mathematical problem posing skill after the intervention. This finding corroborated the findings of Chapman (2012) who was of the opinion that prospective elementary school teachers' sense-making of problem posing would be dependent on their mathematical knowledge, imagination or creativity, and past experience with problem solving. It is observed from the findings that, in line with previous studies (Ajai, & Imoko, 2015; Chen, Van Dooren, Chen, & Verschaffel, 2011), the algebraic problem-posing skill scores of male and female indicated that the mean of the female is higher than the mean of the male pre-service Mathematics teachers. Generally speaking, after intervention, male and female pre-service teachers were able to pose solvable mathematical problems. This is consistent with the findings of many previous studies. On the whole, it is hoped that if given proper orientation, opportunities and training gender will no longer be an issue in algebraic problem posing scores in Algebra in particular.

The non-significant gender difference in algebraic knowledge for teaching scores obtained in this study could be because male and female pre-service teachers participated actively. They were engaged in the new innovative teaching strategy in the algebraic learning experience which is an evidence of meaningful learning. This was because the teaching strategy is gender friendly and pre-service teachers found it as an easy way to learn and the strategy impact equally on pre-service teachers' problem-solving and problem posing skills. This implies that given the right conditions of learning mathematical problem posing, male and female pre-service teachers would perform equally.

Interestingly, the study showed that male and female pre-service teachers' creativity and solvability of solving and posing real-life problem situations are not significantly different whereas the pre-service teachers'

complexity of solving and posing real-life problem situations is significant. In Nigeria, majority of Mathematics teachers are females and they do exercise some levels of tolerance as compared to their male counterpart. Most male teachers are said to be impatient. Male teachers' impatience to details was noticed during the treatment sections. The female pre-service teachers spent more time on the tasks, paying attention to details and achieved higher scores. It is suggested that teacher educators should apply student-centred instructions on pre-service teachers. They should be taught with and exposed to student-centred instructions as this will enhance their creative, complex and solvable skills to solve and pose real-life problem situations. It must be stressed here that few studies have really investigated the use of solve-reflect-pose instruction as a teaching strategy and the effect of solve-reflect-pose strategy on prospective teachers' problem solving-posing skill in algebra.

There is no doubt that there is baseline algebraic knowledge for teaching that teachers should possess in order to successfully apply algebraic creativity, complexity and solvability problem posing knowledge. Problems posed method of teaching is yet to attract the desire attention especially Mathematics teacher training program (Isik, 2011; Isik, Isik & Kar, 2011). If given the right opportunity and enlightenment, pre-service teachers would pose suitable mathematical problems if they are given the chance to pose their own problems (Akay & Boz, 2010). Therefore, to enrich teacher education program in Nigeria, problem-solving and problem-posing should be seen as integral aspect of teacher education programmes. Thus, solve-reflect-pose strategy solving is a good instructional package which can be used to achieve the objective. The Mathematics teachers and teacher educators are encouraged to adopt this teaching strategy to improve their teaching style and enhance their students' performance in the mathematics.

CONCLUSION

Many authors have discussed the impact of problem-solving, reflective thinking and problem-posing strategies in teaching of Mathematics. Solve-reflect-pose strategy is an active learning and teaching strategy which enables the pre-service Mathematics teacher to become aware of and determine his/her problem solving and posing abilities and reflective thinking skills, in order to build necessary domains of algebraic knowledge, improve in the knowledge of students' thinking processes and to perform well in problem posing tasks. This study investigated the effect of solve-reflect-pose strategy on pre-service Mathematics teachers' problem solving-posing skill in algebra. From the findings of the study, solve-reflect-pose strategy could be used effectively in a mixed gender class to teach mathematical concepts because gender had no significant effect on solve-reflect-pose strategy in algebraic problem solving-posing scores of pre-service teachers in algebra. The teacher helps students to develop their strengths and improve upon their identified weakness. Problem solving-posing skills could be used to develop students' strengths and improve upon identified weakness. It is important to expose students to math problem solving-posing activities.

RECOMMENDATIONS

Mathematics teacher educators and Mathematics teachers at all levels should further investigate the application of solve-reflect-pose strategy as a mode of instruction in the classroom setting. Since solve-reflect-pose strategy enhances the meaningful learning of algebraic concepts, there is therefore the need to further train teachers on the application of this teaching strategy. Problem posing is a forgotten component of the curriculum, there is urgent need of reintroducing it back into our school curriculum.

SUGGESTIONS FOR FURTHER STUDIES

This study explored the effects of solve-reflect-pose strategy on pre-service mathematics teachers' creativity,

complexity, and solvability problem posing scores in mathematics. Though the study highlighted the benefits derivable from this study, yet research in this area continues to expand.

Conflicts of Interest

The authors declare no conflict of interest.

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DISCLAIMER STATEMENT

We certify that the work reported here has not been published before and contains no materials the publication of which would violate any copyright or other personal or proprietary right of any person or entity. The authors declare no conflict of interest. Furthermore, the research was funded by nobody but through the personal efforts of the authors

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