International Journal of Education and Practice
2021 Vol. 9, No. 2, pp. 354-364.
ISSN(e): 2310-3868
ISSN(p): 2311-6897
DOI: 10.18488/journal.61.2021.92.354.364

MATHEMATICAL PROFICIENCY AND PRESERVICE CLASSROOM TEACHERS' INSTRUCTIONAL PERFORMANCE

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Article History
Received: 29 January 2021
Revised: 2 March 2021
Accepted: 5 April 2021
Published: 19 April 2021

Keywords
Academic achievement
Mathematical proficiency
Teaching practicum
Teaching performance.

ABSTRACT

This study aimed to investigate the mathematical proficiency level of the Hashemite University female students in teaching mathematics during practicum program. The study sample consisted of (41) female classroom teacher students at the second semester of the academic year 2019/2020. The study adopted the descriptive approach. The data were collected using observation protocol; the validity and reliability of the protocol were checked and proved acceptable. Lessons were videotaped, in addition to written notes. Study findings revealed that the teaching performance level in math proficiency was generally weak. Moreover, the teaching performance level in both conceptual understanding and productive disposition was medium; while the level of performance in procedural fluency, strategic competence, and adaptive reasoning was weak. The findings also show that there was a positive moderate correlation between academic achievement and performance level. They also revealed that there were statistically significant differences in math proficiency at the significant level ($\alpha = 0.05$) attributed to academic achievement.

Contribution/Originality: This study is one of few studies which have investigated the mathematical proficiency through practical education program at the university. It will provide useful insights to stakeholders and educational policy makers to reconsider and developing the teaching and practical education plan for students of the class teacher specialization in Jordan.

1. INTRODUCTION

Mathematics, by its nature, structure, and interdependence between constituents, plays a significant role in developing mentality and problem-solving abilities. The aim of learning and teaching mathematics goes beyond acquiring math concepts and calculations to attain proficiency. The National Council of Mathematics teachers (NCTM, to be the fourth criteria of math evaluation (NCTM, 1991, 2000). The criterion assesses math student's ability to utilize this knowledge in solving life mathematical problems, using math language to convey ideas, deduction and analysis, conceptual understanding, procedural fluency, disposition for math learning and understanding its nature. Teaching mathematics requires an active teacher with mathematical proficiency, an ability to take propitious decisions relevant to math knowledge in class situations, in order to determine curriculum objectives and student's needs. The teacher is the essential factor in the teaching process. S/he is the one to be trained on using the most effective strategies in reinforcing math teaching in order to achieve the set objectives

(Archibald, 2007). Thus, teaching practicum programs in universities are considered one of the major issues in preparing the teacher and in correlating theory to practice. Such programs provide the student-teacher with an opportunity to perform numerous teaching and educational programs that enable him/her to practice what s/he has learnt in a comfortable atmosphere under a direct supervision from his/her academic supervisor.

Several researchers discussed success of math concept that was subjected to radical changes to comply with the changes affecting society and teaching. Success of math in the first half of 20th century implied knowledge and understanding of logical procedures, and an ability to conduct mathematical process.

In 1950s and 60s, concentration was directed towards understanding math structure and unification of ideas. That was followed by a need to return to basics which interpreted success to be the ability to conduct mathematical procedures quickly and accurately. It was also followed by math reform movement in 1980s and 90s and was characterized by focusing on the term of mathematical ability which implied logic, problem solving, relating mathematical ideas to all fields of math, in addition to empowering teachers to use the calculator and computer (NRC, 2004). At the onset of 21st century, the National American Council for research used the term "mathematical proficiency" to denote all aspects of experience, competence, and math cognition, not to be only confined to academic knowledge which is not enough anymore. Proficiency implies using it in different contexts through which deep understanding of math can be developed (Growth, 2017; Kilpatrick, Swafford, & Findell, 2001; National Research Council, 2001).

1.1. Strands of Mathematical Proficiency

According to Kilpatrick et al. (2001); MacGregor (2013) mathematical proficiency consists of five strands which are: Conceptual understanding, Procedural fluency, Strategic competence, Adaptive reasoning, Productive disposition.

Conceptual understanding reflects the student's ability to construct a mathematical knowledge and to relate it to previous experiences and use it in new mathematical contexts and situations through absorbing the concepts and mathematical interrelation. For deep understanding, learner is better able to remember procedures and avoid errors in solving mathematical problems (NRC, 2004; Siegfried, 2012). Obeida (2017) ascertain that conceptual understanding includes accurate handling of mathematical concepts in the learner's cognitive structure together with all relevant generalization, in addition to a deep and clear knowledge built up. The indicators reflect understanding mathematical concept, its meaning, characteristics, symbols, correlated procedures, method of application in life situations, and inferring relevant mathematical generalization. Shteiwi, Zubi, and Barakat (2019) define conceptual understanding as: "the ability to completely perceive mathematical ideas, the ability to present such concepts in more than one way, and correlating them to relevant procedures, and finally the ability to conclude and assess interrelations in a reasonable and correct way". It also involves accurate and swift use of such symbols in a correct mathematical language that provides the student with flexibility and fluency needed for mathematical problem solving. Al-Shammari (2019) defines the second strand of math proficiency, procedural fluency, as "the ability to choose the propitious mathematical operations to solve problems skillfully and precisely". MacGregor (2013) defines it as the ability to skillfully and precisely perform mathematical operation and procedures. Siegfried (2012) pointed out that procedural fluency without conceptual understanding leads to an inadequate understanding of mathematical rules through memorization. The fluency, based on conceptual understanding as mere knowledge of mathematical procedures, doesn't secure understanding mathematical concepts (Al-Shammari, 2019). Al-Shammari also assures that several mathematical tasks require using algorithms mentally or in writing as some of them are not less important than conceptual understanding. Procedural fluency enables learners to develop procedures to solve out familiar situations, but not only to memorize them for solving familiar problems. The fluency also reflects learner's ability to remember steps of mathematical operations, to implement them quickly and accurately, and to correctly and skillfully use them to relate concepts and relations among operations.

The third strand of mathematical proficiency, strategic competence, was viewed by Groves (2012) to be the learner's ability to draft, to re-assess problems in a correct mathematical language and to put down solution strategies using the conceptual understanding and suitable procedures. According to Al-Shammari (2019), strategic competence implies learners' abilities to solve mathematical problems, determine important mathematical data and present them through numerous methods, to discover mathematical interrelations and to elicit new solution methods that suit problem requirements. Thus, the learner gets the resilience needed for processes of mathematical problem solution to present them in several ways through drawing, mental or in writing a formula disclosing interrelations opting for suitable strategies such as: figure drawing, guessing, table constructing, using logical elicitation, and using models to present the context of a mathematical problem, etc. There is correlation between strategic competence, conceptual understanding, and procedural fluency. In order to develop non-routine solution strategies, the learner needs to understand implicit information and interrelation between problems, in addition to fluency and skill to solve out routine problems (NRC, 2004; Qarni & Shalhub, 2019).

As for the fourth strand of math proficiency, adaptive reasoning, refers to the ability to think logically regarding relations between mathematical concepts and situations. Reasoning is necessary because it stems from contemplation, interpretation, and logical thinking. Adaptive reasoning incorporates how to justify math conclusions as it correlates elements to one another (Groves, 2012). Qarni and Shalhub (2019) confirm that adaptive reasoning is the ability to emotionally think of relations, concepts, and situations and to include intuition, induction, and guessing. It is used to comprehensively understand aspects of the problem. It also helps in the orientation of learning process and in determining the suitable measure of solution. Through implementing solution plan, the students use adaptive reasoning to monitor their progress. Reasoning also implies using logic to interpret and justify the solution of a certain problem or to synthesize one. All such things are reflected in the practice of informal justification, intuition, logical induction and logical thinking about relations between concepts and operations to discover whether or not solutions were logically integrated (Kilpatrick et al., 2001). Regarding the fifth strand of math proficiency, productive disposition, it refers to inclination and feeling for math, thus perceiving its significance and benefits gained from it, when accompanied by a serious, industrious and competent learner. Henceforth, math can be understood through persistent efforts. In addition, it provides the learner with self-confidence that makes him consider it to be an essential subject that is worth attention. Developing productive reasoning requires identifying benefits of being persistent throughout the process of math learning (Siegfried, 2012).

Schoenfeld (2007) ascertains that math proficiency is essential for the learner because mathematical knowledge is not enough for math competence. The learner should be able to effectively use this knowledge in real life. His possession of math proficiency is indicative of a long-range success. The aforementioned five strands of math proficiency need to be taken into consideration, as they are intertwined, inseparable and developed in integrated manner (Groves, 2012; MacGregor, 2013; NRC, 2004).

Many studies were conducted exploring the teaching performance in terms of the components of mathematical proficiency among pre-service mathematics teachers, such as Usman (2020). The results of this study showed that student teachers exhibit a weak level of conceptual understanding in trigonometric inequalities, their level of performance in procedural fluency. The strategic competence was weak as well, and in general, the performance of student teachers in light of mathematical proficiency was also weak in the subject of trigonometric inequalities. Awofala (2017) aimed to explore the relationship between mathematical proficiency and gender in math course. The sample consisted of 400 secondary school students in Nigeria. Results revealed that the students' mathematical proficiency level was high. In addition, it was found that there was not any statistically significant difference between the respondents' mathematical proficiency levels which can be attributed to gender.

Among the studies that examined the in-service mathematics teachers' instructional practices Qarni & Shalhub (2019) observed that the level of teaching performance of mathematics teachers in light of the requirements for developing mathematical proficiency as a whole was moderate. The level of teaching performance was moderate too in the observation card axes (procedural fluency, strategic competence). However, the level of performance in the fifth axis, the productive disposition, was weak. The results of the study (Al-Shammari, 2019) revealed that the practices of female teachers in the elementary stage of mathematical proficiency as a whole were at a weak degree, while the practices of female teachers in the conceptual understanding came with a moderate degree. They were reported weak in each of the remaining axes (procedural fluency, adaptive reasoning, strategic competence, productive desire). Al-Maliki (2018) showed that the level of teaching performance was weak in differentiated teaching skills, and a medium level in conceptual understanding skills. The results of the four steps of teaching skills (focus, teaching, training, evaluation) showed that the level of the performance was moderate in the skill of concentration, and weak in the rest of the skills. In addition to that, Al-Maliki and Al-Salouli (2018) conducted a study aimed at identifying the level of teaching practices of mathematics teachers in the primary stage in light of standards for teaching and learning mathematics. The results of the study showed that the performance level of teachers was moderate in the practices related to tasks of mathematical value, in addition to the teaching practices related to class discussion and dialogue, and teaching practices related to the teaching and learning environment. The results indicated that there were no statistically significant differences in the level of teaching performance attributable to the two variables Years of teaching experience, and academic qualification.

The issue that this study discusses is the inability of students at the elementary level in public schools to solve math problems. Such an issue may be attributed to teachers whose majors were not math. Furthermore, mathematical proficiency is a modern variable therefore enjoying a high mathematical proficiency level is one of the goals sought from receiving education of great importance in 21st century. The current study focused on quality of the teaching practicum program at the Hashemite University examining the instructional performance of class-teacher majors taking that course in terms of mathematical proficiency.

To achieve such an objective, the study attempts to find answers to the following questions:

1- What is the level of teaching practices available for class-teacher majors in field training in terms of mathematical proficiency requisites?

2- Is there a correlation between student-teacher's achievement and overall performance in terms of mathematical proficiency?

3- Are there differences with statistical significance at the level (α=0.05) in teaching practice of student-teachers that might be attributed to academic achievement?

2. METHODS AND PROCEDURES

2.1. Study approach

To achieve objectives of the study regarding teaching practices in terms of math proficiency, the researcher adopted the descriptive approach as it best fits nature and objectives of the study, being a method that can diagnose the issue quite well.

2.2. Study Population

This included all student teachers (class teacher majors) (164) taking the teaching practicum course at the Hashemite university, second semester 2019/2020.

2.3. Study Sample

The sample encompassed (41) students who were purposively selected from the population and represent 25% of the study population. They consented to participate in the current research. The students enrolled in a practicum course of six credit hours, requires practicing teaching in schools for (14-16) weeks, (4-5) meetings per day. They are supervised by cooperate- teachers and a faculty member. The student starts training by attending classes (30) hours for two weeks then afterwards starts partial teaching for two weeks before he switches to full time teaching.

Table 1 shows participants' academic achievement levels through the Grade Point Average (GPA) from the admissions registration unit data of the Hashemite university.

Table-1. Distribution of study sample according to academic achievement levels

Rating	GPA	Number	Percentage
Satisfactory	2- Less than 2.5	2	4.9
Good	2.5- Less than 3	10	24.4
Very good	3- Less than 3.5	8	51.2
Excellent	3.5 - 4	8	19.5
	Total	41	100

3. STUDY INSTRUMENT

3.1. Observation Protocol

After reviewing works of researchers regarding the observation card, such as those concerned with math curricula (NCTM, 1991, 2000); Mathematics teaching standards and professional development of mathematics teacher (NCTM, 1991) framework of private and general outcomes for teaching math at elementary and secondary levels (2005) and studies of Kilpatrick et al. (2001); Siegfried (2012); MacGregor (2013); Al-Shammari (2019); Obeida (2017); Qarni and Shalhub (2019) etc., an observation protocol was developed regarding classroom math proficiency practices. The observation card consisted of (39) observable behaviors which can be evaluated through observing student- teacher performance in the class. The four-point Likert type scale was used. Practices were scored as follow: High, Medium, Weak, and Nil with 3,2,1,0 score respectively.

3.2. Validity and Reliability of the Card

To examine the validity of the card, it was presented to a group comprising staff member referees, specialized and concerned with the topic of the study. They were requested to give their opinions on the suitability of the card items. Few items were modified, and seven others were deleted in response to suggestions and comments. The card ended up with (32) items. Reliability of the card was verified by calculating internal consistency coefficient using Cronbach Alpha whose value was (0.91), considered acceptable for the purpose of the study. Observation was carried out by attending one period at one class for every sample member. All observation classes were videotaped. Written remarks of supervisors were also taken into consideration. The videoed classes amounted to (41).

The author accompanied one of the colleagues, who was trained on the observation card during class visits. coefficient of agreement between observers was calculated using cooper formula and found to be (0.85).

Pearson correlation coefficient was used to verify reliability of the internal consistency for each strand of math proficiency in the observation card. Correlation coefficient values between items of observation card and total score were greater than (0.7), between (0.79-0.83). These values reflect reliability of ratings.

4. FINDINGS AND DISCUSSION

First question:

What is the level of teaching practices of student-teachers at the Hashemite university in terms of mathematical proficiency?

Means, and standard deviations of the mathematical proficiency were calculated. Tables 2 to 6 present them for each mathematical proficiency strand.

Table 2 shows that students teaching practices related to conceptual understanding were medium with a mean (1.81). This may be, due to student-teachers' awareness of how significant their understanding was. The second item rated highest with a mean (2.51) followed by the fifth item with a mean (2.48). This might be attributed to students' knowledge that presenting and modeling of mathematical ideas is an important skill in teaching elementary stage students who cannot learn except through concrete objects and math modeling as those are the main things that their minds retain.

Table-2. Means and standard deviations of students' performance in the skill of conceptual understanding strand.

No	Item	Mean	Std. deviation	Rank	Level
1	Highlights the importance of the mathematical concept and how to use it correctly	1.80	0.56	3	Medium
2	Focuses on presenting and modeling of math concepts to develop conceptual understanding	2.51	0.78	1	High
3	Enables students to explain basic mathematical	1.68	0.69	4	Medium
4	Encourages students to define the concept in a correct mathematical language	1.15	0.53	6	Weak
5	The teacher relates new conceptual knowledge to the old one in a meaningful manner	2.48	0.60	2	High
6	Corrects students' conceptual errors	1.27	0.59	5	Weak
	average of conceptual understanding	1.81	0.42		Medium

Ratings of the sixth item (conceptual errors…) was weak with a mean of (1.27), the fourth item-defining the concept in a correct language, while the fourth item rated medium with a (1.15) mean. This might be attributed to the belief of student-teachers that students of elementary level are unable to speak correctly, and their linguistic capability does not help to codify the concept.

Table-3. Means and standard deviations for students' performance in the procedural fluency skills.

No.	Item	Mean	Std. deviation	Rank	Level
1-	Encourages students', mental calculation for accurate problem solution	1.80	0.68	Medium	3
2-	Encourages students to use problem-solving method	1.41	0.55	Weak	4
3-	Tells students how to check correct answers	1.27	0.63	Weak	5
4-	Focuses on achieving mathematical assignment efficiently and accurately	1.85	0.57	Medium	2
5-	Asks students to explain concept interrelations in connection with solution	1.93	0.65	Medium	1
6-	Uses examples and practices that focus on higher thinking skills	0.78	0.61	Nil	6
7-	Motivates students' methods to explore presented mathematical ideas	0.66	0.73	Nil	7
	average of procedural fluency	1.39	0.37	Weak	

Table 3 shows that the performance level of student teachers related to fluency was weak; the general average was (1.39) while arithmetic mean for the strand ranged between (0.66-1.93) with variant levels of nil to medium. This shows that student-teachers are aware of how important it is to explain conceptual interrelation and the role mental calculation plays in developing numerical fluency, especially in first elementary classes. Though they focus on successful achievement irrespective of the manner, yet nature of lessons and number of students in class are obstacles in the way of caring for such items in a great and effective manner.

Items that ranked weak were the second "encourages students to use problem-solving method" with a mean (1.41), followed by the third item "students desire to verify correct answers" with a mean (1.27). Such results may be attributed to observing class period, quick implementation, attempt to directly come to solution without training, and concentration of student-teachers on the teaching process more than verification of correct answers. It is noticeable that student- teachers focus more on direct method of teaching in most class situations. They also rely heavily on textbooks. Table 4 presents results of student teachers practices of strategic competence.

Table 4 shows that students' practices of strategic proficiency were weak with a mean (1.39). This conveys that student-teachers still focus on instructing, memorizing, and using stereotyped questions whose answers are determined, hence preventing students from providing unusual new ideas.

Table-4. means and standard deviations of student's performance of strategic competence strand.

No.	Item	Mean	Std. deviation	Rank	Level
1-	Presents math problems from real life	2.07	0.61	1	Medium
2-	Guides students to present mathematical problems in several ways	1.53	0.78	4	Medium
3-	Directs students to determine hypotheses and the required in any math problem	1.88	0.56	2	Medium
4-	Gives assignment that trigger thinking and contemplation	0.610	0.59	7	Nil
5-	Encourages students to create problems mathematically solvable	0.710	0.64	6	Nil
6-	Guides students to the method of determining necessary suitable strategies to effectively solve problems	1.56	0.67	3	Medium
7-	Guides students to determine plus-minus information in problems	1.36	0.62	5	Weak
	Average of strategic competence	1.39	0.38		Weak

Such a result might be attributed to presenting math problems in a stereotypical manner without advising students to avert complicated information, which for the teacher is helpful to consume class time. It might also be traced back to traditional methods of teaching to which they were exposed and were inclined to implement or because of the insufficient training such teachers had.

This might also be attributed to students' age. As they were young, teachers believed that their students were incapable of creating problems that needed contemplation, thus resorting to traditional methods of teaching. Student-teachers' weakness in this respect might also be traced back to the belief that such practices would be a waste of time, though math books concentrate on such skills.

Table-5. Means and standard deviations of student-teachers practices of adaptive reasoning.

No.	Item	Mean	Std. deviation	Rank	Level
1-	Urges students to justify solution method	2.09	0.62	1	Medium
2-	Guides students to assess their solutions	1.04	0.58	4	Weak
3-	Presents open ended life problems that can be solved through different ways	0.83	0.59	5	Nil
4-	Checks students' errors and corrects them	1.51	0.55	3	Medium
5-	Encourages students to clearly speak out their thought to discover why they err	1.73	0.67	2	Medium
6-	Asks students to provide some expectations and guessing for problem solution	0.59	0.63	6	Nil
	average of Adaptive reasoning	1.30	0.40		Weak

Table 5 shows that student-teachers' practices of adaptive reasoning were weak with a mean (1.30). This finding reflects that student teachers do not have adequate awareness of some aspects of adaptive reasoning, though it rated "medium". Some teachers, as well, do not use active strategies of teaching which reinforce adaptive reasoning. Moreover, class overcrowding with students and difficulty of implementing active teaching in groups which make teachers shun that, might be fear of class disruption and confusion.

Results of adaptive reasoning might be attributed to teacher-focus method on teaching more than learner-based teaching method which left a negative impact on methods used for evaluation. It is noted that most student teachers avoid open mathematical problems, due to their inability to prepare similar questions, or may be because of nature of the curriculum which does not cope with this level as they claim. Thus, the teacher in this case will not be more than a performer.

Table 6 shows that student-teachers practices of productive disposition rated medium with a mean (2.12). Such findings might be attributed to the sufficient awareness that the student-teacher has regarding age group she teaches. It is worth mentioning that young students are in need for safe environment, material, and moral reinforcement to get along with the learning process.

Table-6. Means and standard deviations of student teacher level of productive disposition.

No.	Item	Mean	Std. deviation	Rank	Level
1-	Encourages and appreciates students' works to promote motivation	2.34	0.57	3	High
2-	Secures a safe ambience which encourages students to work anxiety free	2.53	0.59	1	High
3-	Suggests activities that highlight and appreciate role of math in life	2.37	0.62	2	High
4-	Cares for students concerns and needs during presentation of math lessons	2.20	0.51	5	Medium
5-	Utilizes technology to simplify mathematical information	1.07	1.00	6	Weak
6-	Correlates math to other sciences	2.24	0.54	4	Medium
	average of productive disposition	2.12	0.47		Medium

Despite the awareness that student-teachers have regarding linking math to other sciences yet lack of awareness of some teachers of math benefits makes them believe that such practices are a waste of time. Student teacher's emphasis more on the teaching process than on training students makes math sound illogical. In addition, concentration of some teachers on the content, disregarding the role of important mathematical activities, gives students the impression that math is rigid. When math is envisioned by students to be useful and helps in solving life problems, then they realize that math learning needs persistence which in turn consolidates self-confidence and skills to search for difficult situations from which they could learn.

Finally, Table 7 outlines level of performance in terms of math proficiency strands, and level of general performance.

Table-7. Means and standard deviations of strands of math proficiency and level of general performance.

	Mean.	Std. deviation	Rank	Level
Average of conceptual understanding	1.81	0.42	2	Medium
Average of procedural fluency	1.39	0.37	4	Weak
Average of strategic competence	1.39	0.38	3	Weak
Average of adaptive reasoning	1.30	0.40	5	Weak
Average of productive disposition	2.12	0.47	1	Medium
Total Average	1.59	0.33		Weak

Table 7 shows the teaching practices of student teachers in terms of math proficiency means ranging (1.81-2.12), the level of conceptual understanding and productive disposition was medium. Furthermore, the other three strands (procedural fluency, strategic competence, and adaptive reasoning) whose rating was weak between (1.3-1.9). These results can be attributed to the lack of awareness of teachers about the importance of these components due to lack of experience as they need more training. The performance of student teachers in terms of math proficiency was generally weak with a mean (1.59). This is consistent with Al-Shammari (2019) and conflicts with the findings of Qarni and Shalhub (2019) study.

In answering question two: *Is there a correlation between student teacher's achievement and the overall performance in terms of mathematical proficiency*?

Pearson's bi-correlation coefficient was used, as presented in Table 8.

Table 8 shows that there is a moderate direct relationship between the level of achievement and the level of teaching performance of student teachers in general. As the value of the Pearson correlation coefficient (R = 0.58) was statistically significant at the level (α = 0.01). In addition, the results showed that there was a moderate correlation relationship between the achievement level and the strands of mathematical proficiency (conceptual understanding, procedural fluency, adaptive reasoning, productive disposition). As the values of the correlation coefficient ranged between (0.41-0.55). While the relationship was positively weak of strategic competence, as the value of the correlation coefficient was (0.37).

Table-8. Correlation coefficients between achievement level and strands of math proficiency.

Strand	Degree of correlation coefficient	Sig.
Conceptual understanding	**0.55	0.001
Procedural fluency	**0.41	0.016
Strategic competence	*0.37	0.023
Adaptive reasoning	**0.50	0.001
Productive disposition	**0.54	0.001
Total performance level	**0.58	0.000

Note: ** level of significance at 0.01 level * level of significancy at 0.05 level.

In answering question three "*Are there differences with statistical significance at the significancy level (α = 0.05) in teaching practice of student teachers that might be attributed to academic achievement?*

Means, standard deviations and One-Way ANOVA were conducted to test the significance of statistical differences. The results are presented in Tables (9) and (10).

Table-9. Means and standard deviations for teaching performance level in accordance with academic achievement.

Achievement level	Total Performance level	
	Means.	Std. deviation
Satisfactory (2- less than 2.5)	1.06	0.44
Good (2.5- Less than 3)	1.47	0.27
Very good (3-less than 3.5)	1.57	0.18
Excellent (3.5-4)	1.94	0.41
Total	1.59	0.33

Table 9 reveals overall differences in means and standard deviations; the highest level of performance was for student teachers whose achievement levels belong to the excellent category (3.5-4) with a mean (1.94) followed by very good (3-less than 3.5) with a mean (1.57), then good (2.5 – less than 3) with a mean (1.47). The lowest performance was of teacher students whose achievement levels were satisfactory (2-less than 2.5) with a mean (1.06). To test the statistical significance of the overall difference's ANOVA was used. Table 10 presents ANOVA results.

Table-10. ANOVA analysis of total performance mean and achievement of sample members.

ANOVA Table							
Total performance mean level of achievement	Between Groups	(Combined)	Sum of Squares	df	Mean Square	F	Sig.
			1.681	3	0.560	7.656	0.0001
	Within Groups		2.708	37	0.073		
	Total		4.388	40			

Results in Table 10 shows that there is a significant difference in performance of math proficiency strands at the statistical significance level of (α = 0.05). The calculated (F) value was (7.656) which is significant at level (α = 0.05). To determine the sources of differences between means, Tuki-Kreimer formula was used as samples were not equal as noted in Table 11. Table 11 shows that there are statistically significant differences at the level of significance (0.05) between means in favor of student teachers with high achievement. Such a result is logical because these teachers with high GPAs give enough effort and time to the teaching practicum program set for graduation semester. In addition, distinguished students at the faculty of education also hold positive attitude towards teaching. Student teachers with high achievements also have self-confidence and enthusiasm towards teaching. Such results are inconsistent with the study of Rawaqa, Mahmood, and Shebly (2005).

Table-11. Differences between means in Tuki-Kreimer Test for post-variance analysis comparisons.

(I) GPA	(J) GPA	Mean Difference (I-J)	Sig.
Satisfactory	Good	-0.40625-	0.230
	Very good	-0.50446-	0.073
	Excellent	-0.87500-*	0.001
Good	Satisfactory	0.40625	0.230
	Very good	-0.09821-	0.781
	Excellent	-0.46875-*	0.004
Very good	Satisfactory	0.50446	0.073
	Good	0.09821	0.781
	Very good	-0.37054-*	0.011
Excellent	Satisfactory	0.87500*	0.001
	Good	0.46875*	0.004
	Very good	0.37054*	0.011

Note: The mean difference is significant at 0.05 level.

In short, findings indicate that GPA could be a predictor of student teachers' job as teachers of first grades. It was clearly noted that, performance of the distinguished student was characterized by enthusiasm and disposition for a future developed profession.

5. CONCLUSION AND RECOMMENDATIONS

The findings of this study revealed that the instructional performance level of the female student teachers is weak in terms of mathematical proficiency. The instructional performance level of the female student teachers is medium in terms of conceptual understanding and productive disposition. The instructional performance level of the female student teachers is weak in terms of procedural fluency, strategic competence, and adaptive reasoning. In addition, there is a positive direct correlation between academic achievement and instructional performance level. there are statistically significant differences –at the statistical significance level of ($0.05 \geq \alpha$) between the instructional performance levels of the respondents in terms of mathematical proficiency which can be attributed to academic achievement. Considering findings of the study, the researcher recommends the following:

1- Increase coordination and cooperation between those in charge of the teaching practicum course in colleges of education and cooperating schools.

2- Get educators, from the ministry of education, and involve them in the process of evaluating college students (class teacher majors) and to take practicum teaching.

3- Train cooperating teachers on strategies of developing mathematical proficiency and upgrade the level of student teachers.

4- Conduct a specialized workshop, for student teachers of first grades, in which concentration should be on strands of math proficiency and on the role of learners in the learning-teaching process.

5- Review student-teacher's programs to base content of math book of first grades on pedagogical knowledge and to expose students of teaching practices mini-teaching programs in universities.

6- Conduct further studies on teaching practice relevant to math proficiency at all stages of learning.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Acknowledgement: Both authors contributed equally to the conception and design of the study.

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