

## The Level of implementing Problem Solving among School Teachers

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| Article Info                                                                                      | ABSTRACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <b>Article history:</b><br>Received 1 April 2025<br>Revised 30 April 2025<br>Accepted 16 May 2025 | The purpose of the study was to identify the level of implementing mathematics problem solving techniques among school teachers in Jordan. A descriptive design using survey questionnaire was used to collect data from the study participants. A total of 180 teachers were participated in this study. The results indicated that a moderate level of in terms of implementing mathematics problem solving techniques in school settings. Furthermore, insignificant differences were found between male and female teachers in terms of implementing mathematics problem solving techniques in school settings. Given these results, it was suggested that mathematics teachers give mathematical problem-solving tactics first priority and promote their ongoing application in their instruction. |
| <b>Keywords:</b><br>Mathematics<br>Problem Solving<br>School<br>Teachers                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>الكلمات المفتاحية:</b><br>الرياضيات<br>حل المشكلات<br>المدرسة<br>المعلم                        | <b>ملخص</b><br>هدفت هذه الدراسة إلى تحديد مستوى تطبيق تقنيات حل المشكلات الرياضية لدى معلمي المدارس في الأردن. وقد تم اعتماد المنهج الوصفي باستخدام أداة الاستبانة لجمع البيانات من أفراد عينة الدراسة. وشارك في الدراسة ما مجموعه 180 معلمًا ومعلمة. وأظهرت النتائج أن مستوى تطبيق تقنيات حل المشكلات الرياضية في البيئات المدرسية جاء بدرجة متوسطة. كما لم تُظهر النتائج وجود فروق ذات دلالة إحصائية بين المعلمين والمعلمات في مستوى تطبيق هذه التقنيات. وفي ضوء هذه النتائج، أوصت الدراسة بضرورة أن يُولي معلمو الرياضيات أولوية أكبر لاستراتيجيات حل المشكلات، والعمل على تعزيز توظيفها بصورة مستمرة ومنهجية في عملية التدريس.                                                                                                                                                                       |
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### 1 Introduction

Generally, speaking that developing student's abilities are important in all educational fields (Al-Mseidin et al., 2023; Alahmari et al., 2023). However, mathematics subject is one of the most important subject that suggested by researchers. The importance of mathematics differs from that of other sciences in its structure and nature; it is an abstract science produced by the human mind, a universal language with precise meanings, characterized by objectivity and a lack of subjectivity, and by its reliance on logic, facts, assumptions, and proofs. It has great importance in life situations, and the mathematical problem is a fundamental element of the mathematical content for various educational stages, as it contributes to developing the student's ability to link mathematics to the environment in which they live (Bani Ahmad & El-Shara, 2025; Hilbert, 2022; Wahyudi et al., 2025).

Adopting teaching techniques, practices, and approaches that put the learner at the center of the educational process, contemporary educational trends have stressed the need to concentrate on the whole development of the student. This entails a special focus on teaching scientific topics, which are central in the educational system. Such an approach calls for differentiating material presentation strategies to accommodate the specific needs of the student and reduce boredom during learning (Al-Qutaish, 2022).

Consequently, current trends in math education advise forsaking conventional techniques and substituting contemporary approaches and techniques that emphasize comprehension and understanding, offer students a stimulating learning environment, and empower them to actively participate in the educational process (Guàrdia et al., 2021; Yadgarovna & Husenovich, 2020).

Although, mathematics and teaching techniques were supported in previous studies, a lack of emphasis on problem-solving techniques and a clearly apparent weakness among students in tackling mathematical challenges were noticed. One factor contributing to this is a lack of attention on employing many approaches to teach pupils mathematical problem-solving skills, despite the clear influence these techniques have on improving pupils' performance (Simamora et al., 2019).

Most of the earlier research has concentrated on examining mathematics instructors' approaches and techniques in solving mathematical challenges, a review of those studies shows that these investigations addressed several components, including the degree of execution (as in the 2025 study of Al-Ahmari & Al-Mohammadi 2025), identifying the most frequent techniques in textbooks and classroom activities (as in Abughoush's study, 2019), evaluating planning, implementation, and classroom interaction (as in the 2025 research of Bani Ahmad & El-Shara), and creating professional development programs based on design research to improve these practices (as in Chirinda's study, 2021). Teachers show different degrees of dedication to planning, direct instruction, and the use of certain math problem-solving methods overall. Still, it is evident that their ability to apply various and complex problem-solving techniques must be improved.

Regarding methods, instrument development, and validation and reliability, past research helped the present study. It also profited from the approaches used in earlier research, including results, statistical analysis, and variable presentation. From their vantage point, the present study aims at identifying the level of implementing mathematical problem-solving techniques among school teachers in Jordan.

## 1.1 Study Questions

This study aimed at answering the following questions:

1. What is the level of implementing mathematical problem-solving methods among school teachers?
2. Are there any significant differences among school teachers in terms of implementing mathematics problem solving techniques based on their gender?

Study objectives

This investigation sought to determine from the level of implementing mathematical problem-solving techniques among school teachers. It also aimed at identifying the statistical differences level of implementing mathematical problem-solving techniques among school teachers based on their gender.

## 2 Study Methodology and Sample

The study adopted a descriptive approach using survey questionnaire to collect data from the study participants that can help to achieve its objectives. A total of 180 teachers were participated, as 75 of them were males and 105 were females as shown in table 1.

**Table 1.** Descriptive of the Study Sample.

| Variable | Category | Frequency | Percentage | Total |
|----------|----------|-----------|------------|-------|
| Gender   | Male     | 75        | 41.7%      | 180   |
|          | Female   | 105       | 58.3%      |       |

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## 2.1 Study Measurement

The study adopted the survey questionnaire from previous studies included Bani Ahmad and El-Shara (2025), Al-Ahmari and Al-Muhammadi (2025), and Abu Ghosh (2019), with a total of twenty-two items. The first step to validate the questionnaire, the researcher gave the first version of the survey to eight professional experts from several Jordanian education college faculties. The appropriateness and validity of the instrument in terms of comprehensiveness and content relevance were confirmed, and any required changes. However, a total of 20 items were used for the final version of the questionnaire. In terms of reliability, Cronbach's alpha coefficient, 0.89, was also used to determine internal consistency reliability. The results show a great degree of reliability, therefore increasing the instrument's credibility in measuring the desired variables as shown in table 2.

**Table 2.** Cronbach's alpha internal consistency coefficient.

| Variable                   | Internal Consistency |
|----------------------------|----------------------|
| Problem Solving Techniques | 0.89                 |

## 2.2 Study Results

The study employed a range of statistical methods appropriate to its nature and to achieving its research objectives. These included descriptive statistics and analysis of variance (ANOVA). To interpret the mean responses of the sample on the instrument's items, a five-point Likert scale was used for scoring, with scores assigned as follows: (1) very low, (2) low, (3) average, (4) high, and (5) very high. The means were categorized as follows: values of 2.33 and below represents a low level, values from 2.34 to 3.67 indicate an average level, and values from 3.68 to 5 represent a high level.

Regarding to question one, table 3 shows that, from their perspective, mathematics teachers employed a moderate level of problem-solving strategies, with a mean score of 3.58 and a standard deviation of 0.62 as shown in table 3.

**Table 3.** Means and Standard of Mathematical Problem-Solving Strategies.

| Variable        | Mean | Standard Deviation | Level    |
|-----------------|------|--------------------|----------|
| Problem Solving | 3.58 | 0.62               | Moderate |

Regarding to question 2, which stated are there statistically significant differences between the mean scores of the study sample regarding the level of implementing mathematical problem-solving strategies among school teachers, the arithmetic means and standard deviations were calculated according to the variables of gender. Table 3 and 4 shows these results. Table 4 shows apparent differences in the arithmetic means for the degree to which mathematics teachers employ mathematical problem-solving strategies, driven by differences in gender and experience. To determine whether these apparent differences were statistically significant at the significance level ( $\alpha \leq 0.05$ ), a one-way ANOVA was used, as shown in table 5. Table 5 shows that there are no statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) between the mean ratings of the study sample regarding the extent to which mathematics teachers employ mathematical problem-solving strategies, attributable to the gender variable. The F-value was (0.010), and the significance level was (0.921).

**Table 4.** Descriptive Statistical Level of Mathematical Problem-Solving based on Gender.

| Variable | Category | N   | Mean | Standard Deviation |
|----------|----------|-----|------|--------------------|
| Gender   | Male     | 75  | 3.56 | 0.55               |
|          | Female   | 105 | 3.59 | 0.68               |

**Table 5.** One-way ANOVA of the effect of gender mathematics teachers employ mathematical problem-solving strategies.

| Source of Variation | Sum of Squares | df  | Mean Square | F     | Significance (p) |
|---------------------|----------------|-----|-------------|-------|------------------|
| Gender              | 0.004          | 1   | 0.004       | 0.010 | 0.921            |
| Total               | 2373.910       | 180 |             |       |                  |

### 3 Discussion

Regarding to answer the research question, the study indicated that the participants scored moderate level in implementing mathematics problem solving techniques. The results may be attributed to the teachers' modest use of problem-solving techniques is thought to be caused by their proclivity to rely on a small number of conventional classroom activities. Some instructors also lack enough methodical training to expose them to various problem-solving strategies appropriate for several pupil levels. Furthermore, little class time and large teaching workloads might lead instructors to favor approaches that are simpler to use and faster to produce results at the price of those that need more time or more in-depth preparation and application abilities.

The most highly rated approach—modeling or sketching—is explained by its extensive employment in mathematics education. It is readily incorporated into classroom activities and directly related to visual representation abilities, which enable pupils to grasp the linkages between the parts of the issue and to understand it. The study results also presented a significant difference between teacher's gender in terms of implementing mathematics problem solving techniques. This may be attributed to the fact that, regardless of gender, mathematics teachers share a similar perception of mathematical problem-solving strategies, as their teaching practices rely more on prior experience and training than on gender differences. Furthermore, official curricula and training programs provide standardized guidelines for all teachers, promoting uniformity in classroom practice.

#### 3.1 Study Implications

The study contributed to literature by filling the gap in terms of identifying the level of implementing mathematical problem-solving techniques among school teachers in Jordan. Additionally, the findings of this study can help mathematics curriculum designers to create suitable material, approaches, activities, and assessments so that students may successfully employ mathematical problem-solving techniques and so meet the required learning outcomes.

#### 3.2 Recommendations

In light of the results of this study, the following recommendations can be made which are creating teacher training courses and workshops to increase the application of mathematical problem-solving techniques, with a particular emphasis on seldom-utilized ones like estimating and checking, back testing, and pattern identification. Additionally, include activities suitable for the classroom that motivate pupils to use different approaches, especially those needing deductive reasoning and disciplined planning. Finally, the study limited to small sample size, therefore, future studies should maximize the study sample.

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