

ORIGINAL ARTICLE

Investigation of Mathematics Teachers' Awareness of Educational Objectives in Virtual Teaching (Case Study: Ninth Grade Teachers in Delfan City)

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ABSTRACT

The present study was conducted with the purpose of "measuring the level of teachers' awareness of the goals of ninth-grade mathematics education" regarding their readiness to effectively hold virtual classes. The study was applied in terms of purpose and descriptive-survey in terms of method. The statistical population of the study consisted of all mathematics teachers in Delfan City. The statistical sample included mathematics teachers in the first secondary school who were teaching in the academic year 2024-2025, from which 38 teachers were selected at random and participated in the study. They answered the questionnaire. The data collection instrument was a researcher-developed questionnaire comprising 20 items, which measured the main and subsidiary hypotheses of the study. The collected data were analyzed using SPSS software (version 22) and by employing descriptive and inferential statistical methods. The findings of the study indicated that mathematics teachers' overall awareness of the educational objectives (cognitive, psychomotor, and affective) of the ninth-grade mathematics textbook was at a satisfactory level. Furthermore, no significant difference was observed in the awareness levels between male and female teachers. Regarding the varying levels of awareness across domains, the findings revealed that teachers possessed the greatest awareness of cognitive objectives, followed by psychomotor objectives, with the lowest awareness pertaining to affective objectives.

KEYWORDS

Educational Goals, Awareness of Teachers, Virtual Education, Ninth Grade Mathematics.



Introduction

The quality of the education system, as an institution influencing the development of human resources and economic growth, depends on students' academic achievement. In this regard, the main goal in our country is to nurture a generation capable of solving the complex problems surrounding them (Motahari Nejad & Fatehi Chenar, 2017). Among the various subjects, mathematics holds a special place due to its unparalleled role in strengthening logical thinking and problem-solving, and mastery of it is considered a prerequisite for success in many scientific and technical professions. The mathematics curriculum specifically emphasizes the application of learned material in real life. Among the key objectives of this curriculum are establishing a connection between mathematical concepts and everyday life, developing modeling and problem-solving skills, and strengthening the ability to analyze and interpret phenomena (Noshadi et al., 2023). Achieving these high-level objectives depends on the effectiveness of teachers, which itself requires them to have sufficient knowledge of the educational objectives. Teachers' educational effectiveness is dependent on their professional competencies. Competence in the teaching profession refers to an integrated set of knowledge, skill, and attitude that enables the effective performance of educational tasks (Ebrahimi et al., 2021). One of the fundamental pillars of this knowledge is "awareness of educational objectives." According to reputable models, the knowledge required by teachers is not limited solely to content knowledge (mathematical concepts) but also includes pedagogical content knowledge, which encompasses awareness of educational objectives, understanding of the learner, and comprehension of how to effectively convey concepts (Amiri, 2021). This type of knowledge helps the teacher understand why some students have difficulty learning a particular concept and how to teach that concept effectively.

Fung et al. (2017) demonstrated that mathematics teachers, in addition to content knowledge, require specific skills and attitudes for effective teaching. They found that teachers' experience and tenure have a direct impact on educational effectiveness and student success.

Despite the importance of the subject, a review of the research background indicates that previous studies have not comprehensively examined the level of mathematics teachers' awareness of the three educational objectives (cognitive, psychomotor and affective) in the ninth-grade mathematics textbook under the conditions of emergency virtual education. This study seeks to fill this gap. Based on the above, this research aims to address the following hypotheses:

1. The level of mathematics teachers' awareness of the cognitive objectives of ninth-grade mathematics is appropriate.
2. The level of mathematics teachers' awareness of the psychomotor objectives of ninth-grade mathematics is appropriate.
3. The level of mathematics teachers' awareness of the affective objectives of ninth-grade mathematics is appropriate.

Methodology

This research is applied in terms of purpose and descriptive survey in terms of data collection method. In terms of time dimension, it is considered cross-sectional, as the data were collected during the 2024–2025 academic year. This method was selected due to the nature of the research, which aims to "measure" and "describe" the level of teachers' awareness.

The statistical population of this study consists of all ninth-grade mathematics teachers in Delfan City during the 2024–2025 academic year. According to inquiries from the District Education Office, their number is 40. Given that the statistical population was limited and accessible, the census method was employed, and 38 teachers agreed to participate in the study and responded to the questionnaire. The rationale for this selection was the small size of the statistical population and the objective of the research, which was to accurately generalize the findings to the entire target population.

Instrument

In the present study, a questionnaire was used as the instrument to measure teachers' awareness of the educational objectives of ninth-grade mathematics. The questionnaire was researcher-developed and designed to assess teachers' awareness of the educational objectives of ninth-grade mathematics based on the three domains: cognitive, psychomotor, and affective.

Result

According to the data, regarding female teachers' awareness of the cognitive objectives of the ninth-grade mathematics textbook, approximately 77% is at an acceptable level or above, while 23% is at a low level. For male teachers, this figure is about 96% at an acceptable level or above, and 4% at a low level.

Regarding female teachers' awareness of the psychomotor objectives of the ninth-grade mathematics textbook, approximately 92% is at an acceptable level or above, and 8% is at a low level. For male teachers, this figure is about 88% at an acceptable level or above, and 12% at a low level.

Table 1. Independent t-test for comparing male and female teachers' awareness of cognitive, psychomotor, affective, and total educational objectives

Variable	Degrees of Freedom	Significance (p-value)	t-statistic	Mean Difference
Cognitive objectives	21.761	0.188	-1.359	-0.22178
Psychomotor objectives	25.777	0.699	0.391	0.05129
Affective objectives	35.560	0.417	-0.821	-0.09123
Educational objectives	27.992	0.517	-0.656	-0.07785

According to the data in Table (1), the significance values (p-values) for cognitive objectives is 0.188, for psychomotor objectives is 0.699, for affective objectives is 0.417, and for total educational objectives is 0.517. In all four cases, the p-value exceeds 0.05. Therefore, the difference in mean awareness between male and female teacher groups regarding cognitive, psychomotor, and affective objectives, and overall educational objectives for ninth-grade mathematics, is not statistically significant. In other words, it can be stated that there is virtually no difference between male and female teachers in their level of awareness of the aforementioned objectives.

Discussion

This study was conducted with the aim of investigating the level of awareness among mathematics teachers in Delfan City regarding the educational objectives of ninth-grade mathematics for teaching in emergency situations. The findings indicate that, overall, teachers' awareness of the educational objectives is at a desirable level.

1. **Cognitive objectives:** The findings revealed that 89% of teachers demonstrated acceptable or higher awareness in this domain. The mean awareness score (3.57) was significantly above the average level, indicating teachers' adequate knowledge of the cognitive objectives of the textbook.
2. **Psychomotor objectives:** In this domain, 89% of teachers also exhibited acceptable or higher awareness. The mean awareness score (3.54) was significantly above the average level, reflecting teachers' readiness to design appropriate instruction aligned with the psychomotor objectives.

3. **Affective objectives:** Although 74% of teachers possessed acceptable awareness in this domain, this percentage was lower compared to the other two domains. The mean awareness score (3.38), while above the average level, was evaluated as weaker relative to the other domains.

According to the Friedman test, the ranking of teachers' awareness levels is as follows: cognitive objectives (mean rank = 2.21), psychomotor objectives (mean rank = 2.12), and affective objectives (mean rank = 1.67). This result indicates less attention to affective objectives compared to the other two domains.

Although mathematics teachers in Delfan City generally possess acceptable awareness of the educational objectives of the ninth-grade mathematics textbook, insufficient attention to affective objectives may lead to student demotivation and reduced instructional effectiveness. This study emphasizes the necessity of conducting teacher empowerment courses with a focus on affective objectives and strategies for achieving them in virtual education settings. Based on the above results, it is recommended to hold educational workshops on the importance and methods of realizing affective objectives, revise in-service teacher training programs with an emphasis on virtual education, and conduct similar research in other regions and educational levels.

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Ethical Considerations

All ethical principles have been observed in this article. Participants were informed of the purpose of the study and the implementation procedures. They were also assured of the confidentiality of their information.

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Conflict of Interest

According to the authors, this article has no conflict of interest.

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