Migration Letters

Volume: 21, No: S13 (2024), pp. 231-244

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)

www.migrationletters.com

Measuring The Level Of Shyness Among Pre-Service General Education Mathematics Teachers

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Abstract:

This study aimed to identify the level of shyness among general education teachers in the pre-service stage, as the sample included (240) mathematics teachers. The purposive sample was chosen. The indications of content validity, which represented (80%), and the indications of internal construct validity, which measure the extent to which the item score is related to the total score of the scale among members of the study sample, were verified, where the value (0.30) is[1] considered a criterion for distinguishing the item and its belonging to the scale. The reliability significance was also verified using Cronbach alpha, which reached (0.919).

The results also showed that there is an average level of shyness among mathematics teachers in general education in the pre-service stage in the Kingdom of Saudi Arabia, where the arithmetic mean for the level of shyness was (2.81) and a standard deviation (0.96), and the results showed that there were statistically significant differences at (α≥ 0.05) in the level of shyness among mathematics teachers in general education in the pre-service stage due to the age variable, and the differences in the level of shyness were in favor of teachers of the age group (25 years and younger). There are also no statistically significant differences at (α≥0.05) in the level of shyness among mathematics teachers in general education in the pre-service stage due to the years of experience variable.

The study recommends training teachers on ways to modify behavior to face challenges within the classroom environment, as well as conducting further studies and research related to emotional and behavioral disorders in mathematics teachers.

Keywords: *Shyness, Primary stage, Secondary stage, Mathematics.*

Introduction

Given the position that teachers hold in the educational system, the learning and teaching process plays a crucial role in the tremendous cognitive and technological development that is occurring today. The most significant benefit of this development is the ongoing improvement of teacher preparation programs, which raises the bar for teachers and equips them with the experiences necessary to carry out distinguished educational work in the classroom. The current research will discuss the level of shyness among pre-service general education mathematics teachers.

Research Problem

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It is believed that there is a unique quality to the way mathematics is taught, especially in the interactions between teachers and students. However, the application of a pre-service learning system contributes to teacher development. The study's problem was formulated in the following main question:

- What is the level of measurement of shyness among mathematics teachers in general education in the pre-service stage?

The following sub-questions arise from the research problem, which deals with the psychometric properties:

1- What is the level of shyness among mathematics teachers in general education in the pre-service stage?
2- Are there statistically significant differences ($\alpha \geq 0.05$) in the level of shyness among mathematics teachers in general education in the pre-service stage due to the age variable?
3- Are there statistically significant differences ($\alpha \geq 0.05$) in the level of shyness among mathematics teachers in general education in the pre-service stage due to the years of experience variable?

Research Importance

First: The theoretical importance of this research lies in:

- Stirring interest in knowing shyness disorders among mathematics teachers.
- Raising interest in the extent to which teachers possess communication skills in the teaching process in front of students.

Second: The practical importance:

- Identifying the concept of shyness among teachers.
- Enriching the field of mathematics teaching and its relationship to levels of shyness.
- Identifying the problems of teaching mathematics among teachers.
- Benefiting from the results of this study in making appropriate decisions in teacher preparation.

Research Goals

Investigating the extent of the emotional level of shyness among teachers in public education in the Kingdom of Saudi Arabia.

Research Justification

- The paucity of Saudi research on the subject of shyness and mathematics instruction.
- The lack of Saudi studies that focus on emotional problems, such as shyness in the teaching process among mathematics teachers.

Research Limitations:

Research limits include the following:

- **Age limits:** The application of this study was limited to teachers.
- **Spatial limits:** The application of this study was limited to the Kingdom of Saudi Arabia (the eastern and central regions).
- **Temporal limits:** Data collection for this study occurred during the 2023/2024 academic year.

Research Delimitations

The small sample size that was examined affected the findings, and the researcher could not locate and access further cases within the Kingdom of Saudi Arabia.

Definitions of Terms

1- Shyness: It is a sensation of disorientation, unease, and social anxiety. It gives the impression that a person is flawed, unloved by others, and powerless to make amends.

2- Pre-service stage: Before taking on any teaching duties, trainee instructors undergo instruction and training in this setting.

3- Mathematics: A set of abstract knowledge resulting from logical deductions applied to various mathematical objects, such as sets, numbers, shapes, structures, and transformations. Mathematics is also concerned with the study of topics such as quantity, structure, space, and change. There is not yet an agreed-upon general definition of the term.

Theoretical framework and Previous studies

Math teachers who are shy are confused in the classroom, especially for their lack of expertise and understanding of pupils' psychological traits.

First: Literature Review

First : Shyness among mathematics teachers

In the education sector, pre-service math teachers frequently experience anxiety and shyness due to a variety of factors related to their university teaching methods, such as a lack of teaching experience, student confrontations, and ignorance of the psychological aspects of education that can have a negative impact on the process. Teaching and learning.

A previous study on mathematics-related shyness and anxiety in teachers (Dreger, Aiken, 1957) confirmed that these topics have been researched since number anxiety among college mathematics students was recognized as an emotional syndrome and disorder in the late 1950s. Math-related emotions include anxiety and tension, which makes it difficult to finish math problems. As an emotional syndrome and disorder. Having mathematics includes feelings of stress and fear that hinder the ability to complete mathematics.

According to (Tobias,1978) mathematics anxiety is a condition that prevents a person from solving mathematical problems and is characterized by panic, immobility, and mental turmoil. Competent and self-assured adults experienced these emotions. However, (Ho, Senturk, Lam, Zimmer, Hong, Okamoto, Wang, 2000) contend that besides emotional responses to mathematics as a subject of study, mathematics anxiety also involves physiological and cognitive components.

According to (Uusimaki, Nason, 2004), attitudes, beliefs, topic knowledge, and preferred learning styles in mathematics are among the cognitive elements that influence the anxiety of aspiring primary math instructors. According to (Cooke, Hurst, 2012), pre-service math teachers who are shy and apprehensive are more likely to have unfavorable attitudes and ideas about the subject of mathematics. Additionally, (Novak, Tassell, 2017) attest to the reality of mathematical misconceptions. inadequate mathematical reasoning abilities and inadequate spatial reasoning abilities. The occurrence of low confidence in their capacity to teach mathematics is also confirmed by (Haciomeroglu, 2013).

While math fear can persist throughout high school and beyond, (Bekdemir, 2010) contends that classroom experiences have the greatest environmental impact on arithmetic anxiety and shyness, beginning in the early school years.

Three categories can be used to categorize the reasons for anxiety and shyness in mathematics, according to (Trujillo, Hadfield, 1999): intellectual, environmental, and personality factors. Personal issues include low self-esteem, shyness, and the perception that mathematics is a field best left to men for girls. Environmental influences include bad school experiences, demands from parents, insensitive teachers, and the traditional approach to teaching mathematics, which emphasizes memorization of formulas, laborious calculations, and number manipulation. According to (Idris, 2006), intellectual issues include teaching with learning styles that are mismatched, attitudes held by students and teachers, a lack of perseverance, a lack of confidence in one's mathematical competence, and a lack of perception of the benefits of mathematics. High emotionality is seen favorably on tests when the person retains a high degree of self-confidence in their performance, according to (Cassady, Johnson, 2002).

Second: Pre-service mathematics education

There are various facets of the teacher that are connected to the significance of teaching mathematics. The child's instruction in mathematics is parallel to the process of effective communication with that group because he is aware of the abilities required to teach the early and secondary stages. These skills are analogous to the language that a child learns to communicate with society.

Both (AITSL, 2019a, 2019b) suggest that there are crucial prerequisites before service in order to teach mathematics. At both the primary and secondary levels, educators need to make sure that they have a solid grasp of mathematics and practice it. Testing (pre-service teachers, PST), passing a series of unit tasks in mathematics education, measuring overall teacher performance, and lastly, reading and numeracy assessments for beginning teacher education prior to instructors graduating are all required. Graduate teachers must complete a demanding teacher registration process in their first year of teaching in order to demonstrate that they meet the requirements set by the teaching profession body in each state of Victoria and the Australian Institute for Teaching and School Leadership (AITSL).

According to (Itter, Myers, 2017) report that pre-service elementary teachers frequently exhibit negative or ambivalent attitudes toward mathematics and typically suffer higher levels of mathematics anxiety than other college students.

Therefore, (Gleason, 2013) asserts that anxiety about mathematics may contribute to the lack of sufficient confidence and mathematical understanding to be effective teachers of mathematics (pre-service primary teachers, PST).

In teaching mathematics, anxiety and shyness are therefore described as "a feeling of tension or fear towards mathematics-related activities" by (Ashcraft, 2002). Furthermore, he claims that "feelings of discomfort and shame in oneself and in front of others, and anxiety when thinking about mathematics or completion of mathematical tasks" are characteristics of mathematics anxiety. This avoidance of mathematics is a major obstacle to the teaching of mathematics in the classroom.

Second: Previous studies

Conducted (Sanders, Nielsen, McPhail, Forrester, 2019) conducted a study entitled “Maths anxious pre-service teachers’ perspectives of ‘doing’ mathematics in a whiteboard room” that aimed to find out anxiety about teaching mathematics, which is considered common among primary school teachers. Pre-service students, many of whom experience higher levels of math anxiety than other college students. This study asks the following question: What are anxious

pre-service mathematics teachers' perspectives on "doing" mathematics in the whiteboard room? The Abbreviated Mathematics Anxiety Rating Scale (A-MARS) was used to identify high, moderate, and low levels of mathematics anxiety in a group of first-year pre-service teachers (N = 196). Semi-structured interviews (n=6) explored perspectives analyzed through Vygotsky's sociocultural dimensions of personality and personality, as well as the physical environment of the blackboard room. The results showed:

- Performing calculations in the classroom using the whiteboard was positive and attractive for the participants because the room provided positive interactions between people and promoted an attractive learning environment that worked to alleviate their anxiety about mathematics.

And (Peker, 2009) conducted a study entitled "Pre-service teachers' teaching anxiety about mathematics and their learning styles" that aimed to identify differences in anxiety and teaching shyness among pre-service teachers in mathematics according to their preferences for a learning style. The sample included (506) pre-service teachers participating in this study. Among the total, there were (205) pre-service primary school teachers, (173) pre-service primary mathematics teachers, and (128) pre-service secondary mathematics teachers. The researcher used two types of tools: the Learning Style Inventory (LSI) and the Mathematics Teaching Anxiety Scale (MATAS). The LSI identified participants' preferred learning styles: divergent, assimilating, convergent, and accommodating. (MATAS) found the level of anxiety among participants in teaching mathematics. The researcher used a one-way analysis of variance (α=0.05) to analyze the data. The results showed:

- There are statistically significant differences in mathematics teaching anxiety between convergent learners and the other three types of learners: divergent, adaptive, and absorbing. The difference was in favor of close learners. Convergent learners had less mathematics teaching anxiety than other types of learners.

- Divergent learners showed the highest level of anxiety and shyness in teaching mathematics.

And (Ersozlu, Blake, Usak, Hawken, 2022) conducted a study entitled "Addressing Preservice Teacher's Reasons for Mathematics and Test Anxiety" which aimed to identify different perspectives on anxiety, stress, and shyness regarding teaching mathematics. Especially among pre-service teachers, the sample included (39) teachers who joined Victoria State University from various teacher education programs in the school or college of education. The age range was wide as (28%) of the participants were between (24-29) and (13%) of them were between (18-23, 30-35, 36-40, 41-46) years old, and (20%) of them were over (46) years old. The results showed:

- (80%) of the teachers have a desire to teach after graduation, while (12%) of them have not decided yet and (2%) are not interested in teaching at all.
- There is a negative correlation (close to the average level) between mathematics teachers' perceived anxiety, tension, shyness, and knowledge of mathematical content.
- There are high problems with the teaching content.

And A study the importance of culture among pre-service teachers, (Özcan, Bahadır, 2023) conducted a study entitled "Opinions of mathematics teachers and pre-service teachers about the relationship between mathematics and culture" which aimed to determine the relationship between (mathematics and culture). The research seeks to identify the perspectives of

mathematics teachers and teacher candidates on the relationship between (mathematics and culture), and is important to contribute to the field literature on ethnic mathematics and cultural mathematics. The sample included (34) mathematics teacher candidates who had taken the "Mathematics and Culture" course and (32) mathematics teachers actively working in various fields. A form consisting of (4) open-ended questions was used. The qualitative data obtained from the answers to these questions were evaluated through content analysis. The results showed:
- It appears that teachers and teacher candidates know ways to recognize cultural and intercultural attitudes and that teacher candidates who are not aware of these attitudes are more likely than teachers to be.

Both teachers and teacher candidates see cultural diversity as a positive and beneficial privilege that can develop individuals socially and individually. When asked about the contributions of cultural diversity to mathematics education, they agreed that both teachers and teacher candidates would develop students socially, increase course efficiency, provide lasting and meaningful learning, develop the mind individually, and create a rich perspective. Teachers had more negative thoughts about the impact of cultural diversity in their classrooms on mathematics instruction than teacher candidates did.

And (Uusimaki, 2004) conducted a study entitled "Addressing Preservice Student Teachers' Negative Beliefs and Anxieties About Mathematics" which aimed to identify whether it is possible to change pre-service teachers' negative beliefs and fears about mathematics so that they can perceive mathematics as a creative subject. The sample included (16) primary education teachers who were obsessed with mathematics in open-ended collaborative mathematical activities and lectures using the computer. The results showed:
- Teachers demonstrated a better understanding of the changes that need to occur in pre-service mathematics education programs, in order to improve perceptions of mathematics among pre-service students interested in mathematics and, subsequently, primary mathematics teachers.

Methods and Procedures
This chapter deals with a presentation of the study methodology in terms of the study population, study sample, study tools, and statistical treatment.

Research approach:
The study approach is the method used to achieve the desired goals, and in the current study, the descriptive approach was relied upon to suit the purposes of the study related to measuring the level of shyness among mathematics teachers' education in the pre-service stage.

Population and Sampling
All aspiring primary and secondary math instructors in the Kingdom of Saudi Arabia, particularly in the Dammam area, made up the study population. Because math teachers are required to have just math-related educational experience, this demographic is quite limited.

Sample
Using the selection table as a guide, the study sample of (240) researchers was purposefully chosen from the study population (Krejcie, Morgan, 1970; Sekeran, Bougie, 2010). The study instrument was electronically disseminated to the sample participants via an electronic link and Google Survey software: It was possible to retrieve 100% of the questionnaires that were distributed.

Table (1) shows the demographic characteristics of the study sample members by age and years of experience.

Table 1. Table (1) Distribution of study sample members according to demographic variables

variable	Frequency	Ratio
Age		
25 years and less	132	55.0
Older than 25 years	108	45.0
Total	240	100.0
Years of Experience		
One year or less	108	45.0
More than a year	132	55.0
Total	240	100.0

The study tools

The study scale was developed from two parts, which are as follows:

- The first part includes demographic information, consisting of age and years of experience.
- The second part which includes items on the study scale, which attempts to reach the level of shyness among mathematics teachers' education in the pre-service stage, and consists of (7) items.

Validity of study tools:

It is necessary that the measurement tools be valid to measure what they were designed for, and here this must be verified through some procedures related to validity, which were verified in two ways:

1- Content veracity:

Following the preparation of the first version of the study tools, (6 arbitrators) with expertise in the curriculum specialty were asked to evaluate them and provide their opinions on the sincerity of the content, the statements' applicability to the scale, and their ability to measure the intended objectives. They were also asked to confirm that the paragraphs' phrasing and relationship to the dimensions were clear. With an (80%) criterion to show the item's validity, changes were suggested in response to the experts' (arbitrators') feedback. The scale's composition changed to seven items once the changes were made, which indicates the apparent validity of the tool.

2- Construct validity:

The internal construct validity was verified by measuring the correlation of the item score with the total score of the scale among members of the study sample, where the value (0.30) is considered a criterion for distinguishing the item, its belonging to the scale, and that it measures what it was designed for, and Table (2) shows these results:

Table (2) Correlation coefficients of the item with the total score of the study scale

The level of shyness among mathematics teachers	
Paragraph number	**Correlation coefficient with the total score**
1	.853**
2	.791**
3	.882**
4	.869**
5	.834**
6	.815**
7	.705**

**: A function at the significance level (0.05)

Table (2) shows that the values of the correlation coefficients between the scale items and the total score were higher than (0.30), which is the acceptable value for distinguishing the items. This indicates that all the items measure the same characteristic effectively, which confirms the validity of the internal structure of the study scale, and thus is formed. The scale consists of (7) items.

Reliability Study Tools:

To calculate the Reliability of the study tool, we relied on the use of the Cronbach Alpha test, as it is noted that the Cronbach Alpha value for the seven items of the study scale and at (n 240) = (0.919), which is an acceptable value for the study, and the Reliability coefficients show the extent to which the responses of the study sample members agree with each other. In the paragraph and the field where Reliability coefficients that are less than (0.60) are unacceptable, Reliability coefficients that range between (0.60 - 0.70) are acceptable, Reliability coefficients that range between (0.70 - 0.80) are good, and Reliability coefficients that range from (0.70 - 0.80) are good. Ranging between (0.80 - 0.90) is excellent, and reliability coefficients that are close to (1.00) are very strong.

Degree of judgment on the paragraph:

It was taken into account that the five-point Likert scale was graded: strongly agree = 5, agree = 4, sometimes = 3, no = disagree, strongly disagree), and three levels of agreement were reached on the five-point Likert scale based on the following equation:

The upper value – the lower value of the answer alternatives divided by the number of levels, i.e.:

$\frac{(5-1)}{3} = \frac{4}{3} = 1.33$ This value is equal to the length of the category.

Thus, the low level is from 1.00 to less than 2.33, the medium level is from 2.34 to less than 3.67, and the high level is from 3.68-5.00.

Study Procedures

One of the most crucial steps in conducting a study is developing the study procedures. This study involved reviewing earlier research on the topic of the study, which focused on the degree of shyness among pre-service mathematics teachers, in order to draw insights from certain studies. In addition to having a panel of experts evaluate the scale and suggest changes based on their observations, prior research and the use of measurement instruments from other prior studies are utilized to construct the scale items in a way that aligns with the research questions.

After the scale was constructed, the researcher distributed the study tool to the study sample members electronically. During this process, the researcher clarified certain aspects of the study, explained its goals and the significance of the research for science, and emphasized the importance of handling measurement tools with seriousness and accuracy. The sample members were identified, and then the proper statistical analysis techniques were used to extract and discuss the data.

Statistical treatment

The study adopted the program (SPSS Version - 23) to analyze the data and extract the results, where some descriptive statistics methods were addressed, such as calculating frequencies and percentages to identify the demographic characteristics of the study sample members and extracting the values of correlation coefficients using the (Pearson Correlation) test to verify the validity of the data. The internal structure of the study tool, in addition to using Cronbach's Alpha test to verify the stability of the tool. The study also touched on extracting arithmetic means and standard deviations to verify the level of responses of the study sample members to the scale items and the total score, in addition to using (Independent Samples T-test) to identify the significance of the differences in the level of shyness among mathematics teachers in general education in the pre-service stage is attributed to the demographic variables among the participants.

Study variables:

The study included independent variables related to demographic data:
- The age.
- Years of Experience.

The study also included independent variables related to teachers' demographic data:
- The level of shyness among mathematics teachers in general education in the pre-service stage.

Results and Discussion

The study's findings were sorted into the following categories:

The First question: What is the level of shyness among mathematics teachers in general education in the pre-service stage?

Arithmetic means and standard deviations were calculated to verify the level of shyness among mathematics teachers in general education in the pre-service stage, from the point of view of the participants, and the following table (3) shows this.

Table (3) The level of shyness items among pre-service general education mathematics teachers, arranged in descending order according to the arithmetic mean

No	Paragraph	Arithmetic Mean	Standard Deviation	Rank	Level
7	My academic studies at university were weak, so it had a bad impact on my educational processes	3.45	1.09	1	Middle
6	I feel ashamed when I make mistakes while doing easy math tasks	3.15	1.07	2	Middle

2	I feel shy while teaching mathematics in the classroom	2.77	1.34	3	Middle
3	When others see my performance in mathematics, I would like to become invisible because I feel ashamed	2.68	1.16	4	Middle
1	When I calculate something in front of others, I feel nervous because I am ashamed of my athletic abilities.	2.59	1.19	5	Middle
5	I avoid doing math tasks in front of others. Because I am ashamed of my ability to teach mathematics	2.55	1.15	6	Middle
4	I feel ashamed that I am not good enough at mathematics as I would like to be	2.46	1.17	7	Middle
	Total	2.81	0.96		Middle

Table (3) show that the is a moderate level of shyness among mathematics teachers in general education at the pre-service stage in the Kingdom of Saudi Arabia. It was shown from the results that the arithmetic means of the level of shyness reached (2.81) and a standard deviation of (0.96). The highest degree of shyness among this category of participants was represented by the paragraph that states, "My academic studies at the university were weak, so it had a bad impact on the educational processes." With a moderate degree, it had a mean (3.45) and a standard deviation (1.09), followed by the paragraph that expresses shyness is related to "I feel ashamed when I make mistakes while doing easy tasks in mathematics" with a mean (3.15) and standard deviation (1.07), and then came the shyness related to "I feel shy while teaching mathematics in the classroom" and also at an average level. It had an arithmetic mean of (2.77) and a standard deviation of (1.34).

In the last place was shyness, represented by the item that stated, "I feel ashamed because I am not good enough at mathematics as I would like to be," with an arithmetic mean (2.46) and standard deviation (1.17). In the penultimate place came shyness, represented by "I avoid doing arithmetic tasks." In front of others, because I am ashamed of my ability to teach mathematics) with a mean (2.55) and standard deviation (1.15) and also at an average level.

It is noted from the results that the values of standard deviations are higher than the value (1.00) in all items of the tool, and this indicates a high level of dispersion in the responses of the study sample members, which shows that there is a difference in the degrees of agreement and disagreement with the items of the study tool at the same time.

The Second question: Are there statistically significant differences ($\alpha \geq 0.05$) in the level of shyness among mathematics teachers in general education in the pre-service stage due to the age variable?

Arithmetic means and standard deviations were calculated and the Independent Samples T-test was used to identify the significance of the differences in the level of shyness among mathematics teachers in general education in the pre-service stage due to the age variable, and are shown in the following table (4):

Table (4) Independent Samples T-test to identify the significance of the differences in the level of shyness among mathematics teachers in general education in the pre-service stage due to the age variable.

Source of variance	Age	Number	Arithmetic Mean	Arithmetic Mean	Degrees of Freedom	Value (t)	Statistical significance
shyness	25 years and less	132	2.97	0.97	238	2.855	*0.005
	Older than 25 years	108	2.62	0.92			

*: A function at the significance level (0.05).

Table (4) show that the level of shyness among mathematics teachers in general education in the pre-service stage, aged (25 years and under), reached (2.97) with a standard deviation of (0.97), and the level of shyness reached the level of the other category of teachers who Their age (over 25 years) was (2.62) with a standard deviation of (0.92), and the value of the t-statistic was (2.855), which is a value higher than (1.96), and with a statistical significance of less than (0.05), which indicates the presence of significant differences. A statistic of ($\alpha \geq 0.05$) on the level of shyness among mathematics teachers in general education in the pre-service stage is due to the age variable, and the differences in the level of shyness were in favor of teachers from the age group (25 years and younger).

The Third question: Are there statistically significant differences ($\alpha \geq 0.05$) in the level of shyness among mathematics teachers in general education in the pre-service stage due to the years of experience variable?

Arithmetic means and standard deviations were calculated and the Independent Samples T-test was used to identify the significance of the differences in the level of shyness among mathematics teachers in general education in the pre-service stage due to the years of experience variable, and are shown in the following table (5):

Table (5) Independent Samples T-test to identify the significance of differences in the level of shyness among mathematics teachers in general education in the pre-service stage due to the variable years of experience

Source of variance	years of experience	Number	Arithmetic Mean	Arithmetic Mean	Degrees of Freedom	Value (t)	Statistical significance
shyness	One year or less	108	2.89	0.97	238	1.264	0.208
	More than a year	132	2.74	0.95			

*: A function at the significance level (0.05).

Table (5) show that level of shyness among mathematics teachers in general education in the pre-service stage with practical experience (one year or less) reached (2.89) and a standard deviation of (0.97), and the level of shyness reached the level of the other category of teachers who Their experience (more than one year) was (2.74) with a standard deviation of (0.95), and

the value of the t-statistic was (1.264), which is a value less than (1.96), and with a statistical significance higher than (0.05), which indicates that there are no significant differences. A statistic at (α≥0.05) on the level of shyness among mathematics teachers in general education in the pre-service stage is due to the years of experience variable, and the differences between the values of the arithmetic averages did not reach the level of statistical significance.

Discussion

1- What is the level of shyness among mathematics teachers in general education in the pre-service stage?

The results of the study showed that there is an average level of shyness among mathematics teachers' education at the pre-service stage in the Kingdom of Saudi Arabia, where the arithmetic mean of the level of shyness was (2.81) and a standard deviation of (0.96). The paragraph represented the highest levels of shyness among this category of participants and states, "My academic studies at the university were weak, so it had a bad impact on educational processes." It had a moderate degree; it had a mean of (3.45) and a standard deviation of (1.09), followed by the paragraph that expresses shyness in relation to "I feel shy when "I make mistakes while doing easy tasks in mathematics" with a mean of (3.15) and a standard deviation of (1.07), and then the shyness related to "I feel shy while teaching mathematics in the classroom" came at an average level as well, as it had a mean of (2.77) and a standard deviation of (1.34). In the last place was shyness, represented by the item that stated, "I feel ashamed because I am not good enough at mathematics as I would like to be," with an arithmetic mean (2.46) and standard deviation (1.17). In the penultimate place came shyness, represented by "I avoid doing arithmetic tasks." (in front of others, because I am ashamed of my ability to teach mathematics) with a mean (2.55) and standard deviation (1.15) and also at an average level.

- The results of the study agreed with (Sanders, Nielsen, McPhail, Forrester, 2019) that performing calculations in the classroom using a whiteboard was positive and engaging for participants because the room provided positive interpersonal interactions and promoted an attractive learning environment that worked to reduce mathematics anxiety. I also agreed with (Ersozlu, Blake, Usak, Hawken, 2022) that the level was moderate between anxiety, tension, and perceived shyness of mathematics teachers and knowledge of mathematical content.

The researcher's interpretation: An average level resulted from teachers' lack of experience teaching mathematics, particularly in applying and understanding mathematical skills, communication strategies, and learning emotional intelligence. This shows that the teacher's university preparation was deficient in educational experiences.

2- Are there statistically significant differences (α≥0.05) in the level of shyness among mathematics teachers in general education in the pre-service stage due to the age variable?

The results of the study showed that the level of shyness among mathematics teachers in general education in the pre-service stage who were (25 years old and younger) reached (2.97) and a standard deviation of (0.97), and the level of shyness reached the level of the other category of teachers who were (older than 25 years old) was (2.62) with a standard deviation of (0.92), and the value of the t-statistic was (2.855), which is a value higher than (1.96), and with a statistical significance less than (0.05), which indicates the presence of statistically significant differences at (α≥0.05). The level of shyness among mathematics teachers in general education in the pre-service stage is attributed to the age variable, and the differences in the level of shyness were in favor of teachers from the age group (25 years and younger).

- The results of the study agreed with (Uusimaki, 2004) which showed teachers had a better understanding of the changes that need to occur in pre-service mathematics education programs, in order to improve perceptions about mathematics among pre-service education students interested in mathematics and subsequently primary mathematics teachers.

Researcher's interpretation: Teachers' age range is regarded as significant. The educational and cultural competencies of math teachers grow with age, as do their talents, capacities, and knowledge of communication techniques. These factors lessen confrontational shyness and boost self-confidence and self-esteem.

3- Are there statistically significant differences (α≥0.05) in the level of shyness among mathematics teachers in general education in the pre-service stage due to the years of experience variable?

The results of the study showed that the level of shyness among mathematics teachers in general education in the pre-service stage with practical experience (one year or less) was (2.89) and a standard deviation of (0.97), and the level of shyness was for the other category of teachers whose experience was (more than one year) (2.74) with a standard deviation of (0.95), and the value of the t-statistic was (1.264), which is a value lower than (1.96), and with a statistical significance higher than (0.05), which indicates that there are no statistically significant differences at (α≥0.05) The level of shyness among mathematics teachers in general education in the pre-service stage is attributed to the variable of years of experience, and the differences between the values of the arithmetic averages did not reach the level of statistical significance.

- The results of the study disagreed with (Peker, 2009) that there are statistically significant differences in mathematics teaching anxiety between convergent learners and the other three types of learners: divergent, adaptive, and absorbing. The difference was in favor of the close learners, and the divergent learners showed the highest level of anxiety and shyness in teaching mathematics. I also disagreed with (Özcan, Bahadır, 2023), which shows that teachers and teacher candidates know ways to recognize cultural and intercultural attitudes and that teacher candidates who are not aware of these attitudes are more likely than teachers, and teachers have more negative thoughts about the reflection of cultural diversity in their classrooms and teach mathematics to teacher candidates.

The researcher's interpretation: Since mathematics requires a wide range of interactions, technological and knowledge advancements have made it easier to access a wealth of information, particularly regarding teaching techniques. This could improve the quality of instruction and put newly graduated math teachers on par with more experienced educators in terms of scientific standing.

Recommendations:

- Educational recommendations:
  - Developing the preparation of mathematics teachers with emotional aspects.
  - Train teachers on methods of modifying behavior to face challenges within the classroom environment.

- Suggestions for research purposes.
  - Conduct more studies and research related to the emotional and behavioral disorders of mathematics teachers.
  - Conduct more studies and research related to the stages of pre-service teacher preparation.

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