

How could I reduce my student anxiety about evaluating mathematics by mixed-method research?

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Abstract

Objective: This research has been applied in terms of purpose and descriptive in terms of method of action research.

Method: The method of collecting information was using a new approach of combined research method. The research site was one of the elementary schools in Birjand in the academic year 2014-2015. The research sample was selected by purposeful sampling method. In this research, after proving the existence of anxiety and anxiety of the sixth-grade student in the evaluation of math lesson, using scientifically and creatively collected evidence and information, scientific and creative methods were used to reduce anxiety and anxiety. Research tools included qualitative methods such as peer evaluation, observation and interview with parents, as well as quantitative methods such as Test Anxiety Inventory (TAI) for data collection.

Results: Examining student nutrition status and improving it as one of the most important prerequisites for learning, reviewing fear history in a math lesson by talking to the student himself and his parents, focusing on the principle of substitution fear, helping the student to volunteer in anxious classroom situations, providing a few simple exercises to the student prior to the main assessment in math alarm, asking the student to help students in lower grades in math lesson to establish a self-efficacy anxiety disorder, using cognitive learning, in the process of solving math exercises related to evaluation, the use of relevant evaluation using authentic tasks, the use of amplifiers activity, encouraging based on the lowest level of performance without fear or anxiety in children and the use of self-assessment and peer assessment was.

Conclusion: After implementation of these solutions, the student's anxiety was assessed again with the help of combined research method. The results showed that students' anxiety was reduced in math lessons.

Key words: Action research, Combined approach, Anxiety disorder, Math

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Introduction

General Research

Recognizing learning disorders

The number of students with learning disabilities is reported to be between 4 and 12 percent. The term was originally derived from the term Disabilities of learning, but since the term learning disabilities also included all aspects including physical disabilities, the term learning disabilities was chosen. Such students are those with normal IQs who have all kinds of healthy learning. They are good at verbal and writing skills but poor at math or vice versa. Every year in the country, 85 billion tomans are lost due to the loss of students, but the psychological damage is much higher. The National Advisory Committee on Children with Disabilities (1968) defines learning disabilities as follows: "Children with learning disabilities show disabilities in one or more of the basic psychological processes related to the understanding or use of oral or written language. This disability may be impaired in listening, thinking, speaking, reading, writing, spelling or arithmetic. These disorders are due to cognitive deficits, brain injury, minor impairment of brain function, dyslexia, speech disorders and more. These children 's learning disorders are not problems such as vision, hearing or motor deficits, mental retardation, emotional distress and lack of environmental facilities" (Erfani, 1998).

According to new findings on learning, in 1963 a group of terminology specialists replaced learning disabilities with idioms, since the term disability refers to other terms such as physical or mental disability, that is, disabilities that do not become full-time, It seems and seems to be more appropriate if the term is used in learning disorders and (according to the authors of learning problems) (Tabrizi, 2002: 980).

Fear disorder

Fear is one of the body's natural reactions to dangerous situations. Fear is one of six emotions (anger, hatred, sadness, happiness, surprise, fear) that researchers believe are the main emotions. The excitement of fear causes one to avoid approaching dangerous stimuli and thereby increase their chances of survival, so fear is an adaptive response. Humans are basically born with a thrill of fear, which can easily be seen in a multi-day-old baby. Fear, in addition to the positive aspects it has for human survival, can also have negative aspects. For example, fear of objects, people, or situations that are not inherently intimidating or dangerous can interfere with a person's normal adaptation to the environment and cause problems in their personal lives. Many fears arise at a particular point in time and disappear after some time through one's cognitive development, some fears are neurologically and biologically relevant, and their emergence or elimination is related to human genetic programming, such as fear of wild animals. However, most fears arise in the course of life and in the process of becoming conditioned. At the same time, many fears are morbid and lack adaptation. The subject of fears is different. Fear can arise in response to a particular animal, person, situation, or object. The fears that arise in response to a particular situation can be due to the person's inability to adapt to that environment or the fear of functioning in that situation.

Anxiety Disorder

One of the disorders that may be hidden in one of the main learning disorders that cannot be clearly seen is pre-school anxiety and anxiety disorder. Anger is a psychological and physical distress caused by the overwhelming and important fear. In the dictionary of Dehkhoda the fear is as follows: "Anxiety and fear that make the heart move faster" (Dehkhoda, 1995). Wherever the word "anxiety" is spoken in this research, it is also meant to be anxious.

The difference between fear and anxiety

Fear and anxiety are very similar, but the response to fear is both psychologically and biologically anxious. Anxiety is a future-oriented mood and is accompanied by feelings of anxiety and lack of

control over future events that are threatening. Fear and anxiety both report danger or threat, yet anxiety, unlike fear, is felt even when there is no real danger. Many adolescents report that their fears lead to feelings of helplessness and dramatically disrupt their daily activities (Maki Abadi & Farauddin, 2011; Jahani Quote, 2012). Anxiety is a vague and unpleasant feeling that is often unknown to individuals (Springwell, 2004, quoted by Tahmasebi, 2013).

Anxiety Disorder and Exam Anxiety

Anxiety is one of the negative emotions that play a central role in everyone's life. One of the types of anxiety is exam anxiety or fear perception of any academic evaluation, which is one of the most important aspects of negative motivation and has adverse effects on students' classroom performance. Duss describes exam anxiety as an undesirable feeling or emotional state that individuals experience in formal tests or other evaluation situations (Hill & Wigfield, 1984; Reza Zadeh & Tavakoli, 2009). Although thinking about the origin and meaning of anxiety has been the focus of theologians and philosophers for centuries, it is often said that Freud conducted the first psychological study of anxiety. For Freud, anxiety has three parts, namely the unpleasant character, the discharge or the outflow phenomenon, and the perceptual of the two preceding states. Two types of state and trait anxiety have been identified. State anxiety refers to the feeling of fear and intensification of autonomic nervous system activity that varies widely and varies at different times, but trait anxiety refers to individual differences in their susceptibility to anxiety. Individuals exhibit varying levels of anxiety relative to threatening situations (Ghaffari and Arfeh Baluchi, 2012). In most situations, they become extremely anxious, and a person with low trait anxiety, even in situations that are relatively intimidating, exhibits only a little anxiety (Ball, 1994). Hill and Wigfield (1984) believe that some students experience test anxiety during their elementary and preschool years, when parents consider unrealistic demands or high expectations for their children's performance. Accordingly, parents' negative attitude to the failure of their children, which is contrary to their expectations, causes children to become anxious about evaluation situations for fear of their parents' inappropriate reaction to their performance (Mousavi et al., 2009).

Theoretical structure of the relationship of anxiety, learning and academic performance

Anxiety is an obstacle that can be resolved by other issues. In all cognitive activities including evaluation, anxiety is a little useful, but high anxiety makes solving problems difficult (Saif, 2009: 391). Anxiety is not always harmful. Rather, excessive anxiety reduces learning efficiency.

Operational Test Anxiety Definition

It is a score that the subject receives on the 25-item Anxiety Scale of Abolghasemi et al. (2009) (TAI).

Combined approach to research and data collection

Since both quantitative and qualitative research methods complement each other, the use of both methods leads to deeper research and understanding of research issues. Conducting quantitative and qualitative research is also called a combined method or a mixed method. This is also known as mixed research. Qualitative and quantitative research can complement each other by playing related roles (Gall & Borg & Gall, 1996; Translated by Nasr et al., 2012: 64).

In the present study, data - both in the status quo and in the validation section - were collected using this method.

Background

Aghajan Beigi and Sharifi Dahmadi (2015) in a study entitled Therapeutic Effectiveness on Children Anxiety and Aggression in Children of 5 to 7 years old have concluded that sandbag therapy is effective in decreasing generalized anxiety and separation anxiety in children but effective in reducing communication and verbal aggression in children. is not.

Global (2012) conducted a study on the effectiveness of social skills training on fear reduction in Alborz industrial girls and aimed to investigate the effectiveness of social skills training on fear

reduction in Alborz industrial school girl students. The decrease in fear scores was effective in the subscales of fear of failure and criticism and fear of the unknown. There was also a significant difference between the boys 'and boys' fear scores in all subscales and the overall fear score.

Ghaffari and Araf Baluchi (2012) in a study on the relationship between achievement motivation and academic self-concept with exam anxiety in graduate students of Ferdowsi University of Mashhad with the aim of investigating the relationship between academic achievement motivation and academic self-concept with self-exam and university student anxiety. The results found that the combination of the variables of achievement motivation and academic self-concept can well predict exam anxiety. Also, there was no significant difference between the two groups of male and female students in academic self-concept, achievement motivation, and test anxiety.

Akbari Bourang and Amin Yazdi (2010) found that girls experience significantly higher test anxiety than boys, but Shaeiri et al. (2005) examined the relationship between test anxiety and academic achievement with regard to gender and gender, gender differences, and gender differences. They did not observe test anxiety.

The prosecutor and student researcher (1996, quoted in Tahmasbpour, 2011) conducted a study on some students and concluded that, first, the test anxiety scale was correlated with the factors of other anxiety scales (such as the Cattell scale) and thus the relationship between test anxiety and Anxiety factors of personality were confirmed. Secondly, the level of exam anxiety had a significant effect on the total grade point average of the individual courses and therefore the effect of exam anxiety on academic performance decline was clarified. Third, some anxiety factors had a significant effect on academic achievement. The Cattell Anxiety Scale was used as a standard measure for measuring anxiety levels in this study and measures anxiety symptoms in individuals.

Research findings by Pack Ron et al. (2011) suggest that motivation for achievement is related to learning and academic achievement and to negative thoughts and emotions such as stress, anxiety that lead to performance decline, according to which And they are keen to make progress, have perseverance and effort in all areas, especially in the field of education, and have come up with better solutions to unforeseen issues rather than being affected by negative emotions and thoughts. There are also gender differences in the attribution styles that individuals use for their behaviors, leading to negative emotions such as anxiety in the educational arena.

Studies on gender and anxiety have provided conflicting findings, including Rezazadeh and Tavakoli (2009), Kapell et al. (2005, quoted by Ghaffari and Arfa Baluchi, 2012), Maria and Navo (1990), Karimi, and van Katsen (2009) and Bronsma (2004) found that girls experience higher test anxiety than boys significantly; regarding gender differences in motivation for achievement, girls indicated that girls at all levels of achievement motivated to progress. They are more interested in boys than in boys, and they are interested in different areas and so on The Mathematics, Science and girls interested in poetry and his literary ability and they (the thirty-Gelinak hydrological units and Borg, 2006).

Problem Statement

Life is full of challenges, stresses and problems that need to be resolved. Anxiety is one of the most studied emotions and many theories have been put forward. Theories based on clinical cases have a special place. Anxiety is an emotion that contains helplessness for which there is no definite definite source, but its definition at Oxford is not accompanied by general agreement, and ultimately it is within the general framework of psychoanalytic, learning-behavioral, physiological, cognitive-existential, and Cognitive considerations, and perhaps the best of these theories, are those based on the concept of "uncertainty" (Tahmasebi, 2013).

Basically, every exam has its own excitement and anxiety. All human art is to take the biggest exams with the least amount of anxiety. In general, people do not like to be judged by others. For this reason, whenever one is put to the test, he or she becomes anxious, of course, the anxiety itself is not unusual, but what should be considered an annoying and deterrent factor is the intensity of the overwhelming excitement and anxiety. Attending social gatherings or taking part in various tests

can enhance some people, so one of the important tasks of educators is to focus on the anxiety factor and to take the necessary measures to reduce it among adolescents. Test anxiety can be a state of mind and physical symptoms that include sweating, tingling, shortness of breath, and so on. In the classroom, the problem of anxiety can sometimes reduce learning performance and efficiency and lead to hidden learning in the individual. In this research, the research anxiety of evaluation anxiety in mathematics lesson is presented and scientific and creative solutions are presented.

Importance and necessity of research

Despite the adverse effects of anxiety on students' academic performance and the fact that professional development is a serious issue in primary education, existing research focuses on elementary students and studies on ways to reduce test anxiety. Ignoring students' anxiety problems and justifying it by not mastering or not studying the lesson will reduce the overall self-esteem and lack of real student learning. The result will be that the main cause of students' evaluation scores will be unfairly attributed to their laziness and playfulness, not the main cause of anxiety. This research work has also explored this problem. The target audience for this study is most of the teachers who have problems with student anxiety. Given the similarity of the situation stated in this study and their students, these teachers can use the proposed solutions and, if this situation is similar, generalize the results of the present study to other studies.

Describe the status quo

In the academic year 2014-2015, researcher was teaching at the second, fourth, fifth and sixth grades of primary school in Birjand. An evaluation of the student during the month of September, either in the presence of a problem-solving board or in written tests of mathematics, revealed anxiety and anxiety that reduced her severe performance.

Collection of information (Evidence 1)

In order to collect data to describe the status quo, a combined research approach was used that helped the researcher understand the causes of the problem.

Indicators of the combined research approach

Qualitative indicators of the status quo

To evaluate the student's current status in mathematics lesson evaluation, two methods of peer evaluation and sample evaluation sheet completion and direct and indirect observation of states and behaviors were used, as follows:

Partner Evaluation

Other colleagues were asked to evaluate the student in the math lesson and to complete the evaluation anxiety checklist with regard to appearance symptoms prior to evaluation.

Using direct and indirect observation

Direct and indirect observation of student behavior and speech prior to oral or written tests revealed a state of hopelessness, anxiety and anxiety in his behavior.

Quantitative indicators of the status quo

Numbers and figures can be used to illustrate the status quo in the following quantitative indices:

Using Self-Assessment "Test Anxiety Scale (TAI)"

For this purpose, the Test Anxiety Scale (TAI) of Abolghasemi et al. (1997) was used as a self-assessment. The questionnaire was given to the student and he completed it. The results of this questionnaire showed that he had high test anxiety.

Data Analysis and Interpretation

According to the quantitative and qualitative data collected in this study, the existence of exam anxiety for mathematics lesson compared to other courses, proves the existence of mathematical exam anxiety and the lack of mental retardation of the researchers in this study on the existence of

exam anxiety in elementary school students. Be it. As a result, the solution was presented by studying different books and reviewing the opinions of other colleagues.

Choosing the right solution

After explaining the existence of exam anxiety in the student, the temporary solutions to the action researcher were as follows:

1. Examine the nutritional status of the student and improve it as a prerequisite for learning.
2. Examine the history of fear in math lessons by talking to the student and his or her parents, focusing on the principle of substitution fear and the use of reinforcement substitution principle.
3. Helping the student to voluntarily place himself in anxious situations.
4. Prior to the basic assessment in math, give the student one or two simple exercises to solve.
5. The student was asked to assist students in lower grades for math lessons at the time the relevant courses would eventually lead to teaching or assessment, thereby establishing a conceptual self-efficacy.
6. Applying Cognitive Apprenticeship.
7. Using Vigotsky's private speech in the process of solving math lesson evaluation exercises.
8. Using authentic evaluation using authentic assignments.
9. Using Active Amplifiers.
10. Encouragement based on the lowest level of fearless performance in the student.
11. Use of self-assessment and peer-review.

Implementation of the solutions provided

In this section, Action Researcher describes each of the methods and describes how they are implemented in the same way as above:

- Assessment of student nutrition status and improvement as a prerequisite for learning: Student nutrition is one of the important prerequisites for learning. As long as the body is hungry or thirsty, it will not be able to concentrate on class affairs. Abraham Maslow's hierarchy of needs is categorized into two categories: basic needs and freeways. Basic needs include: Physiological needs, need for security or safety, need for love and belonging, and need for self-esteem or self-respect, extra junctions or needs related to self-actualization or self-realization include things like curiosity, a desire to know, learn, acquire truth, knowledge, experience, perceive beauty and order and harmony (Saif, 2009: 234).
- Investigate the history of fear in math lessons and resolve it by talking to the student and his or her parents regarding the concept of substitution fear and using the principle of substitution reinforcement:

A review of student mathematics history in the past academic year through discussions with parents and the student themselves revealed that mathematical difficulty and its evaluation in relation to the student person, the mathematics scores of other students, and their consequences (such as sending students to school, compensation). In recent years, fear of substitution for mathematics lessons and its evaluation in the student has created fear.

Substitution fear is the acquisition of the emotional response to fear through observation (Saif, 2009: 178). During World War II, for example, it was found that children's fear of silence was transmitted to them through their parents' fears of silence. After the problem was examined in the student, the principle of substitution reinforcement was applied in the classroom. In this way, all students in the math alarm were praised and thanked by the student who answered the math question correctly after evaluating the presence of all students.

- Helped the student voluntarily place himself in anxious situations:

In this regard, the student was helped to reach the big goals by taking small steps. For example, at the beginning of the day, with no scores, daily tests were administered to the student with anxiety. We then turned them into written tests and monthly evaluations.

This educational point is presented in Wolfgang's (1987) Handbook of Educational Psychology. He said: "If your student is anxious to see the exam papers and this anxiety undermines their performance, first take a number of exams daily that you do not score. If you find that their anxiety is reduced and their performance improves, turn daily exams into weekly exams and continue doing so and calculate student scores on exams" (Saif, 2009). We continued the same process for daily evaluations until the student's test anxiety declined over time and came to normal.

- Provide students with one or two simple exercises before solving the basic math test to solve them:

In this solution, the student was asked to solve one or two simple exercises. This was a way to calm him down, and a great deal of student anxiety was present at this stage and would not be transferred to the main evaluation stage.

- The student was asked to assist students in lower grades for math lessons at the time the relevant courses would eventually lead to teaching or assessment, thereby establishing a conceptual self-efficacy.

Ideal self-efficacy is the belief that one can do something successfully (Wolfe, 2004: 319, cited by Seif, 2009: 173). Therefore, with the supervision and evaluation of students from lower grades, students developed a sense of self-confidence, and the student gained the ability to teach and learn for education. This ability and self-esteem reduced the student's anxiety about evaluating mathematics lessons.

- Cognitive Apprenticeships:

Cognitive apprenticeship is intended for learners to engage in learning with real-life tasks and issues while working with more proficient people. Cognitive learning means working with an unskilled learner next to a more skilled learner. Swan (2005) has used the term peripheral partnership for cognitive learning. Using this theme, both sixth-grade students were asked to answer math questions in groups and even some tests. This reduced the student's anxiety about evaluating mathematics lessons.

- Using Vygotsky's private speech in the process of solving math lesson evaluation exercises:

In the socio-cultural theory of Vygotsky's development, talking to children is called private speech. Studies of private speech have shown that children use this type of speech when they are dealing with difficult tasks, when they make a lot of mistakes, or when they do something that is confusing to them (Burke, 1994, quoting Seif, 2009: 97).

The research method also used this scientific theory, and the student was asked to state his or her work process when faced with mathematical questions. Emphasizing complete silence while the student is working on difficult issues may make it more difficult for them (Wolffeld, 1995: 49; cited by Seif, 2009: 97).

- Using authentic evaluation using authentic assignments:

In order to make the assessment more tangible for the student and to be closer to real life, original assignments were used for evaluation. That is, the concepts of sixth grade math were linked to real life problems. In other words, the creation of a "position of reference" was considered in the evaluation. In the reference situation, when a teacher plans a course or evaluation, she hopes that the knowledge and skills that students learn will be useful outside the classroom. This is called a "position return". The reference position refers more to the applicability of the training course. By specifying a reference position, learners' motivation to learn will increase, as they will know where and how their effort will be used as a result (Dios, 1974, quoted by Ahdian, 2008: 60). Genuine assignments are also objective, not symbolic.

- Use of Active Amplifiers:

The activities that children can do can be used as a booster for activities that pay less attention to them (Saif, 2009: 559). In this research activity, when the student in question was interested in an activity such as helping other students or spelling to other students, etc., this interest was used to normalize the process of evaluating mathematics lessons. Was. The student was asked not to be alarmed at the math when going to the board before doing his favorite activity and to calmly solve problems to allow him to do other activities at a later time. After operating this method, we observed a decrease in student anxiety in mathematics and especially in the evaluation of this lesson.

- Encouragement based on the lowest level of fearless performance in the student:

In evaluating a student, she was encouraged by the teacher whenever she achieved the minimum level of learning and provided the correct answer. This greatly increased the student's motivation and reduced his test anxiety.

- Self-assessment and peer-to-peer use:

In addition to the above, in a number of tests the student was asked to self-test and he or she would personally discover his or her mistakes. He was also sometimes asked to evaluate his peer student (peer review). This has led to a reduction in anxiety in addition to the assignment of responsibility by observing another student's anxiety in assessment.

Data gathering (Evidence 2) and interpretation of results obtained after new measures

In order to collect data to evaluate the students' anxiety after the solutions presented, again a combined research approach was used, which the data obtained helped the researcher to understand the changes created after the research measures.

Indicators of the combined research approach

Qualitative indicators of the status quo

To evaluate the current status of the above-mentioned classroom, two methods of peer evaluation and sample evaluation sheet completion and direct and indirect observation of states and behaviors were used, as follows:

Partner Evaluation

Other colleagues were asked to re-evaluate the student in the math lesson and to complete the assessment anxiety checklist with regard to appearance symptoms prior to assessment.

Using direct and indirect observation

By observing the student's behavior and speech prior to the written or oral tests, his or her frustration and anxiety and anxiety were significantly reduced.

Quantitative indicators of the status quo

Numbers and figures were used again to explain the situation after applying the proposed solutions in this section in the form of quantitative indices:

Reusing Self-Evaluation 'Test Anxiety Scale (TAI)' in a New Look with Content Validity

For this purpose, the Test Anxiety Scale (TAI) of Abolghasemi et al. (1997) was used as a self-assessment. For more detailed information, some changes were made to the questionnaire so that the new answers would not be affected by the answers of the previous period. The results of this questionnaire showed that her test anxiety had changed.

Data analysis and interpretation (validation)

Evaluating the quality changes made

In the peer exam anxiety list, which has three subscales of affective and emotional symptoms, behavioral and physiological symptoms, and cognitive symptoms, test anxiety has been decreasing before and after the implementation of new measures.

Evaluation of quantitative changes

Changes in student anxiety test scores decreased from 78 to 49 before and after new measures.

Conclusion

As mentioned, this study was conducted using a combined method of data collection. It was also pointed out that the hybrid method is the result of a combination of quantitative and qualitative research methods. This study also collected data using qualitative methods such as peer evaluation, observation and interview with parents as well as quantitative methods such as the Test Anxiety Questionnaire (TAI) and proved before the research that this problem the student means anxiety and apprehension before evaluating the math lesson. Then scientific and innovative measures were taken to address this problem. These include: examining a student's nutrition status and improving it as a prerequisite for learning, reviewing fear history in a math lesson by talking to the student and his or her parents, focusing on the principle of substitution fear, helping the student volunteer in anxious teaching situations, presenting A few simple exercises for the student prior to the core assessment in math, asking the student to help students in lower grades in mathematics and thus establishing the student's conceptual self-efficacy, using cognitive aptitude, using Vigotsky's private speech in the process of solving exercises. Worth The math, using relevant evaluation using authentic tasks, the use of amplifiers of activity, encouraged by low student performance without apprehension in the use of self-report and peer assessment. After the above-mentioned measures, the student's anxiety was assessed again using quantitative and qualitative methods.

Suggestions

What creates powerful teachers' thoughts and ideas has no rules or educational law, so it is recommended that all teachers dealing with students with apprehension, especially in mathematics, be offered:

1. Never suppress a student's mathematical aptitude and interest in the first evaluation of courses, especially mathematics, or even with a limited number of assessments. Poor assessment results may be due to excessive anxiety that has overshadowed student performance.
2. Consider the reference position and the original assignments for the evaluation of the math lesson.
3. Increase their study of educational problems, under the supervision of experienced teachers and teachers, to ensure that the test anxiety and apprehension are addressed.
4. One of the important conditions for generalizing the results of the present action research - as pointed out in the necessity and importance of the research - is the similarity of other situations with the conditions of this research. Therefore, it is suggested to all teachers to generalize the solutions of this research only when observing similar conditions.

The limitations

The present research action has some limitations during the implementation and during the research process as follows:

- 1- Since one of the research tools has been observation and interviewing, so it has all the weaknesses of observation and interviewing tools such as subjective bias and so on.
2. Another tool of the research was self-assessment questionnaire, so all the weaknesses of the questionnaire in the present study will be obvious, such as how the respondent responds to the questionnaire questions, the moods and emotions of the respondent when answering the questionnaire, and so on.

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