The Effect of Using Electronic Mind Maps on Developing Musical Thinking among Fourth-grade Primary School Students

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Introduction

The rapid development in the field of learning and communication technology has led to the emergence of new innovations, strategies and educational learning applications based on building social knowledge and sharing information, in which learning is characterised by positivity, participation and motivation. This interactive participation is the environment for collaborative learning, where the learning process has become not only a process of acquiring knowledge, but also the construction and development of educational, cultural and pedagogical knowledge, and the sharing between students and linking experiences in previous and future stages. Computer communication technology helps in forming, sharing and building knowledge in a way that suits modern technological development.

The impact of this technological progress has been clearly reflected in the educational process, as new methods and approaches have emerged.

A new educational system that relied on the use of technological innovations to achieve the required learning, and it was

These innovations have a clear impact on the elements of the educational situation, as they have changed the role of the teacher from a transmitter

To know that it facilitates the educational process, it designs the learning environment and monitors the students' levels and progress.

He guides and directs them, and then the role of the learner changes accordingly. He is no longer a passive recipient, but rather an active interactor. Positively, and every student learns according to Self-motivation and change Editing and sharing (Thamer Al-Malah, 2015, 4)

There are many strategies. There are methods that can be followed by the music education teacher, which work to consolidate concepts, theories and practical information in the minds of students and thus use them to increase their achievement . The mind maps strategy is one of the most important strategies . Which achieves this,

and this is what was indicated by the study of Sahar Amin (2012 AD) , as it aimed to employ mind maps as one of the strategies for teaching piano playing, and the results showed that mind maps are a clear and easy way to deal with, whether interpreting or preparing them, and mind maps are also suitable for achieving feedback for students and increasing academic achievement among students.

As indicated by Jacqueline Michel's study (2016 AD) , which aimed to identify the types of maps, a mind map was designed to clarify the mind and its application in the subject of analyzing world music, where the conditions that must be met by the student in order to be able to acquire the skill of analysis, and designing a mind map that clarifies to the student the elements of analysis for any musical score and applying mind maps of thinking No. 3 MinutBach As a model for the proposed concept The research followed the descriptive approach (content analysis) . The results achieved the study 's objectives . (Jacqueline Michel, 2016, p. 102)

And he knew her Hussein Abdel Basset (2014 AD, p. 8) said that it is a free creative visual representation using words, lines, symbols, colors, and images. It consists of branches that branch out from the center for facts, concepts, principles, generalizations, ideas, and relationships included in the educational content . It requires spontaneous thinking when creating it, and the teacher uses it in presenting the content with the aim of helping the student develop learning, thinking, and achievement patterns. The student uses it to summarize, generate, and organize information and ideas in his cognitive structure in a way that facilitates processing and remembering them in the future.

As many previous studies have indicated, such as the study of: Huda bint Muhammad Hussein (2012 AD), the study of Keles . O (2012) , the study of Karlsen . S. (2012) , and the study (2016) S. & Kirino . E. Tanaka , the study of Muhammad Wasif Abdul (2018 AD), the study of Hussein Yaqoub Youssef Al-Najad (2019 AD), and the study of Hussein Mahmoud Hussein Diab (2019 AD), Al-Shammari's study (2014) showed the importance of mind maps in attracting students' attention through

active participation during the teaching process, as they work to activate the brain with the information provided, and this works to develop mental abilities and skills, which leads to increased academic achievement.

Merchie and Van Ker (2012:1388) and Reda (2014) also indicated that mind maps organize ideas, create connections between them, and provide students with the opportunity to analyze, integrate, and synthesize concepts with each other .

Liu et al.'s study (2014, 19) showed that mind maps are cognitive representation tools that reduce students' cognitive load and work to activate memory and remember information easily and clearly .

He sees Maher et al. (2016) quoted from Buzan said that the electronic mind map has great importance for the individual in the following :

- It enables an individual to take a quick, comprehensive look at a large topic or complex issue .
- It enables the individual to plan the routes he will follow or make decisions, and it will make him know where he has been and where he is going .
- Collects large amounts of information in one place .
- Encourage him to solve problems by allowing him to see new methods (Bozen, 2005, 7) .

The stage of musical thinking is the first basic stage, the cornerstone of the educational process, as it is the period in which the first seeds of the child's personality are planted and crystallized, and its features appear in his future life. It is the period in which the child has a clear and sound idea about himself, and a specific concept of himself from all physical, psychological and social aspects, which helps him to live in society and adapt properly to himself . (Jacqueline Michel 2016, p. 67)

Habib (2003) confirms that musical thinking has the ability to activate the mind and leads to overcoming difficult mental tasks such as tests .

In addition to providing flexibility and improving performance, embarrassing and

emergency situations, Cutler (1998) showed that arts-related programs have great importance for the social and cognitive dimensions of students.

Within this framework, the current research seeks to enable fourth-grade primary school students to develop musical thinking using the electronic mind maps strategy.

Research problem :

Through actual reality, as the researcher works in the field of education and teaches music education, and deals with fourth-grade primary school students , and through her visits to several primary schools in Luxor Governorate, she noticed that music education for students does not receive sufficient attention, with some fourth-grade primary school students having shortcomings and weaknesses in cognitive and musical thinking, which led to some students being distracted during the explanation of musical rules and theories and feeling the difficulty of this part. Therefore, the researcher conducted a survey study of some fourth-grade primary school students, where she found that there is a lack of ability to arouse students' interest in the subject of learning, and a lack of students' participation in practicing information included in musical thinking topics and using the mind in using them. This may be due to the lack of use of mental, cognitive, intellectual and mental abilities represented in the use of imagination, pictures, drawings and symbols, which may result in a deficiency in musical thinking .

Therefore, it was necessary to pay attention to using strategies that help to excite students and urge them to develop musical thinking and enable them to participate in preparing the teaching situation with appropriate teaching strategies, as their use works to stimulate and operate the brain for the information provided and develop cognitive, intellectual and mental abilities and skills until musical thinking is improved by using the mind during learning, and among these strategies is the electronic mind maps strategy that works to employ the brain in its right and left sides by using words, pictures and colors in the middle and sub-ideas begin to generate and branch out in all directions, and this is what many previous studies indicated that

dealt with the use of mind maps in teaching various and specialized academic subjects and this is what was indicated by the study of both: Moore.MC . amp.Leung.B .(2006) , Chan.dw study (2007) , Hanin Samir Hourani study (2011), Jacqueline Michel study (2016) , Muhammad Abu Shama and Rabab Ibrahim study (2018), Manal Hassan Ali Swaraj study (2019) and Badria Hassan Ali study (2020)

Hence, **the researcher sees** the necessity and importance of using and experimenting with the electronic mind maps strategy in teaching music education and determining the extent of its effectiveness in developing musical thinking among fourth-grade primary school students .

Research questions :

Through the previous presentation of the research problem, its questions can be identified as follows:

1_ How can a program based on electronic mind maps be built in teaching music education to develop musical thinking among fourth-grade primary school students ?

2_ What is the impact of using electronic mind maps in teaching music education to develop musical thinking among fourth-grade primary school students?

objectives Research

The current research will aim to:

- To design a music program based on the use of electronic mind maps that is suitable for fourth grade primary school students .
- Discovering the effect of using electronic mind maps in teaching music education to develop musical thinking among fourth grade primary school students .

Importance of research:

1_ The current research may achieve a practical application and a real response to the scientific recommendations that call for the necessity of using modern strategies and methods in teaching to ensure the success of the educational process in its various stages, including (the mind maps strategy).

2_ It may constitute a new addition in the field of studies related to music education, which in turn may lead to improving the teaching methods used.

3_ It may draw the attention of educational officials and teachers to the importance of the electronic mind mapping method and provide the opportunity to use it in teaching music education.

4_ This current research may provide specialists and researchers with a measure of musical thinking.

5- This research contributes to improving the level of achievement of fourth - grade primary school students in music education .

Search parameters / a Research Limits

The current research was limited to the following determinants

1_ Human determinant : A group of fourth-grade primary school students in Qena Governorate . They were chosen because they are the most appropriate group for the nature of the current research .

2_ Subject specific: Electronic mind maps strategy , where the special topics were relied upon. b Electronic mind maps (rhythmic signs and their pauses, lines and spaces, rhythmic exercise And the melody) accompanies the sounds added to the pictures .

3- Location **locator :** Abu Bakr Al-Siddiq Primary School , Qena Governorate.

4 - Time limit: First semester of the academic year 2024/2025

hypotheses :

1_ There are statistically significant differences between the average scores of fourth-grade students of the primary school for the experimental and control groups in the post-test of the musical thinking scale in favor of the experimental group.

2_ There are no statistically significant differences between the average scores of the fourth-grade students of the primary stage of the experimental group in the first and second (follow-up) dimensional measurements of the musical thinking scale.

Search procedures:

group Search:

The research included a group of 60 fourth- grade primary school students who were divided into two groups (experimental - control), each containing 30 students.

methodology :

This research is based on the experimental method, as it includes independent and dependent variables. The experimental design was chosen from equivalent groups (control and experimental) through pre- and post-measurement, in order to suit the nature of the current research.

variables :

variable :

Electronic mind mapping strategy.

variables :

Thinking music.

Search tools :

1_ Musical Reasoning Test : (prepared by the researcher)

Terms Search:

1- Strategy **:**

Procedurally, it is defined as: a set of ideas and principles that are followed to implement the e-learning process in a way that adds enjoyment and excitement to it and achieves the maximum possible amount of educational goals.

2- Electronic mind map :

Procedurally, it is defined as: a personal diagramming technique that contains the keys to concepts, information, and facts in a systematic drawing that simulates the shape of a nerve cell in the brain, using symbols, images, and words; which contributes to the development of musical thinking and the direction towards the subject.

4_ **Musical thinking : (Musical thinking)**

It is defined procedurally as: developing students' awareness through concepts, judgments and conclusions, which leads to developing students' thinking through mastering performance skills.

Previous Studies:

The first study: Iman Muhammad Fathi's study (2014)

This study aimed to measure the effect of using electronic mind maps on developing some critical reading skills in English among first- year secondary school students . The research sample consisted of 40 female students from the first year of secondary school . The experimental approach was followed , and the results showed that there were statistically significant differences between the average scores of the study sample in the pre- application. The dimension of critical reading skills in English for first- year secondary school students .

Researcher's comment : The researcher benefited from the previous study in preparing the experimental program and revealing the impact of using electronic mind maps.

agrees with the current research on the use of electronic mind maps, **but differs** from it in the dependent variable and the research sample.

The second study : Study Badria Hussein Ali (2020).

This study aimed to identify the mind maps strategy in terms of the concept, foundations and principles on which it is based, and to reveal its effects in teaching music education to develop achievement and attitude towards the subject among middle school students. The study followed the quasi- experimental approach with two equivalent groups, and the study sample consisted of a group of second- grade middle school students, numbering 60 students, who were divided into two groups. The study concluded in its results that mind maps are effective in developing musical achievement and attitude towards the subject among middle school students.

Researcher's comment : The researcher benefited from the previous study in preparing the theoretical framework .

is consistent with the current research. In using the mind maps strategy and its impact on developing the attitude towards music education, **and it differs** from it in its impact on academic achievement and the research sample.

The third study : Asmaa Abdel-Sabour Muhammad's study (2022).

This study aimed to identify the mind mapping strategy, its objectives, importance and impact on teaching school songs to educational qualification students at Sultan Qaboos University. It followed the experimental approach . The study sample consisted of a group of educational qualification students at Sultan Qaboos University. The results showed that the use of mind mapping strategy in teaching

school songs contributed to the development and benefit of the research sample members in school songs.

Researcher's comment : The researcher benefited from the previous study in identifying mental maps and their importance.

is consistent with the current research. In using the mind mapping strategy, **it differs** from it in the dependent variable and the research sample.

Theoretical aspect :

First : Strategy Electronic mind maps:

Mind mapping is an effective learning strategy that links information read In books and notes, drawings and words in the form of a map transform the idea being read into a map containing abbreviated forms mixed from a single sheet of paper, giving the learner ample space for thought and an opportunity to review their previous knowledge and connect it to new information. (Abdul Hamid Abdul Razzaq Shaikhon, 2019, p. 77)

electronic mind map : It is one of the learning strategies prepared through computer classifications and smart tablets that depends on divergent visual thinking by converting narrative textual information into organized and arranged ideas that are divided into a main idea from which secondary ideas branch out related to it in the form of an organized cognitive structure linked to students' previous experiences in a sequential manner that shows the relationships between both the main and secondary ideas in addition to maintaining the impact of learning for a longer period. (Maram Adel Abdel Fattah, 2023, p. 1891)

Electronic mind maps are designed using computer programs such as:

IMind Mab , MindMangers , FreeMind , MindViey , and these programs do not require the user to have graphic skills because they automatically create maps from streamlined curves of branches, and they also allow dragging and dropping images from the graphics library, and they add powerful and new capabilities and abilities to the mind map . (Khadija Abdel Aziz Muhammad, 2021, p. 180)

The importance of electronic mind maps in the educational process:

It is represented in the following points: -

1- Presenting ideas in a comprehensive, organized, and smooth manner, which facilitates and simplifies the teaching and learning process by making information easily accessible, thus saving time and effort.

2- The clear interconnection of ideas and information makes it easy for learners to understand and comprehend, thus overcoming study and memorization problems.

3- Effectively integrate and link previous knowledge with new knowledge and find the relationship between them, so that the scientific material is arranged in the mind and logical (meaningful) learning occurs .

4- Increase learners' ability to learn new topics by giving them a greater number of ideas.

5- Instilling a sense of excitement in the learner and eliminating tension and boredom through the use of colors and images in preparing the material. (Maram Adel Abdel Fattah, 2023, p. 1891)

Features of electronic mind maps:

There are many characteristics that describe electronic mind maps, including:

(Collection - abbreviation - Organization - Comprehensiveness and integration - Ability to concentrate - Speed of recalling information - Continuity of integration) (Amal Muhammad Tawfiq, 2023, p. 1946)

Second: Musical thinking :

First: Thinking

no comprehensive definition of thinking for several reasons, the most prominent of which are:

1- The science of thinking is relatively new in modern sciences.

2- Because the study of thinking is divided into four main skills : (brain science, logic, psychology, and artificial intelligence).

3- There are multiple schools of thought and psychology, each with its own unique perspective on the study of thinking, and therefore they differ in defining its meaning. (Sanaa Suleiman, 2011, p. 35)

Magdy Aziz (2007, p. 15) defined thinking as a person's ability to make a specific decision in light of his cultural background, his method of knowledge, his ethics, and his perception of himself and others **.**

And he knew it (Muhammad Anwar, 2006, pp. 50-51) It is a higher mental process that an individual uses when he faces a problematic or ambiguous situation that he has not experienced before. Through it, the mind's internal experiences are organized in a way that suits the ambiguous situation or problem. The relationships between the elements of the situation are understood, ideas are organized and arranged, or hypotheses are imposed and the validity of these hypotheses is verified using information, beliefs and previous experiences to solve the problem and then remove the ambiguity from the situation.

Reasons for thinking:

Saeed Abdel Aziz (2009, pp. 35-36) mentioned a group of reasons that require thinking, which are:

1- Astonishment and wonder 2- Issuing judgments 5- The need for invention and competition

3- Curiosity 4- Enjoyment 6- Human nature itself 7- The existence of a problem.

Characteristics of thinking:

Fahim Mustafa (2006, p. 286) believes that the characteristics of thinking are :

1- A picture of the relationships and links between events and phenomena.

2- Organic part Functional of personality structure.

3- Thinking begins with sensory experience, but it is not limited to it.

4- Relying on the mind and being connected to mental activity .

Magdy Aziz (2007, pp. 16-17) stated that simple mental operations are carried out routinely and with minimal mental effort, such as remembering a person's name or a phone number. As for complex mental operations, they require concentration,

control, and solving their secrets. In the field of thinking , we can distinguish between two levels (basic thinking and advanced thinking). Complex thinking

It is necessary to master basic thinking skills, including (acquiring knowledge, remembering it, observing it, and comparing it), as they are the basis for complex thinking.

musical thinking :

A specific intellectual process related to mental activity subject to the laws of musical culture. stems from sensory experience It is performed by the learner (student) in the form of recalling information to answer questions or solve problems. (Researcher)

application side

Building a program based on the use of mind maps strategy for teaching music education to develop musical thinking among fourth-grade primary school students

First: Experimental design of the research:

The research used the quasi-experimental method with a single-group experimental design due to its suitability for the current research, where systematic modifications are made to the independent variables that are assumed to lead to a change in the dependent variables.

Second: Choosing the research group:

The research group was selected from the fourth grade primary school students participating in the music education activity at Abu Bakr Al-Siddiq Primary School, where their number reached (60) students from classes 4/1, 4/2, and 4/3.

Third: Adjust some variables.

Some variables that could affect the search results were controlled. These variables were:

A- The chronological age of the students: Birth certificates were collected for the research sample whose age was (9) years, and this variable was controlled by excluding students who were not committed to attendance.

B- The social and economic level of the children: The students in the research sample represent one geographical area, as they live in one area and have a somewhat similar social and economic level.

C- Previous experiences : This was done by applying the attitude scale towards the subject of music education as a pre-application to the two research groups, and after calculating the averages of the students' scores and the significance of the differences between these averages, as the results showed that there were no statistically significant differences between the two research groups, as shown in Table (1).

Table (1)

It shows the significance of the differences between the arithmetic means in the pre-test of the experimental group and the control group on the musical thinking scale.

Significance level	degrees of freedom N-1	T value	standard deviation	arithmetic mean	Sample size	Research group
Not statistically significant	59	0.934	2.76	15.3	30	control group
			2.85	15.31	30	experimental group

C- **The economic and social level of the students** : Due to the difficulty of controlling this variable, the two research groups were chosen from a government school in the center. And Qena Governorate, which helps reduce any differences between them.

2 - **Variables related to experimental work and conducting the experiment, which are** :

A - **The person in charge of the teaching process** : The researcher applied the experiment to the two research groups for several reasons, the most important of which was the desire to record the observations that appeared during the application,

the neglect of some teachers of the instructions they were provided with when they were assigned to teach in a certain experiment due to the lack of motivation and their commitment to their school duties of explanation, activities and reserve classes, in addition to their habituation to a specific method that gave them the mechanism of work in teaching .

B - **Experimental loss** : Students who were absent during the experiment and those who were absent during the application of the research tools were excluded , so the two research groups became almost equivalent.

Setting up search tools:

Steps to implement (prepare) search tools :

To answer the questions of the current research and achieve its hypotheses, it was necessary to prepare research tools which

It went through the following steps :

Music Thinking Observation Card :

Direct observation is one of the basic tools for gathering information in scientific research, as it can be used to determine the effectiveness of any curriculum or study program.

Steps to prepare a note card to measure musical thinking skills:

- **Objective of the observation card:**

The observation card in this research aimed to identify the effect of using the electronic mind maps strategy in developing musical thinking.

- **Card building sources :**

The card was built in light of the orientation towards the material, which represents the objectives of the lessons, and reviewing some studies and research that dealt with preparing the observation card.

- **Card vocabulary formulation :**

The wording of the vocabulary was carefully crafted to be precise and clear, in line with the objectives and nature of the observation card. The researcher took several conditions into account when formulating the card, including:

• The phrase contains only one performance.

• The verb must be in the present tense.

• Clarity and brevity of expressions.

• Statements should be procedural so that they can be easily measured and observed.

• **Card Instructions Formula :**

When formulating the card instructions, the researcher took care to ensure that they were clear so that the observation procedures would proceed correctly **.**

• **Card Arbitration :**

The card was shown to a group of judges to ensure the validity of the statements and to express their point of view on each paragraph so that it proceeded correctly. The judges made important observations, based on which the researcher made amendments. The paragraphs that the judges agreed were correct were selected, and the researcher excluded the paragraphs that the judges pointed out.

Research results, recommendations and suggestions :

This chapter presents the most important results, recommendations and proposals reached by the current research.

This is done by answering the questions and achieving the hypotheses, which are as follows:

First: The answer to the first question :

How can a program based on electronic mind maps be built in teaching music education to develop musical thinking among fourth-grade primary school students ?

The question was answered by preparing the experimental part. To use the mind mapping strategy (lessons).

Second: The answer to the second question :

Which states what is the effect of using electronic mind maps in teaching music education to develop musical thinking among fourth grade primary school students?

It was answered using the statistical programSPSS and the results came out as shown in the table (2) and

table(2)

It shows the significance of the differences between the arithmetic means in the post- test for the experimental group and the control group on the musical thinking scale for the music education subject.

Significance level	degrees of freedom N-1	T value	standard deviation	arithmetic mean	Sample size	Research group
Statistically significant	59	23.14	2.13	14.42	30	control group
			5.12	39.17	30	experimental group

It is clear from the previous table that there are statistically significant differences between the average scores of the experimental and control groups in the post- test of the musical thinking scale, where the apparent difference amounted to The arithmetic mean between the two groups is (24.75), so the differences are statistically significant in favor of the experimental group.

This indicates that mind maps played a major role in raising the level of thinking of the experimental research group compared to the students of the control group. Thus, the first hypothesis was achieved, which states **that:** There are statistically significant differences between the average scores of the fourth-grade students of the primary school students of the experimental and control groups in the post-measurement of the musical thinking scale in favor of the experimental group.

To reveal the significance of the differences between the average scores of the experimental group in the first and second post -tests. The second (follow-up) test for the experimental group on the musical thinking scale for the music education

subject, with the aim of ensuring the continuity of the effect of learning based on the use of mind maps. To verify this, the " T " test was used. In the case of linked averages , the results came as shown in Table (3).

table(3)

It shows the significance of the differences between the arithmetic means in the first and second dimensional measurements . The second (follow-up) for the experimental group on the musical thinking scale.

Significance level	degrees of freedom N-1	T value	standard deviation	arithmetic mean	Sample size	Measurement	The group
Not statistically significant	59	0.025	5.12	39.17	30	The first dimension	empiricism
			5.61	39.21	30	The distant the second	

It is clear from the previous table that there are no statistically significant differences between the average scores of the experimental group in the first and second post -tests of the musical thinking scale, which indicates the persistence of the program's effect. Thus, the second hypothesis has been achieved , which states **that: There are** no statistically significant differences between the average scores of the fourth-grade students of the primary school students of the experimental group in the first and second post-measurements. The second (follow-up) scale of musical thinking.

Discussion of research results:

- The research results proved that there are statistically significant differences between the averages of the research group in the post-application on the musical thinking skills observation card at a significance level of 0.01. This indicates the development of the research group's performance as shown in Table (4).

- The research results proved that there are no statistically significant differences between the averages of the research group in the post-application and the second post-application (follow-up). This indicates the effectiveness and the persistence of the effect of the research group on the musical thinking observation card in the post-application and the second post-application (follow-up), as shown in Table (2).

Research recommendations :

In light of the results and recommendations of the current research , the following recommendations can be made:

- Urging those responsible for the educational process to employ and use the electronic mind mapping strategy in the educational process.
- Conducting some studies that use the mind mapping strategy as an approach to developing musical thinking and creativity at different educational levels.

C- The necessity of providing those in charge of the educational process, including supervisors and teachers, with a guide that explains the nature of the mind mapping program and how to use it in teaching.

D- Adding mind maps to the content of the music education curriculum at different educational levels.

research :

In light of the results and recommendations of the current research , studies are proposed on the following topics :

1- Conducting some studies that use the mind mapping strategy as an approach to developing achievement and attitude towards the subject at different educational levels.

2- The effectiveness of using electronic mind maps in teaching music education on developing learning and thinking patterns among middle and secondary school students in Qena Governorate.

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Abstract

The effect of using electronic mind maps in developing the attitude towards music education for fourth grade primary school students

The current research aims to reach the design of a music program based on the use of electronic mind maps that is suitable for fourth grade primary school students and to discover the effect of using electronic mind maps in teaching music education to develop the attitude towards the subject among fourth grade primary school students. The experimental method was used from equivalent groups (control and experimental), and the total researh group was sixty fourth grade primary school students from Qena Governorate. The most important results reached by the research after answering its questions were

There are statistically significant differences between the average scores -of the experimental and control groups in the post-test of the attitude scale towards music education.

There are no statistically significant differences between the average -scores of the experimental group in the first and second (follow-up) dimensional measurement of the scale of attitude towards music education.

:It was one of the most important recommendations of the research

Conducting some studies that use the mind mapping strategy as an1- approach to developing thinking and creativity in music at different .educational levels

The necessity of providing those in charge of the educational process2- including supervisors and teachers, with a guide that explains what the .mind mapping program is and how to use it in teaching

- Adding mind maps to the content of the music education curriculum at3 different educational levels

Keywords:

mind maps, attitude towards the subject, fourth grade primary school students