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The effect of the R.E.A.C.T strategy on emotional creativity among sixth-grade science students

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Abstract: The current research aimed to identify the effect of the R.E.A.C.T strategy on emotional creativity among sixth-grade science students. The research sample consisted of 65 students, divided into 33 students for the experimental group and 32 for the control group. An experimental design with partial control was chosen for both groups, including a pre-test to implement the experiment, and the integrity of the experiment was verified. To achieve the research objectives, the researchers adopted Averill [1] emotional creativity scale, which consists of three areas: emotional readiness, emotional novelty, and emotional authenticity, with a total of 30 items with graded answers. After completing the experiment, the data were analyzed, and it was concluded that the experimental group, whose students studied according to the R.E.A.C.T strategy, outperformed the control group, whose students studied using traditional methods, in emotional creativity. It was recommended that specialized training courses be provided by the Directorate of Preparation and Training at the Ministry of Education for biology and science teachers, focusing on the effective use of the R.E.A.C.T strategy to enhance emotional creativity.

Keywords: *Emotional creativity, R.E.A.C.T strategy, Sixth grade science students.*

1. Introduction

Research problem: Academic subjects, such as biology, are essential in building knowledge and developing practical and creative skills among students. Despite the importance of studying biology topics, the researcher felt that...TanThrough his experienceMIn the field of biology teaching, there is an urgent need for current research, based on the employment of effective teaching strategies and methods, Raising students' motivation to masterThis is what the researcher has built. TanHis perceptions On solid scientific foundations, through a questionnaire that I presented to a number of biology teachers.

In addition, the researcher discussedTanWith supervisors specializing in the nature of the problem under study and the role of modern strategies in increasing student interaction and the challenges students face that require them to leverage their cognitive and emotional potential, especially sixth-grade science students, who feel anxious and fearful due to the fact that they are at a crucial stage that qualifies them for university.; Emotional creativity is one of the key factors that influence students' ability to interact with scientific content and express their ideas. Thus, this research also addresses how modern strategies can develop emotional creativity in students, helping them express their feelings and interact positively with the learning environment.

To check the problem in Emotional creativity among female students. The researcher conducted TanBy field verification by directing a survey questionnaire to a random sample of subject teachers to determine the research problem. In addition to interviews with a number of specialist supervisors and biology teachers, male and female, for the sixth scientific grade in several schools affiliated with the Second Karkh Education Directorate in Baghdad, who have experience of no less than five years, and their number reached (2) biology specialist supervisors and (40) biology teachers for the secondary

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stage, distributed over (35) schools. With the introduction of the definition for strategy and emotional creativity, and directedgroup Questions and through their answers, the following became clear:

- 90% rely on the traditional method of teaching.
- 100% have no prior knowledge of strategy REACT as a teaching method.
- 100% have no knowledge of emotional creativity.

From the above, it is permissible for the researcher Tan Formulate the research problem with the following question:

- What is the impact of strategy? REACT in Emotional creativity to Sixth grade science students?

1.1. The importance of Research

Education is increasingly broad and influential in our modern era, and most countries seek to advance and develop their societies through it. This process has been influenced by rapid cognitive developments, which has led to the need to make tangible changes to the mechanisms of teaching and learning within educational institutions. Education also plays a vital role in providing the necessary flexibility for the educational system, contributing to the advancement of knowledge in line with the requirements of the modern era. Its goal is to prepare individuals capable of facing life's challenges and problems, and of reflecting on their causes and the possibilities of solving them [2].

Education is linked to society, influencing and being influenced by it. Both are in a state of mutual interaction, and society develops with the advancement of education and technology [3]. Thus, developing education and its strategies is essential to improving learning outcomes and overcoming the individualism of traditional educational methods, which focus on memorization and indoctrination, which leads to wasting learners' energies and abilities [4].

Science teaching is more efficient when it is done through strategies, methods and techniques that start from the available information and previous experiences acquired by the learner, as he works to link the information available to him in his cognitive structure and integrate it with the new information he acquires through practicing mental activities and finding new and innovative solutions and information [5].

Since teaching is both a science and an art, and in order to keep pace with modern technologies and developments, it has become necessary for educators to develop teaching methods to enable students to acquire scientific skills and knowledge in line with the requirements of society and to employ that knowledge to meet the needs of their work and society, i.e. education becomes "the art of selecting knowledge, following it up, communicating it, and employing it well [6].

Based on this, the emergence of modern teaching strategies and methods has increased the importance of education, as their experimental applications have begun in the fields of teaching. This has contributed to the development of educational strategies and methods that meet the needs of developing all aspects of students' cognitive, emotional, physical, and social development. The educational context, classroom environment, student characteristics, and the nature of the content are key factors that determine the selection of appropriate strategies and teaching models [7].

Therefore, Saada, et al. [8] mentioned the necessity of seriously considering the teaching methods used in classrooms, with a focus on adopting modern methods that stimulate students' thinking and encourage them to research and innovate to achieve effective learning. This resulted in conducting many studies that led to the development of various models that meet students' needs, abilities, and interests [8].

And through examining on modern strategies that adopt constructivist theoretical approaches in teaching, it is evident that Possibility of using the strategy (REACT is a context-based learning strategy, or contextual teaching and learning, based on constructivist theory. It is also expected to have a positive impact on biology achievement and enhance emotional creativity among sixth-grade science students.

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The strategy is (REACT is an effective strategy that works to connect previous and new experiences and apply them practically, and encourages cooperation and participation among learners, which helps them achieve the desired educational goals [9].

The strategy also has (REACT) plays a major role in increasing students' interest in the subject matter, as it gives them the opportunity to see the importance of the subject and apply it in their real lives [10].

Suggest (Crawford) developed this strategy in 2001, and it consists of five stages: connection, experience, application, collaboration, and transfer. This strategy enables learners to connect content to reality and apply it to their lives, in addition to gaining experience through experimentation and collaboration in groups, which contributes to the transfer of knowledge to new situations [11].

A study reported that [12] that the REACT strategy makes teaching more exciting and effective in learning through participation and cooperation between learners [12].

And for the strategy (REACT) has a positive impact on learners by developing meaningful relationships between content concepts and linking them with daily experiences, and prompting them to question the usefulness of learning in their lives [13].

In light of this, a study showed that Akay and Kanadli [14] that the (REACT) strategy contributes significantly to improving learners' achievement, especially in teaching scientific subjects, by linking scientific concepts to life experiences [14].

Among the important variables that researchers seek to study and improve is emotional creativity among students, as it is a key indicator for assessing academic performance and personal growth. Creativity and scientific curiosity are among the most important characteristics that represent AR. In human activities that require the development and enhancement of individuals' creative abilities, especially in our era characterized by complex changes and academic and life challenges, we need creative people with open minds who are able to transform their negative and positive emotions into innovative solutions using unconventional methods [15].

The concept of emotion and emotional expression, which is linked to creativity, has reasons that have made it more acceptable among behavioral psychologists, namely that emotional behavior depends on the activity of neurochemical systems in the central nervous system, and that this activity can be modified through the learning process [16].

In addition, emotional creativity has an impact on students' level of academic achievement and their desire to succeed [17].

Individuals' lives are characterized by rapid changes, which impact various aspects of their lives and expose them to multiple difficulties, which pushes them to develop new ways to adapt to them, including emotional creativity [18].

From the above, the researcher may summarize the importance:

1- The importance of the study lies in the fact that it may be the first of its kind, according to the researcher's knowledge. Two, which studies the impact of the strategy REACT in their emotional creativity. This type of study is a key component in building a new knowledge base that supports educational and psychological research in the context of general education.

2- This study contributes to enriching the educational library by presenting an integrated theoretical framework on the relationship between effective teaching strategies (such as the strategy of REACT) and psychological and academic variables. And emotional creativity.

3-This study is of particular importance because it focuses on sixth-grade science students, a vital stage of study that represents the transition between secondary and university education. During this stage, many academic and psychological abilities are formed, impacting their future educational path.

4- Providing researchers with a tool for measuring emotional creativity, which will benefit future scientific research.

5-It benefits supervisors and those responsible for training and preparing teachers in training courses, as this strategy aligns with modern teaching trends, making it a powerful tool for preparing teachers to support student learning in an innovative and effective manner.

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Third: Research objective: The research aims to identify the impact of the strategy REACT in Emotional creativity among sixth-grade science students.

Fourth: My assumption and Search: To achieve the research objectives, the following was formulated: the Flee Zero loss There is no statistically significant difference at the level of (0.05) between the average scores of the experimental group students who study according to the strategy REACT and the scores of the control group students who studied according to the traditional method on their emotional creativity scale.

Fifth: Research limits:

1. Human boundaries: Sixth grade science students in secondary and preparatory day schools in Baghdad Governorate, Karkh Education Directorate. Second.

2. Spatial boundaries: Intermediate and secondary schools (government and daytime) for girls in the Baghdad Governorate Education Directorate./ Al-Karkh II.

3. Time limits: The first semester of the academic year (2024-2025 AD).

4. Cognitive boundaries: The first three chapters of the Biology book (first, second, and third) scheduled to be taught to the sixth scientific grade for the year (2024-2025) AD, eleventh edition for the year 2024 AD.

Fifth: Defining terms:

1- Strategy: Define it Ahmed and Aziz [19]. That it is group harmonious and integrated from the procedures. The process taken by the teacher in light of principles and hypotheses in a manner consistent with the structure of the educational material and the needs of the students to achieve the desired educational goals at a specific time [19].

2-strategyREACT) was defined by Crawford [20] as context-based learning that aims to link learners' experiences with new knowledge and is based on the constructivist learning theory. It consists of five main stages: connection, experience, application, collaboration, and transfer of experiences [20].

The researcher adopted Tan identification [20] is theoretically relevant to strategy, as it is consistent with the research objectives and procedures.

The researcher knows it Tan Procedurally, one of the strategies of the constructivist theory adopted by the researcher Tan In teaching the experimental group of sixth-grade science students the chapters prescribed in the biology textbook, the teaching plans were developed according to its five basic steps: connection, experience, application, collaboration, and transfer. In this strategy, scientific concepts are linked to the students' real-life experiences and then applied through activities that promote cooperation and active participation among them, enabling students to apply the acquired knowledge in new real-life situations.

3 -Emotional creativity Emotional Creative: Known by:

April [1]. The individual's ability to understand his or her own and others' emotions in diverse situations and to respond in unconventional and unusual ways that reflect authenticity and flexibility, which benefits the individual and society. Emotional creativity includes three main dimensions: emotional readiness, emotional novelty, and emotional authenticity [1].

The researcher relied on Tan Definition of Averill [1] provided a theoretical definition for this research, and adopted his scale for emotional creativity.

The operational definition is the total score obtained by the female students in the research sample when they answered the items of the emotional creativity scale.

2. Review References

2.1. Firstly: Strategy (REACT)

It is worth noting that the strategy (REACT) was proposed by Crawford [20] based on research conducted by the Center for Research and Professional Development (CORD) in collaboration with educators and cognitive psychologists in the United States of America in 1999, in an attempt to develop and achieve the goals of context-based learning [20]. It is one of the most prominent teaching strategies used according to the contextual learning and teaching approach, and is based on the

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interaction between the teacher and the learner in light of constructive learning within a social cultural contextual framework. It links new scientific knowledge to daily experiences and to the learner's previous background, and stimulates their motivations in a positive way [21].

The learning process using the strategy (REACT) based on constructivist theory is the process of the learner's self-construction of knowledge, and the creation of new, meaningful knowledge from his own experiences and abilities. Each learner has his own interpretation of the reality surrounding him. Learning activities are based on real situations and real evaluation that takes place in a cooperative work group, and develop critical thinking among learners to find solutions to and from the problem that must be studied to improve learners' understanding [11].

Also, the strategy REACT is learner-based, as the learner constructs his own understanding of knowledge, facts and phenomena based on previous experiences and expertise mastered within his cognitive system. It places the learner at the center of the learning experience, where he participates in diverse learning activities including projects, problem solving, field studies and group interaction. Teachers are organized and supportive with the aim of achieving competence for each learner, so that he becomes independent for life and promotes the creation of a learning community that enjoys interaction and diversity [22]. Through these activities, the strategy seeks to: REACT) To increase learners' interest, attitudes and motivation towards academic subjects, improve their practical skills, and enable them to actively participate in the teaching process [23].

2.2. Strategic Steps REACT

The strategy was named after this name ((REACT is an abbreviation for its five steps:

1. Linking Relating: It refers to the connection with the real world, and means learning within the context of life experiences or pre-existing knowledge. This step aims to attract the attention of learners and increase their motivation to learn a new subject, using various methods such as asking questions or Viewing pictures, learners are also asked to provide examples from their daily lives, thus linking the new knowledge to the learner's prior knowledge.
2. Experience Experiencing: Refers to learning through experiences, i.e., the practical training step of experiences within the classroom. This includes learning through exploration, experimentation, and participation in activities presented to learners in worksheets. Thus, learners use their prior knowledge to construct new knowledge.
3. Application Applying It refers to the use of new concepts in new and real-life situations, where learners apply the new concepts when they participate in practical activities to solve problems or through realistic tasks and exercises related to real-life concepts. This stage aims to help learners understand the knowledge and information they have learned [22].
4. Cooperation Cooperating: In this stage, the learned concepts are put into practice, which involves learning in the context of participation, interaction, and cooperation with other learners, and exchanging experiences to enhance knowledge. This is done by working in a team and developing collaborative skills among learners.
5. Transportation Transferring In this stage, acquired skills and knowledge are used in new contexts or situations, and it helps learners deal with unfamiliar situations that were not covered during the lesson. During this stage, learners participate in discussing new issues and cases [20].

The role of the teacher and the learner can be clarified at each stage of the strategy. REACT in more detail as follows:

1.Link/Relationship: The teacher's role is to ask a question or present a text or image followed by questions, reveal their prior knowledge related to the lesson topic, and clarify the relationship between prior knowledge and daily life. The student's role is to answer direct questions, read the text or view the pictures and then answer the questions that follow. The learner clarifies the relationship between prior knowledge and everyday life events and situations.

2.Experience: The teacher's role is to provide specific activities, tools, and methods, and to supervise, guide, and provide feedback during the activities. The learner's role is to carry out activities,

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record observations and results, and provide interpretations and conclusions, which encourages them to be creative and innovative.

3.cooperation: The teacher's role is to divide the class into groups, provide cooperative activities by posing questions or a problem, and ask each group to provide solutions, insights, or answers to the questions. The groups discuss what they have reached. The learner's role is to search for solutions to problems or answers to questions by working in groups, collaborating to provide an answer, report, or vision about the topic or problem, and presenting and discussing their findings with the teacher [20].

4.Application/Employment: The teacher's role is to provide practical exercises and guide students to give examples and other applications of the knowledge they have acquired. The learner's role is to provide examples and applications, use acquired knowledge in similar situations, and find the relationship between previous and acquired experience.

5.Transition/Integration: The teacher's role is to explain questions, issues, phenomena, and topics from life related to the lesson topic, and to ask the students to bring up other topics and phenomena from daily life related to the lesson topic. The learner's role is to infer the relationship between the examples and issues presented by the teacher and the topic of the lesson, and to transfer the acquired knowledge to new situations to gain new acquired experiences [24].

2.3. Strategic Importance REACT in Science Teaching

Some studies and research indicate the importance of using (REACT) In the educational process in general, and science teaching in particular, it can be explained as follows:

1. Contribute to motivating learners and engaging them positively in the learning process, and developing their understanding of basic concepts by linking learning to life experiences and prior knowledge. It also helps integrate and transfer learners to real learning situations that prepare them to build new knowledge.
2. It allows learners to use and build on knowledge, and enhances knowledge retention in long-term memory. This helps transfer learning, often in the context of collaborative learning.
3. It enables learners to understand and comprehend scientific concepts correctly, modify their misconceptions, and develop correct understanding. The strategy focuses in every step on the learners' positivity and activity, which enables them to link the concepts they learn to their prior knowledge and experience by using applications and life situations in an exciting and attractive way that arouses learners' motivation and curiosity to reach the correct scientific concepts behind the life situation. As a result, misconceptions are corrected and errors in understanding scientific concepts are treated, which leads to building balanced cognitive foundations.
4. It helps develop communication, cooperation, and social skills, effective interaction with others, and the ability to self-manage, creating a vibrant and energetic classroom [20].

2.4. Secondly: Emotional Creativity Emotional Creativity

Pointed Jamil [25] states that emotional creativity is sensitivity to emotions and the ability to understand and express a set of authentic emotions in a unique and effective way. Emotional creativity is determined by three criteria: (preparation, novelty, and originality) [25].

Areas of emotional creativity identified by Averill [1].

1.emotional readiness Emotional preparation: Readiness means understanding and learning from one's own or others' emotions [1]. and Averill also sees the similarity of both cognitive creativity and emotional creativity in this readiness, and this stage may be long-term or short-term, and this depends on the ability of individuals. Individuals who have high sensitivity and are more interested and understanding of their own emotions and the emotions of others are more efficient in emotional readiness or preparation, and searching for the possibility of employing emotions and feelings in directing thinking and emotion [26].

2.emotional grandmother Emotional Novelty: It is one of the most widespread indicators of creative response, as it indicates the individual's ability to produce new and unfamiliar responses, by comparing

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the individual's current response with his past responses, or comparing the individual's response with the responses of his peers, or comparing it with the responses prevalent in society. It is the most appropriate standard for measurement [1].

3.emotional authenticity Emotional Authenticity: Authenticity is one of the most important abilities necessary for creative production, as it represents the ability to produce a response that accurately reflects the opinions, beliefs, attitudes, and values of the individual towards society, and honestly expresses what is going on inside the individual [26]. So, Every different response, in order to be creative, must be of value and benefit to the individual and society [20].

Characteristics of emotionally creative individuals:

- They are characterized by openness to experience, good relationships with others because they are sociable, a high level of self- and social independence, and superior decision-making skills.
- They have the ability to process and interpret previous life experiences, benefit from them, and employ them to solve problems in a way different from others, with control and self-discipline.
- They are distinguished by their use of unique methods and creative reactions to confront stressful situations, characterized by perseverance, flexibility, challenge and emotional balance.
- They have the ability to change their emotional attitudes according to life situations, and to deal with problems in a simple, positive way without complications.
- They have a high ability to get along with others, and are more open to experiencing more relationships with them.
- They have the ability to express their emotions, distinguish between verbal and non-verbal emotions, and are distinguished by their high skill level when practicing various activities such as reading and writing.
- Individuals have the ability to process, interpret, and benefit from dramatic experiences, especially since dramatic experiences contribute to the development of emotional creativity.
- The emotionally creative individual has an open-minded personality, characterized by a passion for life and enthusiasm for it, cognitive flexibility, broad horizons, a multiplicity of visions, and integrated thinking patterns [1].

2.5. The Theoretical Basis Adopted by the Two Researchers for the Concept of Emotional Creativity

The two researchers adopt the Social constructivist theory [1]. The basis for her research is that The term emotional creativity was first proposed by the American psychologist [1] who considered emotional creativity a generation of new ideas concerned with emotional phenomena, and this term was part of his theory of social construction, which considers emotions (emotional syndromes) [18]. Between Averill and Thomas-Knowles [27]. The way we think about emotion and creativity and create a connection between them, because emotional behavior is a medium for creative activities, and the individual must have a rich store of divergent concepts through which to link emotional feelings, and if the store of divergent concepts decreases, the role of emotions in facilitating creative activities decreases. Avril sees that emotions are a social construction that depends on a combination of specific biological manifestations and a number of levels of knowledge from perception, coding, thinking and generating new ideas in creative ways, as the levels of emotional creativity are represented by the following:

The highest level represents the biological, social and psychological structures of emotional creativity, i.e. the ability to modify emotions in a new and acceptable way based on changing the beliefs and principles from which the emotions were formed. The middle level of emotional creativity represents the ability to change emotions to meet the needs of the individual and society in new ways. The lowest level of emotional creativity represents the individual's ability to apply the emotions that appear in behavior as they exist in society, i.e. according to the customs and traditions prevailing in society [28].

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Everil explained [28]. The relationship between creativity and emotion is of three types: The first type is that emotion is a motive for creativity represented by the individual's ability to employ his emotions as they exist in society effectively, This lower level of emotional creativity, the second type, creativity can be an emotional response characterized by novelty, effectiveness, and originality, and represents the individual's ability to produce creative emotional ideas that are beneficial to the individual and society. This middle level of emotional creativity, the third type, emotions themselves can be creative products, represented by the individual's ability to modify his emotions, by changing the beliefs and social standards that formed these emotions. This higher level of emotional creativity [28].

2.6. Previous Studies:

2.6.1. First: Previous Studies that Dealt with the Strategy REACT

2.6.1.1. Study Al-Zaidi [29].

The study aimed to: Identify the impact of the strategy REACT on the achievement of fifth-grade biology students in chemistry and their successful intelligence. The study was conducted using a quasi-experimental research approach with partial control, and the sample size was (65) students in the preparatory stage. To achieve the objectives of the study, two research tools were built: Successful achievement test and intelligence testAt the end of the experiment, the results were analyzed and it was found that. There is a statistically significant difference between the experimental and control study groups in the achievement test and the successful intelligence test, in favor of the experimental group who study according to the strategy [29].

2.6.2. Second: Previous Studies That Dealt with Emotional Creativity

2.6.2.1. Study Saleh [30]

The study aimed to Identifying emotional creativity and its relationship to cognitive skills, the need for assessment among university students, and the differences between scientific and literary departments and between males and females. The research was conducted using the descriptive approach, and it reached (225) A university student, and to achieve the objectives of the study, two tools were built: measurement Emotional creativity and cognitive skills scale. After applying the two tools, the results showed: There is a statistically significant positive relationship between aspects of emotional creativity and cognitive skills [30].

First: M Research approach: To achieve the research objective, it was adopted T researcher Tan Experimental method procedures in his research A, where It is a means Effective in identifying the causes of phenomena and problems that appear or are discovered in any area of life Search.

Secondly: Experimental design: I depend T researcher Tan Partially controlled experimental design with two equivalent groups (experimental and control). As shown in the diagram (1).

Table 1.
Experimental design of the research

The group	Equivalence of the two groups	independent variable	dependent variable	Measurement of the dependent variable
Empiricism	-Biology material for the previous year -Chronological age in months -intelligence test -Previous information	Strategy REACT	-Emotional creativity	-Emotional creativity Scale
The officer		The usual way		

A plan (1 Experimental design of the research

Third: Research community: The research community has been identified. Female students the lineSixth Scientific In schools Preparatory and the daytime secondary school affiliated with the General Directorate of Education in Baghdad / Al-Karkh Intention For the academic year (2024- 2025) m.Their

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number is (8419) and to achieve this, the two researchers visited the Educational Planning Department of the General Directorate of Education of Baghdad, Karkh II, in accordance with a letter to facilitate the mission.

Fourth: Research sampleTh: Al-Thanawiya Secondary School was chosenAqeedah for girlsIn the area ofturnRepresenting the community, numbering (201) studentAndIn the sixth grade of science, he choseTresearcherTanSchool picturerandomnessAmong the schools of the research community after obtaining the approval of the General Directorate of Education of Baghdad Governorate / Al-Karkh IIintentionTo apply the current search experience. soThe research sample was selected by random assignment in Al-Aqeedah Girls' Secondary School, as the school contains four sections (A - B - C - D), where the group (A) To represent the experimental group, which numbered (45) students. And Which will be studied according to the strategyREACT, and the group (for) To represent the control group, which numbered (45) students.As shown in Table 1.

Table 1.
Numbers of peopleThe BatIn the research sample.

The group	The branch	Number of female students before exclusion	Number of excluded female students	Number A female students after exclusion
Empiricism	A	45	12	33
The officer	For	45	13	32
The total		90	25	65

Fifth: Control procedures: He was keenTresearcherTanBefore you start Experimental procedures to control variables and factors that may have an impact on the safety of the experiment's implementation.

A. Internal integrity of the experimental design: To ensure internal safety, payTresearcherTanEquivalence between the two research groups (experimental and control) in some variables directly related to conducting the experiment, which are (chronological age, intelligence, previous information test, Biology material for the previous year) soShows the equivalence of the two groups.

b. External integrity of the experimental design: After ensuring the internal integrity of the research variables after conducting sample equivalence, we sought toTresearcherTanTo control the extraneous variables and ensure the external integrity of the design, and that the research results are correct and attributed to the independent variable, so he did researcher TanBy proceduresBy checkingExperimental circumstances and accompanying incidents - experimental extinction - Processes related to the maturity of sample individuals-Effect of experimental procedures).

3. Research Requirements

1. Determine the content (scientific material): One of the research requirements is to determine the scientific material before starting to implement the experiment.,In the chaptersthreeThe first of the biology book forSixth ScientificIncluded in the annual plan for teaching the biology curriculum in the first semester of the academic year (2024- 2025) for the classAFor the sixth scientificAs specified by the educational supervision according to the ministerial plan for the biology subject for the sixth scientific grade for the first semester, The scientific material was distributed in the form of topics for the weekly classes, as follows:Four portionsWeekly for both groups (experimental and control)That is, an average of eight sessions.weeklyFor both.

2.Formulating behavioral objectives: ENNDefining behavioral (educational) objectives is of great importance to the teaching process, as it isDThe basis of every step or activity of teaching andviaThe teacher knows why he teaches [31].

Coined Researcher Tan (266) purpose Behavioral Depending on the classification(Bloom) within the cognitive domain of the levels six (Remembering, comprehending, and applying, and Analysis, And the

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composition, And the calendar and QIt was presented in its initial form to a number of arbitrators and specialists in life science teaching methods and biology teachers, to ensure the correctness of its formulation, accuracy and suitability for the level for which it was developed. In light of their opinions and suggestions, the agreement rate was based on no less than (80%)And moreFrom the opinions of the arbitrators.

Table 2.
Distribution of behavioral objectives within the content of the scientific material.

The chapter	Pages Number	Bloom's taxonomy levels of the domain cognitive						Goals of chapter
		To remember	Absorption	Application	Analysis	Installation	Calendar	
The first	42	3	2	2	2	2	2	13
The second	37	3	2	2	1	2	2	12
The third	52	4	3	2	2	2	2	15
The total	131	10	7	6	5	6	6	40

3. Preparation of daily teaching plans: In light of the educational content of the chapter three The first of the biology book for the first gradeSixth ScientificBehavioral purposes have been prepared.44) A teaching plan for the experimental group, which was organized according to the strategy REACT, and (44) A teaching plan for the control group, which was organized according to the usual teaching method, and was carried out byTresearcherTanBy presenting a model of the two types of teaching plans for the experimental and control groups to a group of judges specialized in life science teaching methods and some biology teachers., To express their opinions and comments and their suggestions regarding its suitability to the content of the material and its behavioral objectives.And it was doneEDue to someTModify it to take its final form.

Seventh: AdaAndSearch:The research tool was represented bygaugeEmotional creativity: In order to achieve the research objectives, it was necessary to have a valid, reliable, and objective scale to measure emotional creativity in the research sample.After reviewing the studies and literature related to the research variable,adoptedresearcherTanEmotional Creativity ScaleEmotional Creativity by Averill [1].In its foreign version, which is based in its structure on the theory of emotional creativity. Avril defined emotional creativity as: The individual's ability to understand his or her own and others' emotions in diverse situations and to respond in unconventional and unusual ways that reflect authenticity and flexibility, which benefits the individual and society. Emotional creativity includes three main dimensions: emotional readiness, emotional novelty, and emotional authenticity [1].

- Determine the purpose of the scale: The Emotional Creativity Scale aims to measure the emotional creativity of sixth-grade science students.

-Defining the domains of Avril's Emotional Creativity Scale: Due to adoption Avril's Emotional Creativity Scale [1]. The researchers found that the scale consists of (3) areas, which are: Emotional readiness-emotional grandmother the Emotional authenticity)

-Formulating the paragraphs of the emotional creativity scale: The scale consisted of (30) paragraphs, where (7) paragraphs represent emotional readiness, (14) paragraphs represent emotional novelty, and (9) paragraphs represent emotional authenticity. As shown in Table (16-3) It was designed according to the Likert method with a five-point scale as follows: (1, 2, 3, 4) (Strongly agree, Agree, sometimes agree, Disagree, strongly disagree) [1].

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Table 3.
Distribution of scale paragraphs within the three areas.

T	Field	Number of paragraphs that measure the domain
1	Emotional readiness	7
2	Emotional grandmother	14
3	Emotional authenticity	9
The total		30 paragraph

- Scale instructions: The researcher preparing instructions attached to the scale to guide the students on how to answer its paragraphs, the instructions have been summarized. In addition to the situation Instructions for correcting the scale.
- -Face validity of the Emotional Creativity Scale: In order to verify the validity of the emotional creativity scale, the researcher conducted: Tan Displaying the scale paragraphs in their initial form, A group of judges specializing in educational and psychological sciences, science teaching methods, and life sciences were consulted after the definition of emotional creativity was presented to them for their opinions and comments. The percentage of agreement was calculated for each item., and Retaining paragraphs that achieved an agreement rate of 80% %more From the opinions of the arbitrators.

A-The first pilot application of the Emotional Creativity Scale: The researcher applied Tan The emotional creativity scale was applied for the first time on a survey sample of (30) female students from the sixth grade of science at Ruqayyah Intermediate School for Girls affiliated with the General Directorate of Education in Karkh II, after agreement with the school administration and the subject teacher, under the supervision of the researcher. Tan On Tuesday, 10-1-2024, to clarify the clarity of its paragraphs and instructions, and for the purpose of calculating the time required for the students to answer the paragraphs, and the clarity of the paragraphs was confirmed in addition to determining the time required to answer the test, by calculating (the average answer time) taken by the first (5) students and the last (5) students to answer the paragraphs of the scale, which amounted to (25) minutes.

for-Second survey application Y: The researcher confirmed Tan From the clarity of the test, its paragraphs, its instructions, and the time required to answer, The researcher deliberately Tan To apply the emotional creativity scale, a second survey application on a sample of (150) female students in the sixth scientific grade, in Al-Amal Intermediate School for Girls affiliated with the General Directorate of Education of Karkh II in Baghdad Governorate on Tuesday 10-15-2024, in cooperation with the school administration and the subject teacher and under the supervision of the researcherTan. After correcting the students' answers to the emotional creativity scale items, the researcher arrangedTanThe students' grades were arranged in descending order, and then the properties of structure and stability were extracted.

A-AFor the distinctive power of paragraphs: Based on the two extreme groups (27%) of the highest scores and (27%) of the lowest scores, which amounted to (41) For each group, the arithmetic means and standard deviations of the scores of the students in both groups were calculated on each item of the emotional creativity scale. Using the t-test for two independent samplesNot equal in numberTo verify the differences between the averages. The calculated T-values ranged between (2.57 -14.41) and the calculated values are greater than the table value of (1.99). That is, it is significant at the level of (0.05). With a degree of freedom (80), For the benefit of the upper group and paragraphs are distinguished.

for-Construct validity of the emotional creativity scale: The validity of the scale's construction is verified through several indicators, including the discriminatory power of the items. The correlations between the paragraph scores and the total score of the scale, between the score of each paragraph and the score of the field to which it belongs, and between the score of each field and the score of the scale.:

1-Correlation of the score of each paragraph in the emotional creativity scale with the total score of the scale: Correlation coefficients were calculated for the scores of the emotional creativity scale items and the total score of the scale. Based on the scores of all members of the survey sample (150) female students, Using Pearson's correlation coefficient, Pearson's correlation coefficient values ranged

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between (0.27 - 0.79). T-values the calculated significance of the correlation coefficient ranged between (3.5- 15.5) At significance level (0.05), These values are acceptable. A function because it is greater than the table value.1.984) and with a degree of freedom of (148).

2-The correlation of the score of each paragraph in the emotional creativity scale with the score of the field to which it belongs: Correlation coefficient values were calculated for the scores of the emotional creativity scale items and the total score of the domain to which they belong, based on the scores of all members of the survey sample. (150) student.

The calculated Pearson correlation coefficient values for the correlation between the scores of the emotional readiness domain items ranged from: Between (0.50-0.75) T-values The calculated correlation coefficient ranged between (7.0-13.7) at significance (0.05). These values are acceptable. function Because it is greater than the value My schedule (1.962) and with a degree of freedom (148).

The calculated Pearson correlation coefficient values for the correlation between the scores of the emotional novelty domain items ranged from: Between (0.35-0.78) T-values The calculated correlation coefficient ranged between (4.5-15.0) At significance level (0.05), These values are acceptable. functionBecause it is greater than the valueMy schedule n (1.962) and with a degree of freedom (148).

The calculated Pearson correlation coefficient values for the correlation between the scores of the originality domain items ranged from: emotionality: Between (0.25- 0.66) T-values The Calculated The significance of the correlation coefficient ranged between (3.1-10.7) at significance (0.05). These values are acceptable. functionBecause it is greater than the valueMy schedule and (1.962) and with a degree of freedom (148).

3- Correlation of the score of each domain in the emotional creativity scale with the total score of the scale: The calculated Pearson correlation coefficient values for the correlation of the domain scores in the emotional creativity scale with the total score of the scale ranged between (0.75-0.93). T-values The Calculated The correlation coefficient ranged between (13.9-30.4) At a significance level of (0.05), these values are acceptable and significant. Because it is greater than the value My schedule (1.962) And degree of freedom (148).

Stability of the emotional creativity scale: The researcher didTanBy calculating the stability coefficient of the emotional creativity scale using the equation (A Wrap-Cronbach's coefficient) and the value reached (0.82), It is considered to be of good stability according to the standards indicated by the literature of measurement and evaluation.

9-Final version of the emotional creativity scale: After verifying the indicators of the exploratory application of the Emotional Creativity Scale, In its final form, it became composed of (30) A paragraph with a graduated answer, so it is ready for applicationOn the research sample, The highest degree on the scale (150) Degree and lower degree on the scale (30), and with a hypothetical average (90).

Eighth: procedures application experience: The experiment was carried out by taking a numberॅAnd the procedures are as follows:

1. It was agreed with ESchool building on ANTThe researcher took overTan Teaching biology to the class Sixth Scientific By himselfAAccording to the mission facilitation book issued by the Directorate of Education in Baghdad Governorate, the class schedule was coordinated in a way that ensures sufficient time for each group, and the experiment began on Sunday corresponding to (22/9/2024) By applying equivalence to the two research groups, actual teaching began onThursdaycorresponding to (26/9/2024), and the experiment ended on the day ofAThe limit of agreement (51/2025), in the first semester of the academic year (2024-2025) And in realityFour portionsper week for both the experimental and control groups.Eight servings for both. When he studiedTresearcherTanThe experimental group according to the strategy REACT was conducted according to daily teaching plans prepared in accordance with the steps of the REACT strategy. The control group studied for the same period of time in the usual manner according to the teaching plans prepared for that purpose.
2. The emotional creativity scale was applied to the two research groups (experimental and control) on Thursday (26/12/2024).

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4. Show Results

To check health The second hypothesis states that "there is no significant difference." Statistically at the level (0.05) between the average scores of the experimental group students who study according to the strategy (REACT), The average grades of the control group students who study according to the traditional method inCreativityemotional

The researcher did Tan By applying gauge Creativity Emotional on my research groups. After correctionAnswersAnd calculate the total score for each student, ExtractedArithmetic means and standard deviations of the scores of the experimental and control groups on the scaleEmotional creativity.

The average scores of the experimental group's responses were (113.67(with standard deviation)6.63)While it reachedAverage scores of control group responses (94.31) Banhara normative(5.31)To determine the appropriate statistical method to verify the differences between the arithmetic means of the scores of the two groups, the researcher verifiedTanFrom the homogeneity of variance of the two groups in the variable of emotional creativity using the test (Levene), as the calculated value of (F) reached (1.52), which is the smallest From the table value (4.03) with two degrees of freedom (1-63), meaning that the variance of the two groups is homogeneous, Table (4).

In light of the homogeneity of the variance of the two groups, the equation was applied:(t-test) for two independent unequal samples to check the differences between the means of the scoresResponsesThe two groups. Table (5).

Table 4.
Values (F) Levene's test for homogeneity of variances of the two groups in a variableEmotional creativity.

Variable	First degree of freedom	Second degree of freedom	Value(f)the calculated	Value(f)tabular	Significance at level 0.05
Emotional creativity	1	63	1.52	4.03	Not significant

Table 5.
Arithmetic means, standard deviations, and t-value for two independent, unequal samples for the significance of the difference between the experimental and control groups in emotional creativity.

The group	Sample	Arithmetic mean	Standard deviation	degree of freedom	Calculated value of t	Table t value	Significance at the level of
Empiricism	33	113.67	6.63	63	12.96	2	function
The officer	32	94.31	5.31				

It is shown from the table (5The calculated t-value (12.96) is greater than the tabular t-value (2) at the level of (0.05) and a degree of freedom of (6).3),and this refers to there is a significant difference EStatistics between the two research group singauge Creativity Emotional in favor of the experimental group Accordingly, the application is rejected. The second null hypothesis is rejected and the alternative hypothesis is accepted, which states, "There is a significant difference."EStatistics at the level(0.05)Between the average scores of the experimental group students. Those who They studied according to the strategy(REACT),The average scores of the control group students Those who they studied according to the usual method in the scale. Creativity Emotional

To show the size of the impact of the independent variable (strategy)REACT) In the second dependent variable (emotional creativity scale), the researcher usedTansquare equationAita(η^2) to determine the effect size. The square was calculated. Aita Based on the results obtained, the table shows (6) that.

Table 6.
Eta square values and effect size calculated from the t value.

Independent variable	Dependent variable	T value	Eta square	Effect size
strategyREACT	Emotional creativity	12.97	0.73	Big

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It is evident from the Table 6 The value of eta squared is (0.73), When compared to standard valuesThe effect turns out to be large. This indicates that strategy (REACT) It had a great impact in promoting Emotional creativityThe experimental group students compared to their colleaguesIn the control group.

4.1. Interpretation and Discussion of Research Results

The results showed the superiority of the experimental group whose students studied according to the strategy ((REACT) compared to the control group, whose students studied emotional creativity using the traditional method. This can be explained as follows:

1. The strategy contributed to ((REACT) positively impacted the development of students' emotional readiness by linking knowledge to real-life situations, which helped enhance their ability to interact emotionally effectively and increase their participation in the learning process.
2. The strategy encouraged students to break out of traditional thinking patterns, which contributed to stimulating emotional novelty. During the experience phase, innovative activities provided students with the opportunity to experience new situations, prompting them to express their feelings in unconventional ways.
3. And The collaborative activities in the application phase provided students with an opportunity to develop their creative and emotional skills by collaborating with their peers. This interaction encouraged students to freely express their thoughts and feelings, which helped foster their emotional authenticity in an unconventional way.
4. The strategy allowed(REACT) provides students with the opportunity to use critical thinking during the transfer phase to find innovative solutions to emotional challenges. By applying acquired skills in new situations, students were able to address emotional situations in unconventional ways, enhancing their creativity and active participation.
5. Presented a strategy (REACT) To enhance students' self-awareness and emotional awareness by linking knowledge to life situations, enabling them to understand and manage their emotions in innovative ways, thus enhancing their interaction. Creativity in educational situations.
   The results of the current study were consistent with the results of previous studies on emotional creativity., Among these studies, Study [4] Study [24]. These studies also showed positive effects of emotional creativity in different educational contexts. Although these studies were descriptive and relied on examining variables and their relationships without adopting specific strategies, their results support the findings of the current study, which followed an experimental approach using a strategy (REACT).

5. Conclusions

In light of the results of the current research, the researcher concluded that: Tan To the following conclusions:

1. That using the strategy (REACT) contributed to achieving a positive impact on the achievement of sixth-grade female students in biology, as the students who studied using this strategy achieved higher results compared to the students who studied using the traditional method.
2. That strategy (REACT) contributes to enhancing students' emotional creativity by improving their ability to express their feelings and interact with the course material, which contributes to their emotional and personal motivation.
3. That strategy (REACT) contributed to increasing interaction between students within the classroom environment, which helped develop their communication and teamwork skills, thus enhancing cooperation among them.

Recommendations: In light of the results and conclusions reached by the current study, the researcher recommends: Tan As follows:

1. The necessity of providing specialized training courses by the Directorate of Preparation and Training of the Ministry of Education for teachers of biology and other scientific subjects, including

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how to use the strategy (REACT) and its effective use in classrooms with the aim of raising academic achievement and enhancing emotional creativity.

2. The Ministry of Education's Curriculum Directorate needs to issue a comprehensive guide for science teachers, especially biology. The guide includes modern teaching strategies, including the strategy ((REACT), with the aim of improving teaching effectiveness and student learning outcomes.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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