

The impact of building a training program according to the dimensions of environmental citizenship for biology teachers in their future thinking

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Abstract

The research seeks to identify the construction of a training program according to the dimensions of environmental citizenship for biology teachers and its impact on their future thinking. 5) Dimensions for future thinking (future planning, positive thinking about the future, future prediction and imagination, future scenario development and future perspective evaluation), As the research community was determined by biology teachers for the fourth scientific grade in the General Directorate of Education of Baghdad / Al-Rusafa 1, the researchers chose the teachers' community, which numbered (135) teachers, with (73) teachers and (102) schools, according to the statistics of the Planning Department / Statistics Division of the Directorate, and the researchers adopted Partially controlled experimental design for two equal groups (experimental and control), The extraneous variables were also controlled, and the experimental program and the measure of future thinking were applied in the first semester of the academic year (2022-2023 AD). future thinking scale.

Chapter One: This chapter includes

First: the research problem

The environmental systems are no longer able to respond to the increasing human requirements of natural resources. In the imbalance of those systems and the restriction of the environment's energy and capacity, with the exposure of the environment to many violations and the exacerbation of its problems as a result of the activities of citizens and their irresponsible and wrong behavior and their weak awareness of their direction, attention to its challenges has become necessary. The obligation to protect it is shared by all members of society and its formal

and informal institutions in this regard, environmental citizenship appeared to form a solid support for protecting and preserving the environment and defending its resources, because the solution to environmental problems is not only borne by state institutions, but citizens bear an important part of that. With devastating consequences, the most dangerous of these consequences is what happens to citizens (including students), who must have the power of awareness, responsibility, and participation in protecting their environment against any danger that threatens it. This was confirmed by most teachers and supervisors through a questionnaire that includes a set of questions, distributed to a random sample. From the research community, it consisted of (15) A male and female teacher of biology in a number of schools in Dhi Qar Governorate / Al-Rifai Education Department, who have actual teaching experience of not less than ten years. After analyzing the results, the results showed the following:

- (100%) of biology teachers did not use modern environmental strategies in their teaching.
- (85%) do not have information about the concept of environmental citizenship.
- (87%) of biology teachers do not include future thinking in their teaching of biology.
- (100%) of biology teachers did not participate in training programs according to the dimensions of environmental citizenship

The researchers noticed, according to their experience in education and in teaching biology for more than ten years, and for more than one school, that teaching is often limited to the traditional method that makes the role of the learner passive, and does not affect the acquisition of environmental culture, just as most students do not practice environmental behavior. Positive and responsible and do not advocate its issues and are not enthusiastic about solving its problems, in addition to the lack of interest of teachers in the correct environmental practices for their students and the sustainability of the elements of the environment. Therefore, the problem of the current research is determined by answering the following question:

What is the effect of excluding environmental citizenship for biology teachers on the environmental culture of their students?

Second: The importance of the research: The importance of the research lies in the following points:

1- There is no Iraqi or Arab study (as far as the researchers are aware) that dealt with building a training program according to the dimensions of environmental citizenship D for teachers of biology and its impact on the environmental culture of their students.

2- The training program contains various teaching strategies according to the dimensions of environmental citizenship, which may contribute to raising the level of environmental culture for their students, by providing a questionnaire for environmental culture that can be used in future research.

3- The researchers hope that the current research will represent a new addition aimed at directing the attention of education workers to the adoption of a training program for in-service teachers according to the dimensions of environmental citizenship in order to benefit from it and direct their teaching strategies on it.

4- The current research is derived from knowing the impact of the importance of the training program on an important variable, which is the environmental culture in the learning and teaching process, and directing the attention of those involved in the educational process to the importance of paying attention to environmental culture through the use of modern strategies.

Fifth: Research Limits:

1- Human Boundaries: fourth-grade students whose teachers will undergo training according to the dimensions of environmental citizenship.

2- Spatial borders: secondary and preparatory schools affiliated to the Directorate of Education of Baghdad / Rusafa First

3- Temporal limits: the first semester / academic year (2022-2023).

4- Cognitive limits: the study material that starts from chapter (first, second, third, fourth, fifth, the subject of fish adaptation for aquatic life from chapter six) of the fourth-grade biology textbook, tenth edition 2019 AD.

Sixth: Defining Terms:

1- The Training Program: The training program was introduced by:

- (Al-Sakarneh, 2011) that it is: a planned, organized and continuous process that aims to develop the skills and capabilities of the trainees, increase their information, improve their behavior and attitudes, and enable them to perform their jobs efficiently and effectively. (Sakarneh, 2011: 16)

The researchers define it procedurally as: training (teachers of biology in the research sample) on the application of strategies for the dimensions of environmental citizenship, through the training program, which consists of ten training units, as it includes introducing them to the theory and the teaching strategies emanating from it and how to implement it in the classroom.

2- Environmental citizenship: Defined by:

- (Julie, 2005) as "responsible and positive behavior of the individual towards the environment in a just society that provides the way to promote sustainability and environmental justice" (8: Julie, 2005)
- Killeen, 2006) as "looking beyond personal interests (the environment), bearing in mind the preservation and direct access to the welfare of the broader society in terms of the rights and needs of future generations, by directing people to act responsibly and positively towards the environment and contribute to achieving just society." (Killeen, 2006: 7)

3- The dimensions of environmental citizenship / defined by:

- (Hafez and Fahd, 2016) as "the basic pillars that can contribute effectively to consolidating and strengthening the knowledge framework and direction of environmental citizenship and transforming it into positive actual behavior."

(Hafez and Jawad, 2016: 260)

- (Agency Environment, (2012) as "keys to achieving environmental citizenship in order to transform it into practical behavior) (Agency, 2012: 11-12 Environment)

The researchers define them procedurally: they are the basic pillars on which the environmental strategies were built, which were included in the training program, and which were considered the keys to achieving environmental citizenship.

Chapter two

This chapter deals with the following axes: training, dimensions of environmental citizenship, and environmental culture

The first axis: training

Training is a process aimed at developing the performance and effectiveness of the trainees by providing them with the required knowledge and information, providing them with the required skills and appropriate skills and experiences, as well as influencing their personal characteristics.

(Yousif & Read, 2020 : 550)

Training plays a vital role in developing the behavior of individuals for the purposes of raising and improving performance, so the educational organization must take into account training and its importance because of its impact on individuals in achieving efficiency and effectiveness. Here, the role of training appears, which provides new knowledge, works to increase what the individual carries of new and diverse

information, increases the skills of individuals, influences their attitudes, modifies their ideas, and works to modify their behavior within organizations in a way that reflects on work with love and sincerity. (Al-Lawzi, 2003: 287-289)

The scientific development, the explosion of knowledge, the diversity of teaching methods, and the emergence of innovations in the field of learning techniques and means have imposed the necessity of paying attention to in-service training so that teachers and trainees in general can get acquainted with the latest educational research to ensure raising the level of teacher performance and thus raising the productivity of education as it is the pillar of progress for all.

(Younis, 2007: 214).

Therefore, training strategies must be developed taking into account the following:

1- The need to identify training needs in the light of the results of teachers' evaluation to identify training competencies.

2- Taking care of the applied aspects as well as the educational developments.

3- Emphasis on taking into account the establishment of training courses in a manner suitable for teachers. (Al-Buhy, 2001: 238)

The importance of in-service training: The importance of in-service training for the teacher is highlighted in:

1- Interest in training has increased as a result of the tremendous technological development in educational technology and the accompanying innovation of new ways of performing tasks, in a way that saves time, effort and cost in the field of teacher preparation and training.

2- Globalization and the accompanying openness of countries to each other, and thus increasing institutions' awareness of the importance of applying the principles of total quality and continuous improvement of all human resources to face changes in the environment in general.

3- The importance of training in achieving the required organizational goals and its role in contributing to developing the skills of individuals and introducing them to what is required of them.

And (Hamad and Globe, 2020) added to the importance of the following training:

1- Training works to reduce work supervisors and control circles by preparing trainees to assume jobs with higher responsibilities that require skills and abilities to improve their creative performance and improve and develop the productivity of their institutions.

2- Increasing the efficiency and creative productivity of the trainee teachers, developing their professional performance, qualifying them, improving their capabilities inside and outside the educational system, and advancing the educational process in a better qualitative and quantitative manner.

3- Assisting the trainees with the aim of developing them professionally by finding opportunities for contact with colleagues within the framework of collective tasks and activities that require cooperative work and to learn about what is new in the field of the profession in terms of methods, methods and strategies, and improve their skills so that they can achieve the goals of the educational institution, so that their work is purposeful, organized and effective.

4- Continuous provision to improve the quality and targeted training outcomes, knowledge and skills, productivity, self-motivation and psychological factor for the trainees and awareness of the institution's goals and objectives.

5- Qualifying the trainees to contribute to the training programs, providing them with positive attitudes towards their profession, creating an atmosphere of cooperation, and ensuring the quality of the trainee's performance within the educational system, which leads to raising their morale and increasing their productivity at work.

(Hamad and Globe, 2020: 420)

System components in the training process: The system consists of the following elements:

First: Input, which is as follows:

A- Human inputs: They are the individuals to whom the training is applied, and who are intended to provide them with new information, skills or attitudes.

B- Material inputs: These include the forms of material allocations that are spent on training that the system can access, and are represented by technologies, devices, educational aids, preparation of the training environment, and funds spent on training.

C- Inputs of information and scientific knowledge: It includes data on the trainees, as well as information, knowledge and ideas put forward by the trainers and trainees.

D- Technical inputs: These are the training methods and methods, their characteristics, diversity, and suitability for the topics being (Sakarneh, 2011: 56)

Second: Processes: They are the organized interactions that take place between the elements of the system for the various inputs in it, for the purpose of obtaining the required outputs. The system, including

teacher preparation, teaching processes, all activities for learners, tests and various evaluation methods.

(Zayer and Jerry, 2020: 69)

Third: Outputs: They are the final actual outputs of the operations, which have already been subjected to training processes and have become overlapping and interactive outputs with each other, and among their outputs is access to a creative, competent trainee who is characterized by the desired skills, capabilities and competencies in light of the set goals, which appear after the completion of the training program. . (Al-Azzawi, 2022: 67)

Fourth: Food back: It is corrective information or a process of analyzing the outputs of the system, in light of the objectives of the system, and diagnosing the strengths and weaknesses of all elements of the system. (Abdul Samie and Hawala, 2005: 28-29)

The second axis: the dimensions of environmental citizenship

The learner should look beyond personal and direct interests to reach the welfare of the broader community (environment), bearing in mind preserving the rights and needs of future generations by directing the individual to act responsibly and positively (personal responsibility) towards the environment and working with members of society (teamwork). cooperative) and contribute to achieving a just environmental society (environmental justice), which in this concept aims to provide important ways to promote ecological sustainability and environmental justice alike (Dawood, 2015: 288)

Therefore, the dimensions of environmental citizenship include:

The first dimension: Personal responsibility: This environmental dimension emphasizes the individual's personal responsibility, will, desire and ability to change the environment and society for the benefit of our universe. It is the citizen who can play the role of a catalyst for change, who participates in decision-making, and who acts as a mentor to his peers.

The second dimension: environmental justice: it is linked to fairness between generations with regard to their environmental rights and duties. Environmental citizens understand the importance of social justice and therefore seek and demand environmental justice between generations and the rights of future generations to a healthy environment.

The third dimension: Collaborative teamwork: The current environmental problems require social, effective, and decisive engagement, in addition to civic participation in collaborative teamwork. Environmental citizens participate in decision-making and acting

collectively and at the public level. In addition, they are active at the local, national, and global levels (Al-Ajmi and Naji, 25: 2018).

Citizenship Conditions: There are many conditions that are the basis for the completion of the concept of citizenship in society, and among these conditions:

1- The completion of the growth of the state, as the growth of the state is based on a culture that depends on political participation, equality before the law, and a correct understanding of the state.

2- The concept of citizenship is linked to the existence of the democratic state, which provides space for freedom, and it enshrines the rights of the citizen. It is determined by the extent of awareness based on the possibility of obtaining information from its various sources, so that this information is the basis for the ability to bear responsibility and participate

3- The extent to which citizens enjoy political, legal, economic, social and cultural rights, through holding a meeting between the people in society and the political authority.

4- Social and cultural upbringing is one of the conditions for friendly citizenship, as the various institutions of society crystallize the individual who is able to understand citizenship through an integrated educational and cultural system (Night, 2007: 57)

Characteristics of citizenship: Citizenship is characterized by certain characteristics, and citizens' awareness of them is very important. Because it motivates them to adhere to it, and they contribute to calling others to it, and it contributes to protecting society from internal and external dangers. Among the characteristics of citizenship are the following:

A- Knowledge that makes learners able to understand the direct impact between a person, his society and his environment, and knows the requirements of society in terms of exercising the rights and duties of citizenship, proposing solutions to real life problems, presenting ideas, methods and alternatives to improve the reality of the learner and his society, contemplating and criticizing knowledge and expressing views on society's problems

B- Skills that lead to learners acquiring follow-up to current events, continuous self-learning skills, collaborative work, effective time and effort management, decision-making, proposing and implementing alternative methods, knowledge gathering and experimental verification.

C- The values and attitudes that make the learner characterized by a sense of responsibility, appreciation of the value of work, loyalty to the homeland, appreciation of national figures, the practice of democratic

behavior, good use of resources, appreciation of the learner for himself, his colleagues and his community, appreciation of the value of innovation, acquiring the volunteer spirit, learning calculated risk, broad-mindedness, and acceptance of the other (Noura and Salma, 28: 2018).

Education for citizenship

It is preparing individuals to participate as active and responsible citizens in a democratic life. It aims to arm young people with knowledge, skills and understanding, enabling them to play an effective role in the public life of their country and effective education on citizenship. Through education on citizenship, young people learn their rights, responsibilities, duties and freedoms, and they receive information about Laws, justice and democracy, and through them they also learn to participate in decision-making, in their school life, in their neighborhood, in their local community and in their country as a whole as active citizens and as part of the world. (Abu Bakr, 2016: 52)

The third axis: thinking

It is the duty of teachers to teach students how to think and to raise the level of their ability to think, because it is possible to influence thinking at all levels and forms (Yousif , 2019:174). Thinking is a cognitive mental process and it is a reflection of relationships, phenomena and events in human consciousness. With a coherent and meaningful fabric, thinking is a symbolic activity that includes dealing with symbols to solve the problem (Jalil, 2014: 310). The process of developing the ability to think is one of the most important goals of education. Indeed, some believe that developing students' ability to think in a way that helps them overcome life problems that they face (Abbood, 2023: 56) Therefore, male and female teachers should be trained to think so that they can face problems in a flexible manner, especially those problems that have been chosen to be a subject for teaching or training students on (Abbood, 2023: 23). The current era of psychology is also an era of thinking, with an emphasis on the growing need for experimentation. New and non-stereotypical ways of solving problems and the many difficulties we face (Ahmed , 2018: 511). Also, many educators agree that education for thinking or learning its skills is an important goal, and schools should do everything they can to Providing opportunities for thinking for its students, and many educators consider the task of developing the student's ability to think an educational goal that they place at the forefront of their priorities, but this goal is often shocked by reality when applied because the existing educational system does not provide sufficient experiences in thinking (Yousif , 2019: 2876) so This research focuses on the most important types of thinking, which is future thinking

The fourth axis: future thinking

The concept of forward thinking

Future thinking is one of the types of thinking in which planning and scenarios are used to give predictions that may occur in the future in a certain period of time.

The concept of future thinking is the totality of intellectual processes that the individual uses to explore future experiences, from which he develops understanding and planning in order to solve a future problem, and also develops predictions based on his experiences in reaching goals, results, solutions, or decision-making (Torrance. 2003: 10). Future thinking is "the mental process that aims at realizing future problems and transformations, formulating new hypotheses related to these transformations, reaching new connections using the available information, searching for unfamiliar solutions, examining, evaluating and proposing possible future ideas in order to produce a new information stock that directs the individual towards Long-term goals in an attempt to draw the preferred future pictures, and study the variables that can lead to the possibility of this future picture (Ibrahim, 2009: 288). It is also the ability to formulate new hypotheses, reach new connections using the available information, search for new solutions, modify hypotheses and reformulate them when necessary, draw proposed alternatives and then formulate the results" (Hafez, 2015: 482).

From the aforementioned, the researcher notes that they agreed that future thinking is a set of skills from which the past is evoked to develop a future vision to benefit from it to understand the future, from planning, forecasting and making the appropriate decision for that.

What is forward thinking?

The nature of future thinking can be defined in the following:

A- For future thinking as a mental faculty: it means "a process of perceiving problems and the ability to formulate new hypotheses, reach new connections, using the available information, search for solutions, modify hypotheses, reformulate them when necessary, draw proposed alternatives, and then present the results in the end. This process requires optimism, hope, search for mystery, unclear features, research, investigation, and imagination to embody thinking in a mental image, drawings, or ideas.

B- Future thinking as a visualization process: it means "the process of generating a lot of ideas, raising questions about the information that has been collected, using imagination, thinking, contemplating, brainstorming, and using the what-if-in strategy with the aim of developing a vision Initial of what the phenomenon will be in the future, and this process includes borrowing from other people's ideas,

unleashing imagination, simplifying the complex, more hard work, failure and continuous good trying.

C- Future thinking as a forward-looking process: it means “the process through which the individual discovers, creates, examines, evaluates and proposes possible, potential or preferred futures, and this is formulated in the form of predictions. (Ahmed, 2017: 177-178)

D- Future thinking as a prediction process: it means "the process through which an attempt is made to form various future images that are likely to occur, and to study the variables that can lead to the possibility of the occurrence of this future image, as the individual wonders about:

- What could be (The Possible).
- What is likely to be (The Probable).
- What should be (The Preferable).

E- Future thinking as a process of calculated expectation: it means the process that is based on understanding and perceiving the development of events from a future time extension; To find out the direction and nature of change based on the use and analysis of various information about the present, and to benefit from it in drawing a preferred and desired picture for the future.

F- Future thinking as a problem-solving process: it means the process by which the current problems are monitored and tracked, and multiple alternatives are proposed for what the problem will be in the future; Focusing on the importance of drawing alternative and expected images, and developing unfamiliar solutions. (Al-Mutairi, 2018: 58)

(Ibrahim, 2009) mentioned that the individual goes through several stages of the future thinking process as a problem-solving process. Which:

- Gathering information: that is, returning to the natural environment to gather information, seek inspiration from the environment, and develop skills and talents.
- Meditation (thinking): means raising questions about what has been collected and using investigation and imagination to answer questions while proposing alternative questions.
- Incubation: means adopting an idea, selecting among the most expected ideas, in terms of occurrence, and making a decision; It depends on the individual's ability to intuition and intelligent guesswork to choose ideas and alternative ideas.
- Growth: means Improving the idea, avoiding what should not be done in order to reduce future risks. (Ibrahim, 2009: 55)

G- Future thinking as a creative productive process: It means the mental process through which the individual is relatively liberated from the constraints of the present, represented in the sensitivities of the short-term view that feeds narrow interests, which constitute an obstacle in the way of producing something new that can be used and coming up with the stock of information, which can This confirms the novelty of the future product, the amount of information and benefit, and the proposal to convert the new product into a possible future, with the intention of directing the individual to go towards long-term goals and informing him of the measures that must be taken in time, with the aim of reaching them (S.IAu Robertson, 1999) quoting from (Ahmed, 2017: 175).

Stages of future thinking

Future thinking includes several stages that the individual must go through to achieve his desired goals, and he clarified them (Zanqour, 2015) in the following points:

1- Looking Around: It is the first stage of future thinking, through which the individual can understand and analyze the factors, and understand everything surrounding the problem or the subject to be solved.

2-Meditation (Looking Ahead): Through it, the individual can develop possible alternatives to solve a problem, draw future pictures, and develop an appropriate scenario to follow in the future.

3- Planning: An appropriate plan is prepared to determine the gap between the current reality and the hoped-for future, and to develop the best future picture and try to achieve it as much as possible.

4- Acting: Previous steps and expected strategies are implemented, with indicators for evaluation, identification of strengths and weaknesses, and path adjustment (Zanqour, 2015: 71).

Third chapter: research methodology and procedures

1- Research methodology: The current research followed the experimental research approach with partial control, as it is defined as a research design in which individuals are randomly assigned to conduct the experiment using the best available tools, and to observe and interpret the changes that occurred in it, and it requires the experimenter to be able to control random variables

2- First: Experimental Design: Experimental Design

Experimental design is the first step in the implementation of experimental research, as each experimental research has its own design that guarantees its integrity and accuracy of the results that result from it. The determination of this design depends on the nature of the problem and the circumstances of the sample, and its selection is

considered as an action plan for the method of implementing the experiment in question (Botros, 2015: 73 The researcher adopted the experimental design with partial control of the experimental and control groups, the post-test of the future thinking scale for biology teachers, and the pre- and post-test of the environmental culture scale for their students, as shown in the chart (1):

striped (1) Research experimental design

Telemetry	Tribal measurement	dependent variable	the independent variable	Parity	Group	Class
Future thinking scale		- future thinking	A training program according to the dimensions of environmental citizenship	-sex -Qualification Number of years of service -Training courses he underwent	Experimental	teachers
			They have not undergone a training programme		control	
Environmental culture measure	measure of environmental culture		Their teachers have undergone the training program	-chronological age - intelligence - sex -Environmental culture	Experimental	Students
			Their teachers did not undergo the training program		control	

The research community and its sample:

1- Research population

What is meant by the total group of research that the researcher wants to generalize the results of his research on (Odeh and Malkawi, 1998: 159).

A - Teachers' community: It consists of male and female teachers of biology for the fourth grade of science in preparatory and secondary governmental daytime schools affiliated to the General Directorate of Education of Baghdad / Al-Rusafa Al-Awwal for the academic year (2022-2023). 102) A school according to the statistics of the Planning Department / Statistics Division of the Directorate

Table (1): The number of teachers and students in the research community

Total	Preparatory Boys	Preparatory girls	Boys high school	Girls high school	N.
135	18	24	35	58	teachers

2- Research sample: Research sample

What is meant by the research sample is the partial group of the research community and it is representative of all elements of society in the best representation, so its results can be generalized to the entire community (Al-Nabhan, 2004: 200). This research required the selection of a sample of students

A- The sample of teachers: The sample of teachers included (40) male and female teachers of biology for the fourth scientific grade affiliated to the Baghdad Education Directorate / Al-Rusafa 1 for the academic year (2022-2023), with (20) teachers for the experimental group and (20) male and female teachers for the control group. As the experimental group was selected randomly from the Department of Numbers and Training of the Directorate of Education of Baghdad / Al-Rusafa Al-Awwal, according to the official book (Appendix), while the control group was chosen by the researcher by random drawing method. Before the experiment began, because of their experience in this field, which may affect the results of the experiment Table (2)

Number of research sample members for the experimental and control groups

Sex		Student sample	Sex		teacher sample	Group
121	females	180	11	Females	20	Experimental
59	males		9	Males		
120	females	180	11	Females	20	Control
60	males		9	Males		
241	females	360	23	Females	40	the total
119	males		17	Ma		

The equivalence of the two research groups (teachers sample):

The researcher equalized the two research groups (teachers sample) in a number of variables that she believes may affect the independent

variable and affect its uniqueness in affecting the dependent variables. The training program, and the researcher obtained the required data, and then the two research groups were rewarded with the following variables

A- Gender: Since the two research samples were male and female teachers in each of the experimental and control groups, their number was (20) male and female teachers, with (11) females and (9) males, appendix (), which indicates the equality of the two research groups in the gender variable.

B- Academic qualification: The researcher noticed through the questionnaire that was distributed to a sample of teachers before starting the application of the training program that all the male and female teachers in the experimental and control groups had obtained a bachelor's degree, as most of them are graduates of the faculties of Education / Department of Life Sciences, and some of them are graduates. Graduated from the Colleges of Science / Department of Life Sciences, so the two research groups from the sample of teachers are equivalent in the academic qualification variable

C- Number of years of service: The researcher applied the chi-square equation (Ca2) to calculate the equivalence of the two research groups in the variable of years of service. The results showed that there was no statistically significant difference at the level of significance (0.05) between the experimental and control groups and at the level of significance (0.05). And the degree of freedom (3), as the value of (Ca2) calculated was (0.15), which is less than the tabular value (7.81), and this means that the two research groups are equivalent in the variable of the number of years of service as shown in Table (3)

Table (3) The equivalence of the two groups of teachers of the research sample in the number of years of service variable

Indication	T value		degrees of freedom	Control	Experimental	Years of service	Group
	Tabular	Calculated					
non function	7.81	0.15	3	6	5	5-1	Experimental And Control
				4	4	10-6	
				3	3	15-11	
				7	8	16 and more	

D - The training courses that they underwent (previous experience): It means the number of teaching methods courses that the experimental and control sample members underwent. Statistically significant between the two groups at a level of significance (0.05) and a degree of freedom (3), as the calculated chi-square value (Ca2) was (0.62), which is

less than the tabular value (7.81), and this indicates the equivalence of the experimental and control groups in this variable, as shown in the table (4)

Table (4) The equivalence of the two groups of teachers of the research sample in the variable

Indication	T value		degrees of freedom	Control	Experimental	The number of training courses	Group
	Tabular	Calculated					
non function	7.81	0.62	3	10	9	not submitted	Experimental And Control
				5	6	One	
				3	4	Two	
				2	1	Three and more	

- Adjusting the conditions of the experiment and preventing associated accidents:

It means all the accidents and conditions that the students of the two research groups may be exposed to during the experiment, which negatively affects the results of the experiment, so the researcher tried to control all the extraneous variables, which are:

A- The duration of the experiment: The duration of the experiment was equal for the sample of the two research groups, as follows:

- Student sample: The duration of teaching, which both the experimental and control groups were subjected to, was the same period from Sunday (10-15-2022) until (15-1-2023), i.e. the first semester of the academic year (2022-2023).

B- Processes related to maturity: Given that the period during which the experiment was conducted was unified for the two research groups, i.e. the two research samples, which are the teachers' sample and the students' sample, as it was limited to the first semester of the academic year (2022-2023), the growth factor will be unified for all members of the two samples and at the same level, so There is no effect of this factor in the current research

C- Experimental extinction: It means the effect resulting from the abandonment of a number of research sample individuals or their interruption during the experiment, which negatively affects the results of the experiment (Abdul Rahman and Zangana, 2007: 479).

- Teachers' sample: the continuation of the male and female teachers chosen by the researcher to represent the experimental group

- Attendance The experiment did not subject to interruption of teachers during the experiment period, as all of them committed themselves to attendance

- Student sample: For this sample, there was no interruption for the students of the experimental and control groups throughout the experiment period, except for some few individual absences, which are considered normal.

D- Two measurement tools: The researcher applied the same measurement tool to the research sample of teachers (experimental and control), which was represented by the measure of future thinking to know its impact on the independent variable. Students, the researcher applied the same tool represented by the environmental culture scale, where this scale was applied before and after for the purpose of equivalence to find out its effect on the independent variable.

E- Ensuring the confidentiality of the research: the researcher was able to maintain the confidentiality of the experimental program by not informing the sample of teachers that they are under trial and in agreement with the Preparation and Training Department of the Directorate of Education of Baghdad / Al-Rusafa Al-Oula after carrying out all the required procedures without informing the trainees that they are under trial. With regard to the sample of students, the researcher was keen on the confidentiality of the research through agreement with the school administrations not to inform the students of the nature and nature of the research so that there would be no change in their activity or their dealings with the experiment, which might affect the internal safety of the experiment.

F- The external safety of the experimental design:

With the intention of external safety, the extent to which the members of the research experiment represent the research community to which they belong, and the possibility of generalizing the results of the experiment to the research community under the same conditions and by performing the same procedures. the researchers tried to provide external safety conditions for the experimental design by carrying out several procedures:

- Experimental selection: It is that the work of the experimental variable on a specific sample differs from the way it works on another group, meaning that the groups subject to the experiment are more sensitive to the experimental variable, and this variable has been overcome by selecting research samples that are well representative of the community.

- The interaction of the pre-measurement of equivalence and its effects: It means the effect of the pre-test on the post-test over time, regardless of the effects of other external factors, and thus the results cannot be

generalized. The period between the application of the pre-scale for the student sample and the post-scale, which is the measure of environmental culture, was a sufficient period that exceeded two months, which is a sufficient period to reduce the effect of this factor.

- The overlap between the choice and the experimental variable: it means that the sample members differ from the members of the community to which we want to generalize the results.

- Interaction of experimental situations: It means that one individual from the sample or the whole sample undergoes more than one experimentation process during a specific period of time, as the effect of previous experiments affects negatively or positively the results of the current experiment, so the researcher controlled this variable as the two research samples (teachers and students) were not subjected) for more than one experiment during the research period

Fourth: Research Requirements:

1) Building the training program:

The construction of the training program is one of the most important stages in the training process, and this construction includes a set of processes and elements that are interrelated with each other and all work to achieve the objectives of the training process, as the careful construction of the training program leads, in turn, to the success of the training program for the target group, and after the researcher reviewed a number of Previous studies that dealt with the training program, such as Makawn's study (2012), Al-Khafaji's study (2016), Jaber's study (2015), Al-Atabi's study (2018), Al-Rubaie's study (2018), Al-Hassan's study (2021), Al-Qara Lusi's study (2022), Al-Tamimi's study (2022), and also through See some references and literature that dealt with training and design

A detailed explanation of the steps of the future thinking scale:

1- Determine the purpose of the scale: This aims to measure the future thinking of biology teachers for the fourth scientific grade

2- Examining the literature, studies, and measures of future thinking: The researcher reviewed a number of literature, previous studies, and some measures that dealt with environmental culture. My agencies:

- Environmental Culture Book: A Civilized Requirement for the Family (Hamid, 2003)

- Future Thinking Strategies book, a study in curricula and teaching methods, the latest applications for the contemporary teacher (Ali, 2017)

- Future Thinking book: "What it is - its strategies - its skills and the importance of including it in the curricula"(Sultan, 2021)

- A foreign study as a study (Summet, Gupta; Hee, Woong, Kim, 2004)
- Arabic studies, such as the study of Al-Qarni (2019), and the study of Abu Al-Ward (2022),
- Local studies such as the study of Al-Budairy (2022) and the study of Al-Budairy (2022)

In light of the foregoing, the researcher decided to adopt the theory of (Torrance, 2003), which defined future thinking as (a set of skills that enable the individual to address his expectations for the future, define its scenarios, and predict its variables in a conscious, effective, and positive manner). The dimensions of the scale (future planning, positive thinking) were determined. the future, predicting and imagining the future, developing the future scenario, evaluating the future perspective)

3- Preparing the initial version of the scale: based on the theoretical concept of future thinking and after defining the dimensions in the light of which the paragraphs of the scale will be built, then formulating the paragraphs of the scale as it included in its initial form with (50) paragraphs by (10) paragraphs for each dimension. The scale included a number of paragraphs These negative paragraphs included general attitudes faced by the teacher in his future life, as well as preparing instructions for teachers explaining how to answer the paragraphs of the scale.

4- Scale Correction: Correct the paragraphs that measure towards the scale, which are paragraphs (1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20). 21, 22, 23, 24, 25, 26, 27, 28 29, 30, 31, 32, 33, 34, 35, 37, 38, 39, 41, 42, 43, 45, 46, 47, 49, 50 As for the negative paragraphs, they are (9, 15, 36, 44, 48), and the researcher put five alternatives for each paragraph (it always applies to me, it often applies to me, it applies to me sometimes, it rarely applies to me, it never applies to me) and the respondent's answers were corrected on The scale is by weights (5, 4, 3, 2, 1) respectively for the positive items. As for the negative items, the correction of the respondent's answers is the opposite of the weights, which are (1, 2, 3, 4, 5), respectively, as shown in Table (5).

Table (5) Scores given to the items of the future thinking scale

It never applies to me	rarely apply to me	It applies to me sometimes	It often applies to me	always apply to me	Paragraphs
1	2	3	4	5	positive paragraph
5	4	3	2	1	negative paragraph

5- The apparent validity of the scale: In order for the researcher to verify the apparent validity of the scale, it was presented in its initial form consisting of (50) items to a number of arbitrators in teaching methods and psychology, to indicate their opinions and observations regarding the validity of the items and their suitability for the purpose for which they were set. The formulation of some paragraphs is based on these opinions and observations, and the researcher used the leading ratio and the value of square (Ca 2) to analyze the responses of the arbitrators on the items of the scale, as (45) paragraphs obtained the approval of all the arbitrators on their validity for the measurement by (80%) or more.

Table (6) Percentages and chi-square value of the apparent validity of the items of the future thinking scale

Statistical significance at the level (0.05)	degrees of freedom	Chi ² value		percent age	The number of arbitrators			Paragraph number	n.
		Tabular	calculated		calculated	Approvers	total		
function	1	3.84	23	%100	0	23	23	11, 10, 8, 4, 2, 1, 20, 19, 16, 15, 12, 28, 24, 23, 22, 21, 38, 36, 34, 32, 31, 49, 47, 46, 44, 43, 42	1
Function	1	3.84	19.17	%96	1	22	23	26, 25, 17, 14, 9, 6, 48, 40, 39, 37, 33	2
Function	1	3.84	15.69	%91	2	21	23	50, 35, 30, 27, 7, 5	3
Non function	1	3.84	2.13	%62	8	15	23	19, 18, 13, 12, 3	4

6- The first exploratory application of the scale: After verifying the apparent validity of the scale, it was applied to a sample consisting of (14) male and female teachers equally from the teachers of the fourth scientific grade from the research community, and not from his sample on Monday and Tuesday (19-9-2022 and 20-9 – 2022) The results of the application resulted in a lack of teachers' inquiries about the scale items, which indicates the suitability of these paragraphs and their suitability for biology teachers and the clarity of the instructions. The average time to answer the items of the future thinking scale was (30) minutes.

7- The second survey application: After verifying the clarity of the paragraphs and instructions of the scale and knowing the time required to answer it, the scale was applied to a second survey sample consisting of (104) male and female teachers of the fourth scientific grade. The application began on Sunday (25-9-2022) until On Thursday (9-29-2022)

to extract the psychometric characteristics of the scale, and the researcher supervised this application herself

8- Finding the psychometric characteristics of the scale as indicators of the validity of the construction: After conducting the second exploratory application of the scale and correcting the teachers' answers according to the prepared answer form, then the final grades were arranged in descending order. As the number of members of the two groups reached (56) male and female teachers, with (28) male and female teachers for one group, in order to extract the discriminatory power of the scale.

- The discriminatory power of the paragraphs: To find out the ability of the paragraphs to distinguish between individuals and to exclude the non-distinguishing paragraphs from them, considering the calculated t-value as an indicator for distinguishing each paragraph of the scale, as the results were analyzed and the arithmetic mean and standard deviation were extracted for each of the paragraphs of the two end groups. It was found that the calculated t-value ranged Between (2.10 - 3.42) and when compared with the tabular value of (2) at the level of significance (5.05) and the degree of freedom (54), it became clear that all paragraphs are distinguished because their calculated T-values are greater than the tabular value

- Correlation coefficient of the paragraph score with the total score of the scale: Pearson correlation coefficient was used to find the correlation coefficient of the paragraph with the total score of the items of the future thinking scale. .21- 0.86). That is, they were all greater than the tabular (r) correlation value of (0.193) at the significance level (0.05) and the degree of freedom (102).

- Correlation coefficient of the degree of the paragraph with the field to which it belongs: The researcher used the Pearson correlation coefficient as well for the purpose of calculating the correlation coefficient of the degree of the paragraph with the field to which it belongs. The future value ranged between (0.24 - 0.71), while the value of the correlation (r) calculated for the dimension of positive thinking about the future ranged between (0.44-0.66). The correlation (r) calculated for the dimension of developing the future scenario ranged between (0.21-0.66). As for the dimension of evaluating the future perspective, the value of the correlation (r) calculated ranged between 0.20-0.71). All of them were greater than the value of the correlation (r) tabular amounting to (0.193) at a level of significance (0.05) and a degree of freedom (102).

- Correlation coefficient of the domain degree with the total score of a scale: The researcher used Pearson's correlation coefficient to find the correlation between the scores of each domain and the total score of the scale table (7)

Table (7) Correlation coefficient of the domain score with the total score of the future thinking scale

Evaluate the future perspective	Develop a future scenario	Prediction and future imagination	Positive thinking about the future	future planning	dimension
0.77	0.80	0.76	0.77	0.75	الدرجة الكلية

Stability of the scale: The stability of the scale was measured in two ways:

A- The split-halves method: the researcher divided the paragraphs of the scale into two halves, one of which includes the degrees of the individual paragraphs and the other the degrees of the even paragraphs, and by adopting the Pearson coefficient, and after correcting it with the Spearman-Brown coefficient, the stability of the future thinking scale reached (0.96), and this confirms a good stability ratio, as The stability ratio, if it is (0.70) or more, is a good indicator of the stability of the scale

B- The Alpha-Cronbac equation: It is one of the methods that measure the homogeneity and consistency between the items of the scale. (4,.....) to answer the one paragraph (Al-Batsh and Farid, 2007: 140). The alpha-Cronbach coefficient was calculated to calculate the internal consistency of the scale and it reached (0.83), which is a good indicator of the stability of the scale.

C- The final picture of the scale: After the researcher verified the psychometric and statistical characteristics of the scale, the scale will be in its final form of (45) items distributed into five dimensions: future planning (9) items, positive thinking about the future (6 items), prediction and future imagination (6 items). (10) paragraphs, developing the future scenario, by (10) paragraphs, evaluating the future perspective, by (10) paragraphs. do not apply)

Chapter Four:

Presentation and interpretation of the results

This chapter includes presenting and discussing the results that the researcher reached, and interpreting these results according to the research objective and hypotheses, as follows:

- The results of the future thinking scale

A- (First null hypothesis):

For the purpose of verifying the first hypothesis, which states that (there is no statistically significant difference at the level of significance (0.05)

between the average scores of the biology teachers of the experimental group who underwent training according to the training program according to the dimensions of environmental citizenship and the average scores of the biology teachers of the control group who were not subjected For training according to the dimensions of environmental citizenship in the future thinking scale.

The researcher used the t-test for two independent, equal samples to show the differences between the mean scores of the experimental and control groups on the scale of dimensional future thinking. Table (8)

The results of the t-test for two independent samples of the two research groups on the future thinking scale

Indication	T value		degrees of freedom	deviation hglufhvd	SMA	number of students	Group
	Tabular	calculated					
دالة	2.02	5.72	38	9.98	168.45	20	Experimental
				7.99	152.10	20	Control

It is clear from Table (8) above that the arithmetic mean of the scores of the experimental group teachers on the future thinking scale was (168.45), with a standard deviation of (9.98), while the arithmetic mean of the control group was This indicates that there is a statistically significant difference in favor of the experimental group for the measure of future thinking. For this reason, the first zero hypothesis is rejected and the alternative hypothesis is accepted, which will be as follows (there is a statistically significant difference at the level of significance (0.05) between the average scores of the biology teachers of the experimental group who underwent training according to The training program according to the dimensions of environmental citizenship and the average scores of the biology teachers of the control group who did not undergo training according to the dimensions of environmental citizenship in the future thinking scale.(152.10), with a standard deviation of (7.99), and the calculated t-value was (5.72), which is greater than the tabular value of (2.02) at a degree of freedom (38) and a level of significance (0.05).

b- Effect size:

To find out the size of the effect of the independent variable on the dependent variable, the researcher used the Cohen equation to measure this effect of the independent variable on the dependent variable. Table (9)

Table (9) The effect size of the independent variable on the future thinking variable

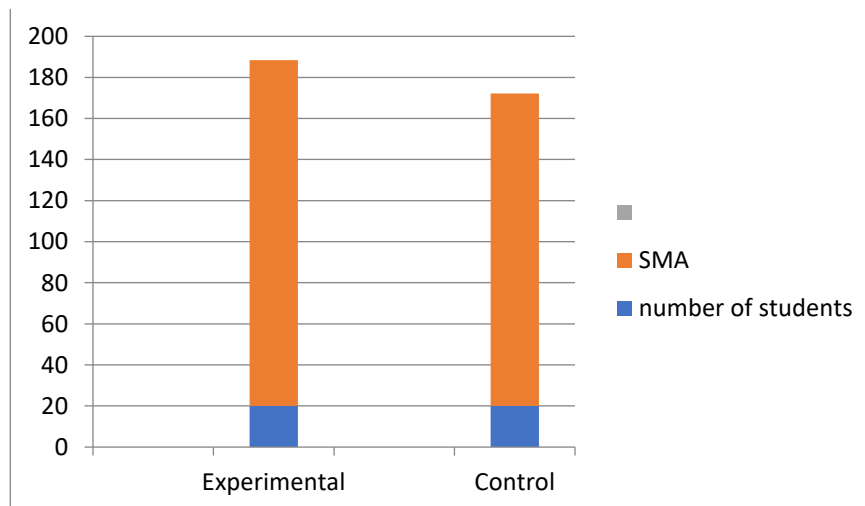
The magnitude of the effect	effect size value (d)	dependent variable	the independent variable
Big	0.90	future thinking	A training program according to the dimensions of environmental citizenship

After the value of the effect size was extracted, it amounted to (1.27), which is a suitable value for the training program variable according to the dimensions of environmental citizenship in future thinking, and by a large amount according to the gradient set by (Cohen 1988).

Table (12) Values of effect size and effect amount

The magnitude of the effect	effect size value (d)
Small	0.2-0.4
Middle	0.5- 0.7
Big	0.8 and above

Figure (1) Comparing the experimental and control groups in the environmental culture scale



Discussion and interpretation of the results: The results of this research will be interpreted as follows:

Interpretation and discussion of research results related to future thinking: It has been shown through the current research that there is a statistically significant difference between the experimental and control

groups and in favor of the experimental group in the variable of future thinking and the size of the effect is considered large

1- Training according to a training program in accordance with the dimensions of environmental citizenship and what this program contained in terms of strategies related to the environment and sub-activities, whether individual or group. Training and choosing the right one works

2- The diversity of the activities included in the program in terms of their number and familiarity with everything related to the environment in terms of activities, as well as the preparation of school plans that highlight environmental issues that highlight environmental pollution issues and other important environmental matters that included new information that contributed to the enrichment of information storage

3- The trainees have the ability to raise their motivation, as the variety of training activities practiced by the trainee helps in the trainee's ability to interact and thus obtain information easily and proficiently as well as to stimulate motivation and the ability to interact

4- The modern methods and techniques used by the researcher such as (Datashaw, PowerPoint, illustrations, working papers, etc.) contributed effectively to the interaction of the trainees and encouraged their positive contribution throughout the training period and prompted the trainee to discuss with the trainer and with colleagues in addition to exchanging environmental information and conveying their observations on environmental issues.

5- The exposure of the trainees to new information that they had not previously known increased their curiosity and their eagerness to know more about environmental scientific research and to pay attention to what is happening around them of environmental problems and their desire to know appropriate solutions to them increased the value of these topics for them and increased their knowledge outcome And thus facilitated the transfer of the impact of that knowledge to their students

Chapter Five: Conclusions and Recommendations

First: conclusions

According to the results of the current research, the following conclusions have been reached:

1- The training program prepared according to the dimensions of environmental citizenship contributed to achieving the training needs of biology teachers for the fourth scientific grade.

2- The training of biology teachers for the fourth scientific grade on teaching according to the dimensions of environmental citizenship helped these teachers to raise their rate of future thinking.

3- The training of biology teachers for the fourth scientific grade according to the dimensions of environmental citizenship had an impact on raising the levels of environmental culture for their students.

Second: Recommendations

The researcher drew a set of recommendations based on the results obtained from this current research, which may contribute to enriching the educational process and those in charge of it, especially in the teaching of biology, as follows

1- Adopting the training program that was prepared according to the dimensions of environmental citizenship and including it in the annual or quarterly plan for the training courses that are prepared by the Preparation and Training Department of the Education Directorates in Baghdad and the governorates to train fourth-grade science teachers according to this program.

2- Emphasis on the practical aspect of teaching strategies, which include writing teaching plans and implementing them during the training courses prepared by the Preparation and Training Department of the Directorates of Education for Baghdad and the provinces for teachers, and not being limited to theoretical aspects.

3- The Department of Preparation and Training of the Directorates of Education in Baghdad and the provinces communicates with teachers and educational supervisors with the aim of identifying the educational and educational needs for the purpose of directing the upcoming training courses towards meeting these needs

4- Preparing and implementing more training courses for biology teachers for all levels of study, including the concept of future thinking for the purpose of developing this thinking for them, or including this thinking within the training courses for the purpose of strengthening their capabilities and capabilities in the subject of future thinking.

5- Raising the motivation of biology teachers through the training program according to the dimensions of environmental citizenship to encourage their students to take care of the environment and raise their levels of environmental culture

Third: Proposals

For the purpose of completing the current research, the researcher suggested the following:

1- Carrying out a study similar to this research at academic stages other than the fourth science

2- Conducting this study on other disciplines such as physics and chemistry

3- Studying the training program according to the dimensions of environmental citizenship for biology teachers in variables other than future thinking, for example environmental values or environmental awareness

4-Conducting a study that includes the analysis of biology textbooks for the secondary stage according to the dimensions of environmental citizenship

5- Conducting a study similar to the current research on undergraduate biology students

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