CLIMART: INNOVATIVE METHODOLOGIES FOR LEARNING CLIMATE CHANGE THROUGH ART AND THEATRE.

ART-BASED LEARNING METHODOLOGIES.

MANUAL FOR SECONDARY SCHOOL TEACHERS.

Co-funded by the Erasmus+ Programme of the European Union

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This document is the result of the Intellectual Output number 2 in the ERASMUS+ Project n°: 2019-1-IT02-KA201-063353 "**Innovative methodologies for learning climate change through art and theatre**" (ClimART)

This work has been coordinated by CRESOL Associació and it has been carried out with the collaboration of all the other ClimART partners: EUROCUBE, SOPHIE-BRAHE-GEMEINSCHAFTSSCHULE, SSS" MILOS CRNJANSKI", OKOSP, IES BOTÀNIC CAVANILLES, LICEO CLASSICO VITTORIO EMANUELE II.

Art using more emotive and personally relevant language may help bridge the divide between scientific information and personal responsibility.

Most people understand the world through stories and images, not lists of numbers, probability statements or technical graphs, and so it is crucial to find ways of translating and interpreting the technical language found in scientific reports into something more engaging. A visual artist can capture the concept of sea-level rise better than any graph, and still be factually accurate if scientific projections are used to inform the work.

In addition, art can provide people with visualizations of the problem and give them a personal experience with the subject-matter, which is especially important regarding climate change as many people still see it as an abstract issue that poses no direct threat. Art may also help to establish a group identity and to give people a sense of being supported in their efforts to help combat climate change.

Therefore, this intellectual output is focused in the preparation of a manual for high school teachers. This manual is focused in artistic knowledge with the aim of helping teachers in the acquisition of knowledge about techniques, methods and technologies to improve the knowledge of teachers and transfer to them the big potential of art.

This manual is innovative because nowadays art is not generally use to transfer scientific knowledge to the students and to the public that attends the performance. Indeed, art represents an innovative and efficient way to transfer climate change issue, allowing to:

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• increase people awareness

• make climate change more visible in a way that goes beyond the images people are used to seeing in relation to this subject

• help the audience to feel more responsive and motivated to engage in problem-solving or applying proposed solutions

With this output, the access of teachers to high quality and innovative material will be increased. As teachers will contribute to the material revision, the relevance of the contents for the target group will be ensured.

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1. MODULE 1. Introduction: Connecting art, education and the natural environment.

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1.1 INTRODUCTION ART, ENVIRONMENT AND EDUCATION

Artistic activities offer unique ways, often non-cognitive, to interpret and signify experiences in the world. They tend to reach the sensory, perceptual, emotional, cognitive, symbolic and creative levels of human beings. Through the creation and contemplation of art, a person's ability improves to be closer to internal psychological levels. At the same time, such activities nurture and guide our sensitivity to reality and life. They can sharpen and refine our perception and make us sensitive to the mystery of things around us.

Carey (2005) argues that

. These ideas were reinforced during the Enlightenment, when a series of philosophers endowed art with spiritual, moral, and civilizing qualities. During the 19th century, such views became a widespread cultural assumption, as they were applied to the poorer levels of the working class of society. As Nicholson describes: "The arts provided an optimistic space that promised social cohesion and personal freedom." They were seen as a means to integrate soul, mind and body that would lead to "an organic society that would not exist without class division." Dewey was a major promoter of these ideas. He advocated arts as part of his educational philosophy; not as a way to educate children to become professional artists, but as a way to encourage "growth of perception." He believed that to allow people to solve social problems, they must first be in contact with their bodies and experience of the world. To avoid "disembodied idealism", the evocation of emotion through arts, drama, music, and narrative would regroup people into their bodies and help them develop genuine solutions to existing problems (McConachie 2012).

Meri-Helga Mantere, quotes that art "comes from the delicate and rough beauty, from the sensual experience, from surprises and amazement, from the internal movement (emotion) of the heart and soul". Much of this, she adds, is not called art, but is an aesthetic and spiritual quality of anyone's life, and can be enjoyed without overloading the environment.

Through art, we can see and get closer to the earth. Art can drive us crazy, provoke us. It can catch us off guard or hit us unexpectedly. It helps us review and renew our understanding of everyday things and events that are so familiar to us that our perception of them has become routine.

In this sense, working with art encompasses a fundamentally open learning experience. American

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cartoonist Scott Adams (1996) once put it this way:

“Creativity is allowing yourself to make mistakes. The art is knowing which ones to keep.”

Art can open to chaos, to the presence of contradictions, to paradoxes and ambiguities; and this quality of art can be of great value in our current times.

There is something specific, unique and irreducible in the artistic process as a way of learning and reaching new understandings of the world. Artistic creation can be seen as a learning process in itself. Education through art according to Herbert Read (1943) implies that artistic or creative pedagogies can be applied to other fields of learning, including efforts to obtain a deeper understanding of the natural environment.

Therefore, it could be taken as a premise that the arts are crucial to activate awareness and address socio-environmental challenges. They can also form the basis for environmentally and socially committed practices.

In relation to the effect of the natural environment in education and training people, Richard Louv in his book "The Last Child in the Woods" refers to the phenomenon "nature deficit disorder". This disorder corresponds to children and young people who lose contact with nature and therefore will no longer fight for it, because they do not know it and, therefore, have not learned to love it.

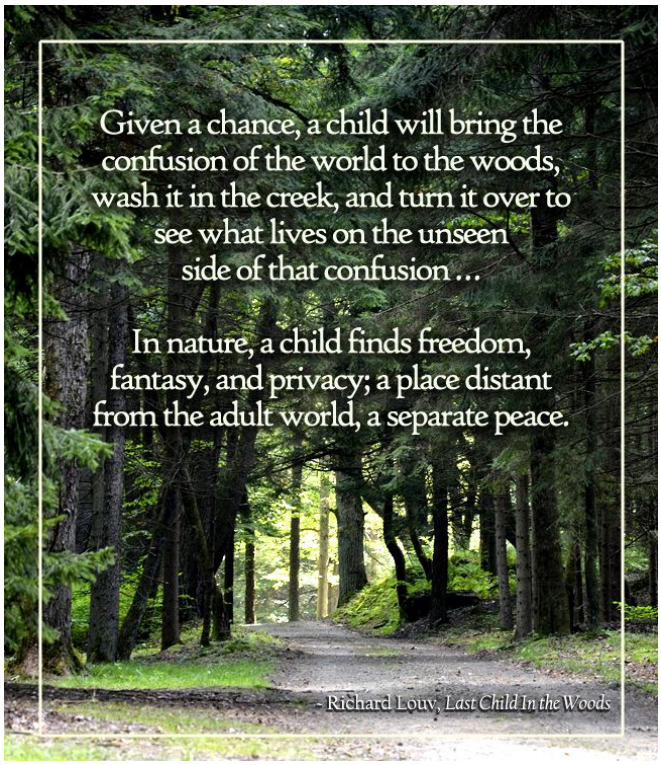

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Figure M1-1. Citation of Richard Louv, “Last Child in the Woods”

Likewise, George Monbiot, from The Guardian, points out: "Most of those I know who fight for nature are people who spent their childhood immersed in it."

Rainer Maria Rilke, quotes that when children grow up, they enter a period of deep melancholy: “they feel that nature no longer has sympathy for them”. Some of these people are unwilling to abandon the nature they have lost. They try to get closer to the natural environment again and frequently these people are artists: poets, painters, composers or architects, since "they see that their task is to understand Nature so that they can take their place somewhere in its great design". By doing so, they render a service to humanity, because through them all humanity approaches nature.

Edith Cobb, in her book "The Ecology of Imagination in Childhood", compiles biographies of several hundred geniuses and creative people and comes to a common observation: they all had close contact with nature during their childhood. Several studies show that children's games in natural areas are more imaginative than those played in urban areas.

When a child finds an object such as a rock or branch, or plays with sand, water or leaves, these materials seem to provide more opportunities to play with than other standard toys. Found objects invite the child to test his creative and physical abilities. The term "loose parts" is often used to define all this range of materials, both natural and created that can be used individually or in combination. Nature provides us with creative elements to learn and create.

All humans are creative. Therefore, the loose parts become a creative element and also somehow artistic. Many game experts and educators have since adapted the theory of loose parts. For example, if a child picks up a stone and begins to play, the stone will most likely become what the child wants it to be. The freedom provided invites the child to think and choose how they want to use it. Loose pieces are materials that can be moved, transported, combined, redesigned, aligned and disassembled and put back together in multiple ways. This is how Nicholson conceived the relationship between creativity and loose parts that we can easily find in the natural environment.

Lastly, it is worth mentioning how environmental education is understood, as this report is included within a project that pursues education and awareness of environmental aspects related to Climate Change. In this case, the concept of environmental education is considered following the INCN.

The International Union for Conservation of Nature (1970) that defines it as follows:

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> Environmental education is the process of recognizing values and clarifying concepts to develop the skills and attitudes necessary to understand and appreciate the interrelation between man, his culture and his biophysical environment. Environmental education also involves practice in decision-making and the self-formulation of a code of conduct on issues related to environmental quality.

It should be noted that the beginnings of environmental education had its greatest momentum in the United States in the late 19th and early 20th centuries. One of its objectives was to reconcile scientific research with the most personal experiences obtained from interaction with the natural world. The study of nature was an attempt to "teach science to children" with the aim of "understanding animal and plant life in the environmental context." Environmental education can be taught at all levels of education, from early childhood education to higher educational levels, and it is particularly practiced as non-formal or informal education.

Education, art and the environment come together in a triangle.

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1.2 CONTROVERSY IN ART, ENVIRONMENT AND EDUCATION.

In line with the prevailing doctrine of economic growth, art is increasingly seen as beneficial as an economic asset (Nicholson 2011, Bishop 2004). In the previous centuries a "better" human being developed spiritually, morally and intellectually; today we are good citizens when we effectively contribute to the economic capital of a nation, that is, when we are more productive employers, employees and consumers. Consequently, there is a greater interest in the arts as drivers of economic and business capabilities. The arts are associated with creativity and innovation, which in turn are considered important drivers of the economy and globalization.

Today, creativity is very similar to profitability (Nicholson 2011: 95) and, as a consequence, there is a renewed interest from governments to develop the creative capacity of students. Certain presumably artistic skills, such as the ability to produce creative solutions, tackle complex problems, think independently, and work flexibly, have become the core of education to produce successful employees who can compete in a globalized market. Nicholson, Bishop, and many others correctly question what is lost when arts renew creativity. Will arts lose their subversive and transformative potential (that is, their promise to "do good") when co-opted by governments and companies that employ them to advance in what is critical? From this, we can conclude that arts do not necessarily and inherently "do good"; they could support developments that reinforce the ecologically destructive nature of our society. Furthermore, Carey (2005) in his publication “What Good Are the Arts?” talks about the common idea that arts are somehow good for us, and he explains why, or what is meant by "good" or "us" or even "the arts", is a tricky business.

In Lucie Sauvé's opinion, Environmental Education (EE) has stepped back following the official international discourse that followed the Brundtland Report (Our Common Future) in 1987 and the United Nations Conference on Environment and Development (better known as the Summit de la Tierra) in Rio de Janeiro in 1992. Sustainable development became the new buzzword and education had to aim at that. In effect, EE was reduced to a tool, as can already be seen in the variety of titles that were given to various efforts:

"Education for sustainable development", "education for a sustainable future" or, simply, "education for sustainability". According to Sauvé, the official discourse on education for sustainable development follows the rational-technological paradigm of education; associating education with a "transfer of scientific and technological knowledge ",rather than promoting critical thinking, it considers education as a means of putting human potential at the service of economic growth (Sauvé , 1999, p. 25). Stephen Sterling (2003), co-editor of Education for

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Sustainability (1996) argues the same. It identifies both in EE and in education for sustainable development a discourse that is "strongly instrumental", at the expense of a reflection on the intrinsic value of learning and the nature of the learning and teaching experience itself. EE's first speech, he argues, was less overtly instrumental. Although there has been a great explosion of interest in EE and training around the world in the past few decades, the results of all this work are "disappointing," Sterling concludes. Programs in the formal and non-formal sectors "have made some, but not a big difference, in society's views on behavior in relation to the environment and sustainability" (p. 230).

On the other hand, Constance Russell (1999), raises the belief that the environmental crisis has been caused by human disconnection from nature and that, therefore, the job of environmental educators is to provide experiences in nature to heal this rift. She cautions against treating nature as a kind of panacea. For her, it is part of the problem that one seeks to tackle, hoping that the experience of nature automatically contributes to the awareness of the environment with commitment and action.

Figure M1-2. Girl in the nature.

Also regarding education and the current educational system, there are many controversies and discussions. The main objective of this report is not to cover the complexity of the educational system, but it is worth highlighting some aspects that will be taken into account in other phases of the document.

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Most policymakers see education as a means, a path, to provide young careers in the global economy. Consequently, in many countries, the focus has been on performance standards and testing, at the cost of encouraging critical thinking, creativity, and green awareness.

Almost three decades ago, the philosopher Ivan Illich (1973) argued that "schooling" confuses teaching with learning. Classroom attendance, Illich says, removes children from the everyday world and "immerses them in a much more primitive and deadly environment."

Now, it can be argued that schools have changed a lot since Illich made these observations. However, people like Sir Ken Robinson (2006) persist in making the same type of claims and demands that schools kill creativity.

Stephen Sterling (2003), in his thesis "The thought of complete systems as a basis for the paradigm shift in education" tries to describe why their approach to education is radically different from conventional approaches. According to him, we are experiencing a change.

In more developed countries, more emphasis is placed on analysis, distinctions and unidirectional causality rather than pattern recognition, synthesis and comments. To counter this one-sidedness, Sterling suggests that we must think fundamentally differently about education, and therefore opts for the new term "sustainable education," suggesting the need for a cultural shift in education to think and practice on yourself, rather than working towards a form of "education for sustainability".

To end this module, one arrives at the reflection that art in environmental education should not be taken as a solution and it is not the objective of this project to provide a solution to this aspect, but it can and should become a tool to facilitate the connection of education and environment.

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1.3 THE EDUCATION THROUGH ART

Artistic creation as a process, is based on curiosity and it is essential to open direction. It usually begins with not knowing and can end in ambiguity and paradox. Art assignments often provoke, challenge the art creation of students, and results often surprise both art teachers and students.

Currently most of the pedagogues, psychologists and researchers who have delved into education through art defend the benefits of art as an enriching agent for the human being. In this line, we can mention scholars such as H. Read, EW Eisner or H. Gardner, among others, who highlight the potential of art as an educational tool. This concept of art together with a concern for the complete development of the human being, highlights the importance of education through art.

In education through art, what is important is no longer the end result, but the transformation that creative or contemplative practice is capable of causing in the human being. This point of view enriches artistic practice, which is no longer just coloring or achieving a result similar to a given model. However, for this, one must be willing to investigate this new approach and assess the qualitative aspects of art (Eisner: 1998).

To better understand this approach, we will analyze some of the aspects of the most important theories in this regard.

According to the art and education professor Elliot Eisner (1998), the problems we encounter in life are very similar to the problems found in arts: "They are problems that rarely have a single correct solution; they are problems that are often subtle, occasionally ambiguous, and sometimes as a dilemma ... Life outside school is rarely like homework, and almost never like a multiple-choice test."

Eisner (2002) has provided a list of ten lessons that he believes arts teach to children.

In complex forms of problem solving, purposes are seldom arranged, Eisner argues; rather they tend to change with circumstances and opportunities. Learning in the arts requires the ability and the willingness to surrender to unforeseen possibilities of work as it unfolds. Art is a way of knowing that encompasses more than can be verbally expressed. Words do not exhaust what we can know. The limits of our language, says Eisner, does not define the limits of our cognition. When people are encouraged to put into words what they feel for the art they need to delve deeper into their poetic abilities to find the right words. Arts, in his opinion, allow us to have experiences that we cannot encounter from other sources and, through such experiences, we are encouraged to discover the scope and variety of what we are capable of feeling.

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10 Lessons the Arts Teach

By Elliot Eisner

1 The arts teach children to make **GOOD JUDGMENTS** about qualitative relationships. Unlike much of the curriculum in which correct answers and rules prevail, in the arts, it is judgment rather than rules that prevail.

2 The arts teach children that problems can have **MORE** than **ONE** solution and that questions can have more than one answer.

3 The arts celebrate multiple **PERSPECTIVES**. One of their large lessons is that there are many ways to **SEE** and **INTERPRET** the world.

4 The arts teach children that in complex forms of problem solving purposes are seldom fixed, but change with circumstance and opportunity. Learning in the arts requires the **ABILITY** and a **WILLINGNESS** to surrender to the unanticipated possibilities of the work as it unfolds.

5 The arts make **VIVID** the fact that neither words in their literal form nor numbers exhaust what we can **KNOW**. The limits of our language do not define the limits of our **COGNITION**.

6 The arts teach students that **SMALL DIFFERENCES** can have **LARGE EFFECTS**. The arts traffic in subtleties.

7 The arts teach students to think through and within a material. All art forms employ some means through which **IMAGES** become **REAL**.

8 The arts help **CHILDREN LEARN** to say what cannot be said. When children are invited to disclose what a work of art helps them **FEEL**, they must reach into their **POETIC CAPACITIES** to find the words that will do the job.

9 The **ARTS ENABLE** us to have **EXPERIENCE** we can have from no other source and through such experience to **DISCOVER** the range and variety of what we are capable of **FEELING**.

10 The arts' position in the school curriculum symbolizes to the young what adults **BELIEVE** is **IMPORTANT**.

SOURCE: Eisner, E. (2002). *The Arts and the Creation of Mind*, In Chapter 4, What the Arts Teach and How It Shows. (pp. 70-92). Yale University Press.

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Figure M1-3. 10 Lessons the arts teach by Elliot Eisner.

In 1943, Herbert Read caused a stir in the educational establishment with the publication “Education through art”. “What I have in my own mind," he said of his approach, "it is a complete fusion of the two concepts, so when I speak of art I mean a process of education; and when I speak of education I mean a process of art, a process of self-creation ”.

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Read appreciates the contemplation of aesthetic beauty as a transformation and it transmutes our mood in a positive sense: "The contemplation of beauty subtracts the sensitivity of the pressure of life, the intended purpose of the symbol towards a state of suspended animation, towards a state of serenity". When beauty is not only an aesthetically correct image, but it conveys an emotion; that is, when it causes a state of mind, we are talking about more than just aesthetic questions. The mood that beauty causes can become a state in which the mind is momentarily abstracted from its ordinary discourse.

It refers to a power that, although subjective and difficult to quantify, is not non-existent. So, beauty has a power on the human psyche, just as we could speak of the power of music, since both have the ability to transmit a feeling of relaxation or fullness. This power has been used at present and numerous courses of Art-therapy and could be used in classrooms as a means for developing emotional intelligence.

Another fundamental aspect to take into account is that art or its teaching, understood holistically, not only develops aesthetic capacities but also creative, intuitive, imaginative or expressive capacities, in addition to providing greater self-knowledge and another way of relating with the environment. All of these capabilities are important in the human development, as Gardner points out, that bring us closer to a more conscious and complete ideal of being human. Gardner defends the type of creative and intuitive thought developed through art because in our society there is a tendency, according to him and other authors, to privilege rational, logical thought. However, Gardner does not exclude rational, logical thinking. On the contrary, it proposes an integrative vision of the valuation of the two types of thought. In Gardner's own words, in his book Artistic Education and Human Development,

It would be as wrong to say that development should be studied exclusively from the artist's perspective, as it is to argue that it is only worth taking the final scientific competence seriously. To be sure, a comprehensive science of human development needs in some way to consider the full spectrum of capabilities and talents displayed by mature human beings in diverse cultures.

What Gardner does not share, like Ernst Cassirer, Susanne Langer or Nelson Goodman, is the point of view that privileges rational logic above all else. Humans are capable of a wide range of symbolic skills, whose scope extends beyond logic and language. Thus, for Gardner and for other researchers who value art as an important pedagogical tool, the problem is that artistic abilities are relegated to the background. Obviously, this fact supposes a damage in the holistic development of the human being.

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Artistic creativity can be limited by fears and be subject to corrections and the need to obtain a single correct answer to what both the educational system and the society need. Therefore, they tend to value rational-logical thinking more than artistic thinking. As a consequence, most adults have limited their artisanal, artistic, spontaneous, expressive, imaginative, intuitive and creative capacities. Gardner conducts a review of scientific knowledge on human development in general from an artistic perspective, trying to integrate this knowledge with reference to educational practices in different areas of knowledge, as well as with different forms of knowledge, in order to achieve a more complete development of human capacities. In this sense, Gardner finds in art, and especially in artistic practice, an ideal tool (1994: 87):

> This review attested to the challenge faced by students who try to synthesize various forms of knowledge ranging from sensor-motor forms of understanding and intuitive to the artisan skills that can develop up to an exquisite level of mastery, and to the notional and formal bodies of knowledge usually accentuated in schools.

Thus, Gardner considers that some types of knowledge are "usually accentuated in schools." Accordingly, it proposes the teaching of artistic practice to counteract this trend and thus achieve a more complete human development in all fields of knowledge. The ideal of the holistic development of the human being is completed with the formulation of the theory of multiple intelligences. What Gardner proposes us is a pluralistic vision of the human mind, which does not have a single way of knowing and understanding reality, but many different cognitive facets.

Therefore, an education that takes into account the development of all human capacities will be more complete and, together with other factors, will contribute to a more complete human development.

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2. MODULE 2.

Methods of Creativity in environmental education.

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2.1 INTRODUCTION

This chapter presents two applied creativity techniques for the promotion of creative thinking and the generation of ideas in students and a guide for the application of these techniques based on real experience.

Thus, throughout Module 2, the explanation of two creative techniques in the generation of ideas and problem solving is exposed in the first place. Secondly, a practical case and real experience in secondary education is described.

This methodology and analysis was carried out in the academic year 2012-2013 in the seventh grade of secondary education in the Beykoz district of the Istanbul province (Turkey). The average age of the students is 13 years old. The study group consists of 20 students in total, 10 girls and 10 boys.

The description of the methodology is based on an experience drawn mainly from the article "Application of the Six Hats for Thinking and SCAMPER Techniques: an exemplary case" published in the Mevlana International Journal of Education (MIJE) Vol . 3 (4), pp. 166-185, December 1, 2013. In this work, an analysis based mainly on observation, open-ended question form, was carried out, while the interviews were used as the secondary source of data. The methodology used provides tools to the students such as The Six Thinking Hats and SCAMPER techniques and as a result, it was seen that the students had made an improvement in the comparison of ecosystems in terms of biodiversity and climatic characteristics.

Educational practices in today's world vary in parallel with the development of technology. Consequently, countries embark on new missions to improve the quality of education. In this study, education is understood as the way to teach people the ways to access available information instead of directly transmitting information and guiding individuals. It is assumed that education tries to provide ways to generate solutions by using skills against new situations they encounter. The purpose mentioned implies, among other aspects, the teaching of science and environmental education so that people can acquire such skills and competencies (Güneş , Dilek , Hoplan and Güneş , 2011).

When studies are discussed conducted in the field, observed the implementation and functionality of learning and teaching especially aims to highlight the ideas of students and improve such ideas

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through various environments discussion and finally emphasize and process introduction of an original product based on creative thinking (Kaptan and Korkmaz, 2002; Isman et al., 2002; Koray , 2003; Yaman , 2003; Koray , 2004; Aksoy , 2005; Aktamışy Ergin , 2006; Demirci , 2007).

For this reason, as has been commented throughout this Intellectual Product 2, the use of creative and artistic methods contributes to finding new educational paths that turn out to be widely effective and motivating.

Research carried out in this field shows that creative methods and techniques are feasible and that they play an efficient role in the development of individual creativity (Atkıncı , 2001; Dinç , 2000). In this context, Six Thinking Hats and SCAMPER techniques were discussed as favorable teaching techniques.

2.2 METHODS OF CREATIVITY

Six Thinking Hats

The Six Thinking Hats Technique is a method created by Edward de Bono (1985) used to present thoughts and suggestions in a specific order and systematize them. The main theme of this method is that it offers the "role play" function. Since the individual's instinct for self-defense is the main obstacle that restricts thought, hats allow the consideration and expression of ideas that would not otherwise be thought and expressed. In addition, Six Thinking Hats allow the individual to handle a specific problem from the Six different points by directing attention in order from one point to another (De Bono, 2002; Erginer , 2000). This technique may require the person to think positive or negative, get creative, or give an emotional reaction (Erginer , 2000). The Six Thinking Hats technique prevents people from staying within a frame in their thinking and viewing events from a perspective unidirectional. As the technique allows thinking from different perspectives, it allows the analysis of the problem from all aspects for the decision-making process. The hats available in the art cover a lot of ways of thinking. And since the technique is easy and pleasant to apply, it is quickly adopted by people (Can, 2005, p. 43). During their study, Altıkulaç and Akhan (2010) noted that the Six Thinking Hats technique has applicability and this technique ensures enhanced creativity for students. Furthermore, Can and Semerci (2007) reported that this technique provided a greater increase in success, and that students were especially insistent on wearing the white hat. Furthermore, the study carried out by Kaya (2013) revealed that the Six Thinking Hats technique has a more positive impact on the development sustainability of children compared to other techniques in the teaching program. A review of the

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literature on the Six Thinking Hats technique shows that this is an important technique for science education that requires individuals to apply the information they have learned about facts of everyday life as the technique enhances creative thinking.

De Bono's thinking hats are defined in the following ways.

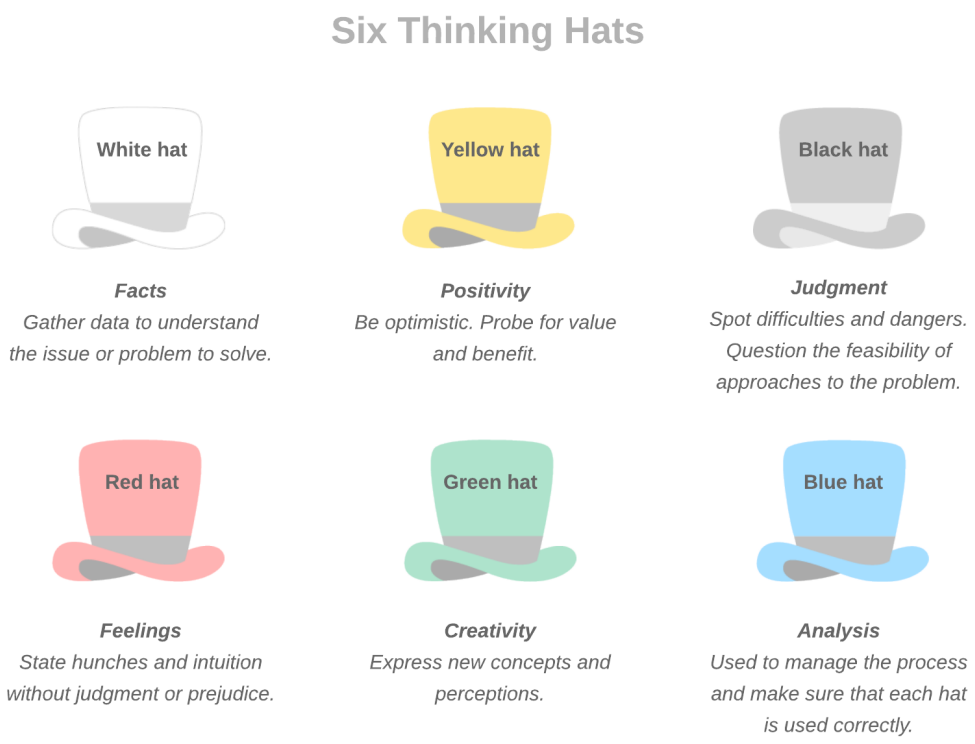

Figure M2-1. Six Thinking Hats.

White Hat

The white hat is like a detective who gathers, organizes, analyzes and presents current information. As detectives collect clues and facts, they remain neutral and impartial to avoid reaching conclusions based on unique pieces of information. Instead, all clues, facts, and evidence must be analyzed and weighed to see what they have and what is missing.

In the same way, while "wearing" a white thinking hat, you must collect and analyze known information to arrive at fact-based solutions. Analyzing the collected data will help you find gaps so you can look for ways to fill them or at least take note of them to get a better idea of how to lead your conversations.

Start collecting data and data based on these troubleshooting questions:

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• What do we know about this topic?

• What do we not know about this problem?

• What can we learn from this situation?

• What information do we need to solve this problem?

• Are there any possible existing solutions that we can use to solve this problem?

Work these questions together as a team to gather more information as each person shares their unique knowledge of a particular issue or problem.

Yellow Hat

This hat represents enthusiasm and optimism. Like a bright, sunny day, the yellow hat is worn to bring positive energy and life to every idea.

In the yellow thinking hat, he seeks to find the benefits and value of ideas. You should not be hampered by limitations or limits, but believe that when there is a will, there is a way.

Yellow hat questions might include:

• What is the best way to approach the problem?

• What can we do to make this work?

• What are the long-term benefits of this action?

These questions are only a starting point. As you work through your Six Thinking Hats exercises , you may want to ask more questions that take into account the optimistic role of the yellow hat.

Black Hat

The black hat is the opposite of the yellow hat and represents judgment. Wearers of this hat look for ways the situation can go wrong.

The black hat is used to expose flaws, weaknesses and possible dangers of the proposed ideas. On the surface, the ideas you got from the yellow hat session may seem perfect. The black hat dives

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below the surface to find possible problems. The black hat is essential to prevent you from jumping headlong into a potentially disastrous situation.

However, the role of the black hat is not just to sit down and be all judicious. Furthermore, this role seeks and identifies the resources that may be necessary to achieve its objectives.

Questions to help you think from the black hat perspective may include:

• How is this idea likely to fail?

• What is the fatal flaw in this idea?

• What are the possible risks and consequences?

• Do we have the resources, the skills and the ability to make this work?

Red Hat

Although he has the red hat of thought, his main objective is to intuitively suggest proposals and action plans based on feelings and hunches. This hat is open-minded and non-judgmental. Using information gained from feelings and emotions, you should be able to intuitively relate these feelings to the problem you are trying to solve.

The goals of a red hat thinker include:

• Introduce intuitive ideas.

• Find the hunches and feelings of your team.

• Reveal the hidden strengths of an idea.

• Use instinct to identify possible weaknesses.

• Find internal conflicts.

For example, some ideas and plans may seem weak or impractical. But if someone wearing the red hat can identify a new idea or plan that "feels" right, this idea should open up discussion and exploration of additional opportunities that you may never have considered.

Questions from the Red Thinking Hat may include:

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• What is my intuition about this solution?

• Based on feelings, is there another way to solve this problem?

• What are our feelings about the choice we are making?

• Does our intuition tell us that this is the correct solution?

Green Hat

Green hats are used for creative thinking. Wearing this hat allows you to think outside the box to explore more possibilities and bend the rules of problem solving. This creative thinking must be free from judgment and criticism.

Because the green hat is now subject to rules or limitations, this is where you can think beyond the norms of reality. The green hat allows you to conduct a brainstorming session in which no idea is too wild or crazy to be noticed or shot down right away. The green hat should refrain from criticizing or judging any ideas or suggestions that arise. The idea is to expand your thinking as you explore possible solutions.

The green hat can ask questions like:

• Are there alternative possibilities?

• Can we do this differently?

• How can we see this problem from other perspectives?

• How do we think outside the box?

Keep in mind that while working with the green thinking hat, you are free to express any ideas that come to mind. Even an idea that may seem absurd and crazy.

Blue Hat

This hat provides a management function and will help you analyze the situation. When wearing the blue hat, your job is to manage the thinking of the other hats to ensure that the team stays focused and works more efficiently towards a viable solution. The role ensures that the other hats are worn correctly.

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Specifically, the blue hat seeks:

Efficiently and effectively improves the thinking process.

Ask the right questions to help direct and focus your thinking.

Maintain and manage agendas, rules, objectives and tasks.

Organize ideas and proposals, and develop action plans.

Questions that will help you in the role of blue hat may include:

What is the problem?

How do we define the problem?

What is our objective and the desired result?

What will we achieve by solving the problem?

What is the best method to move forward?

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SCAMPER

SCAMPER (Directed Brainstorming) is defined as "a kind of practical and entertaining brainstorming technique that is inherent in the discussion method, ensuring implementation of the method" (Yağcı , 2012, s. 486). This originated as a technique initially used by Eberle (1971) to enhance students' creativity. For this technique, an object or a person is chosen and then changed and developed through brainstorming. Common stories well known to all can be used as well. To do this, the questions are directed at the child. The technique improves children's thinking, encouraging them to discover. The technique also teaches how to think flexibly and break patterns (Yıldız and Israel, 2001). According to Michalko (2000), the basic philosophy of this technique suggests that "each idea is born from another existing idea" (as quoted in Yıldız and Israel, 2001). However, Serrat (2009) mentioned that the SCAMPER technique allows differentiation in the ways of thinking of students, improving their problem solving skills and creativity. Gladding (2011) reported that this technique influenced students' lives and assured them of being better by improving their intellectual skills.

SCAMPER seeks to improve a service or a product by applying a series of related questions and with the answers to see how far those ideas can take us. These questions and answers are more like a checklist based on action verbs with which ideas are generated and that can suggest changes in products or services or give us the idea to develop a new one.

- Substitute (Substitute)
- Combine
- Adapt (Adapt)
- Modify (Modify)
- Put to other uses
- Eliminate (eliminate or minimize)
- Rearrange (Reorder or Reverse)

SCAMPER method or method that asks the right questions

S to substitute

- What can we substitute or change to achieve this series of objectives?
- What can we not replace under any circumstances?
- Can we replace the role of this employee?

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- What would happen if we substitute the procedure?
- What if we change the shape, dimensions, color, suppliers, distributors?
- Can we change the segment to which we target this product?

C to combine

- Can multiple projects be combined to unify them?
- Can I mix two products or services?
- Can I combine my ideas with those of the competitors?
- What happens if I mix different departments of the company?

A to adapt

- Can I adapt to another market or target audience?
- Can I adapt this format to solve this conflict?
- Can I adapt to this new law, norm or principle?
- What can I adapt from my functions so that another department or worker fulfills theirs?

M to modify

- What can I modify to improve this product?
- Can I improve the customer experience by modifying some aspect?
- Can I modify the template?
- What do I modify to make this product last longer, be stronger, faster, more beautiful?

P to propose

- Can I use these products for another campaign?
- What other products can I create or what can other products be used for?
- Can it be used by another type of user?

E to eliminate

- What would happen if we remove this item?
- What do I remove to make it smaller, simpler, smoother?
- Can I eliminate any part of the process without losing quality?
- Can I eliminate the risks or errors?
- Can I reduce the workforce without losing competitiveness?

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R to reorder

- Can I reorder workers across departments to improve performance?
- Can I reorder the calendar of events or projects?
- Can I reorder the date of a delivery without causing problems?
- Can I reorder strategies, objectives, techniques or tools?
- What happens if I reorder the manufacturing order of the product?

Once we have seen the meaning of each of the verbs and their possible questions to generate answers and ideas, users must ask a series of questions that contain the 7 questions of the verbs.

2.3 ANALYSIS OF METHODOLOGY

This part of the module shows a real experience with the techniques of creativity.

The application was made with seventh grade students by their science and technology teacher at the mentioned public school. Researchers acted as observers during the study. Criterion sampling, which is used in qualitative research, was used in the study. The fundamental purpose and focus here is to study all the circumstances that meet a series of predefined criteria (Y ıldırım and Şimşek , 2011, p. 112). The students subject to the study are 20 students in total, including 10 girls and 10 boys. 10 of the students in the study group go to school on foot and the other 10 via the transportation system. The average age of the students is 13 years old.

Data collection tools

Taking into account the research questions determined in the study, the researchers collect data in order to identify the problem in more detail and thus obtain suggestions on solving the problem. Data triangulation (Yıldırım and Şimşek , 2011, p. 267) is used according to the nature of the study in order to strengthen the validity of the data and enrich the importance of the results. This is a qualitative research model where researchers used observations, open-ended question forms, and documents as the primary data source, and interviews as the secondary data source. The data collection tools are described below.

Participant observation

Participant observation is known as the case where the researcher enters the research environment, collects first-hand samples and contributes to the data source, trying to understand

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real life in the environment in this process, the researcher also records the behaviors displayed in the environment. The researcher listens to the study group's conversations and observes their behaviors during the data collection process. When required, the researcher builds communication with the sample and asks the subject questions in an effort to understand the meanings and reasons for the behaviors (Çepni , 2010).

Open question form

Open question forms, with a level appropriate to seventh grade learning, were applied to the students to identify their situations before and after the techniques. The questions prepared by the researchers were evaluated by the tenured professors and considered appropriate.

Document review

The document review includes an analysis of written materials that contain information about the phenomenon / phenomena subject to investigation.

Punch (2005) states that documents include diaries, letters, essays, personal notes, biographies and autobiographies, notes and reports, while Böke (2009) states that video and audio records, photographs and drawings can also be used in the review of documents in addition to those already mentioned. While May (1996) and Robson (2001) indicated that the letters, compositions, maps, images, photographs and journals collected from students are documents that can be used in document review.

Interviews

The interview is a technique of data collection through verbal communication. The interview is the most applied to carry out systematic social research. Semi - structured interviews were conducted where the researchers were observers of participants adopting the principle of "moving with the current".

Empirical process

The work process focused on acting on the learning outcomes in science and technology within the educational program. The design and the open questions form were prepared by researchers taking into account the preparation and pre-learning of the students.

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The question form was addressed to students before and after the application, in order to find out which of the two techniques affects educational learning based on the results. Details about the techniques, learning outcomes, and associated teaching outcome are presented in Table 2 below:

Technique Applied	Learning Outcomes	Associated Instructional Design
SCAMPER	**1. With regard to areas in which organisms live and the human impact on such areas, students:** 1.1. Explain the concepts of species, habitat, population and ecosystem with examples.	
SCAMPER	1.2. Explain relationship of living organisms in an ecosystem both with each other and non-living factors. 1.3. Make predictions on living creatures which may be existent in different ecosystems. (SPS-9)	Instructional Design 1
SCAMPER	1.4. Compare ecosystems in terms of diversity of living creatures and climatic features. (SPS – 5, 6). 1.5. Realize the biological diversity in the ecosystem and emphasize its importance.	Instructional Design 2
THE SIX THINKING HATS TECHNIQUE	1.6. Give examples to plants and animals facing the danger of extinction both in our country and worldwide. (SPS -25; STSE – 22, 23, 26) 1.7. Make suggestions as to how plants and animals which face the danger of extinction in our country and worldwide. (SPS–32; STSE – 21, 22, 23, 24, 27)	Instructional Design 3
THE SIX THINKING HATS TECHNIQUE	1.9. Collect and submit information about one of the environmental problems in our country and worldwide, and discuss on its results. (SPS 25, 32; STSE – 18, 20, 21, 26, 27, 29)	Instructional Design 4
THE SIX THINKING HATS TECHNIQUE	1.10. Make inferences of how an environmental problem in the world may affect our country. (SPS, 8; STSE – 18, 20, 21, 28).	Instructional Design 5
THE SIX THINKING HATS TECHNIQUE	1.11. Suggest solutions and attend activities aiming at collaboration against environmental problems in our country and worldwide. (STSE – 20, 21, 22, 23, 24, 26, 27; AV –4)	

Figure M2-2. Applied technique, learning outcome and associated instructional design.

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The students in the scope of the designs prepared through the Six Thinking Hats technique were divided into groups by the teacher. Since the study group consisted of twenty students, three groups were obtained in the designs prepared using the Six Thinking Hats technique . The remaining two students observed each group in the development stages in the implementation of designs took note of their discussions and gave feedback to the groups in the discussion processes.

All the materials to be used (worksheets, cardboard, etc.) were prepared by the researcher. Visual materials were provided to support group studies; In addition, newspaper reports, documentaries, magazines and photographs. Examples from daily life were also provided to attract greater student interest. These tools were used as introductory activities. During development activities, students were asked to choose a situation from the visual tool used and to assess the situation using the Six Thinking Hats method. For the assessment, students created a variety of products to confirm their learning outcome in accordance with each design. Those products formed documents such as banners, posters, etc. The researchers provided the tools to create the products.

Students were assessed in their groups and provided guidance during the process. Ideas produced after the lessons provided through the Six Thinking Hats technique were evaluated in class and recorded. The products created by the students were also evaluated. In addition, interviews were conducted with students and teachers; teacher field notes and researcher observations. Unlike the Six Thinking Hats technique, the design prepared using the SCAMPER technique was provided to students individually without grouping them. However, the practices are similar in terms of content, process, and evaluation.

Steps of the investigation process

The following steps were followed in the implementation of the prepared design through the Six Thinking Hats and SCAMPER methods:

(1) Before the application, the agenda on which work is carried out was obtained with respect to people receiving education. Teachers were consulted in the field of science and technology courses.

(2) Before application, a questionnaire was prepared that was open to the researchers and consists of seven questions.

(3) The application of the open questions form was followed by the application of the instructional design .

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(4) The work was carried out for 3 weeks (12 course hours). During the application period, one of the researchers made an evaluation in terms of the conformity of the applied program with the principles of instructional design. As mentioned above, the application was not made by researchers but by the science and technology teacher who routinely performs tasks at school.

(5) At the end of the practice, the open questions form applied before the activity was reapplied and the students were interviewed.

2.4 DATA ANALISYS

In their natural course, qualitative research incorporates different perspectives on social life, types of analysis, and a variety of perspectives and practices in the analysis of qualitative data. Yıldırım and Şimşek (2011) indicate that each researcher is expected to develop a data analysis plan for their own research by acting not only on the properties to investigate but also on the properties of the data collected and reviewing existing methods of analysis. At the end of the investigation, the data to be obtained in the light of the open questions , l to form, documents, observations and interviews were interpreted mediate you a content analysis. The main purpose is to access concepts and relationships that will be able to collected data. Data is subject to a more complete process in content analysis; Concepts and themes that cannot be realized with a descriptive approach can be revealed in such analysis. In this context, the content analysis of the data obtained in the research was examined by three experts in scientific education from the domain, and the data were inspected in terms of relevance.

Findings on Instructional Design-1

In the first instructional design prepared using the SCAMPER technique, the goal was to provide students with the following learning outcome: "Explain the concepts of species, habitat, population, and ecosystem with examples ." Explain the relationship of living organisms in an ecosystem both with each other and with non-living factors and making predictions about living creatures that may exist in different ecosystems (SPS-9). The analysis of the answers to these questions by the students is presented below.

Students were asked to give examples of these concepts and explain them. Before the application, it was observed that 14 students gave inadequate / incorrect answers regarding the concepts. It was observed that two students knew only the concept of habitat but did not give examples of

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that concept. A student only knew the ecosystem but could not give examples. It was observed that some student knew all the concepts but not with examples.

However, after the application, it was found that all students knew concepts in response to directed questions and examples appropriate to the concepts. In accordance with the following learning outcomes:

"Explain the relationship of organisms in an ecosystem both with each other and with non-living factors"

" Make predictions about living creatures that may exist in different ecosystems . "

"Select one of the ecosystems such as lake, sea, forest, etc.”

“ Explain the relationship of living and non-living creatures in these ecosystems with each other. "

When the answers obtained prior to the application were examined, it was found that 5 students gave inadequate answers and most of the rest gave incomplete answers.

During the implementation of the SCAMPER technique I was also used music in the classroom. The responses of the students were much more elaborate and correct and also these were some of the opinions of the students:

- We had too much fun.
- We have never taken such a different science class before.
- We learned by arguing.
- We speak our opinions, I closed my eyes while listening to the music and I dreamed of being in ecosystems.

Another very remarkable aspect is the opinion and perception of the teacher:

First I hesitated because I was afraid about problems in the application. But I received very good comments from my students. They really enjoyed the lesson. They realized that the only way to learn is to listen to each other even when the tension of the debate increases. Finally her attitude towards the lesson changed; her effort to express herself improved her self-confidence and her decision-making skills.

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Findings on Instructional Design-2

The goal in the second instructional design prepared using the SCAMPER technique was to ensure that students acquire the following learning outcomes in relation to the areas in which organisms survive and the human impact in such areas; "Compare ecosystems in terms of diversity of living creatures and climatic characteristics " and "Realize the biological diversity in the ecosystem and emphasize its importance" . In this framework, a question was addressed to the students.

Initially, most of the students did not know how to respond to these problems. Some gave inadequate or incomplete answers.

Students received worksheets regarding the two learning outcomes indicated in the instructional plan subject to the SCAMPER technique. The worksheets contain a list with three different ecosystems and different groups of species. Students were asked to match the species on the worksheets with the ecosystem that is suitable for the respective species. Later, each student made sure to select an ecosystem and a species. Consequently, it was ensured that the student answered the questions ordered according to the stages: their placement, combining, adapting, modifying, expanding, putting to other uses, eliminating, investing or reorganizing. When the answers given by the students were examined during and after the application, it was found that the students gave adequate answers referring to different ecosystems such as the forest ecosystem, the desert ecosystem and the tundra ecosystem. The students included terrestrial ecosystems in their paintings drew to the end of the design instructional, and cartoon characters on terrestrial ecosystems. The materials prepared by the students were exhibited in the science and technology corner at the school. During the interviews with the students, they reported that drawing and painting was enjoyable for them, that the lesson is much more fun and enjoyable for them and presentation of the materials produced by themselves in the science and technology corner of the school. They had felt very proud of themselves.

Findings on Instructional Design-3

The objective in the third instructional design prepared through the Six Thinking Hats technique was to ensure that students acquire the following learning outcomes in relation to the areas in which organisms survive and the human impact in such areas; "Give examples of plants and animals that are facing with the danger of extinction in our country and around the world " and "Make suggestions on how plants and animals face the danger in our country and everywhere . "

The answers initials to the questions are presented below:

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Species in Danger of Extinction		Solution Offers for Conservation of Species	
Encodings Application Before	Frequency	Encodings Application Before	Frequency
Seal	7	Preserving habitats	8
Penguin	2	Hunting ban	6
Polar bear	2	Making them breed	1
Hermit ibis	1		
Van cat	1		
Kangaroo	1		
Panda	1		
Ostrich	1		

Figure M2-3. Analysis of responses on endangered species and their conservation.

Reports news, newspapers and photographs were given to students regarding learning outcomes sides. Also they were allowed students to watch a documentary about life of penguins endangered, they had seen in photographs.

Later, once students completed the discussion process on the protection of species threatened with extinction through technique hats, were asked to prepare materials that reflect their solutions and ideas such as posters, banners, etc. After application, the frequency rates of the examples given by the students for endangered species and the frequency rates of encodings containing offers of solutions in light of the student materials, the open-ended question form and the interviews are presented below.

Species in Danger of Extinction		Solution Offers for Conservation of Species	
Encodings After Application	Frequency	Encodings After Application	Frequency
Penguin	13	Preserving habitats	15
Seal	6	Hunting ban	9
Polar bear	6	Making them breed	3
Hermit ibis	5		
Anatolian leopard	2		
Short-beaked common dolphin	1		
Panda	1		

Figure M2-4. Analysis of responses on endangered species and their conservation

At the end of the application it was discovered that all the students gave adequate answers. Unlike before the application, the codes " Anatolian Leopard " and "Short-beaked common dolphin" were

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found to appear after application; while the frequency rates were observed that other encodings had increased. Furthermore, it was found that the codings with respect to the offers of solutions for the conservation of the species did not change but increased in terms of frequency.

The teacher evaluated the instructional design and reported his observations from the students in the following way: " I had used the Six Thinking Hats technique before. However, this design instructional impressed the children in a very different way, probably because it contained many compelling visuals. I closely examined their facial expressions while they were watching the documentary. They seemed to have great wonder and interest. This proves that the design instructional is good and qualified. Another point is that this made a great contribution to improving the skills of empathy in the children. I am also happy to see the positive change in his attitude towards the lesson. "

Findings on Instructional Design-4

The objective in the fourth instructional design prepared through the Six Thinking Hats was to ensure that students acquire learning in relation to areas in which organisms survive, and human impact in such areas; "Collect and send information about one of the environmental problems in our country and around the world, and discuss its results." In this context, the question "¿What are the environmental problems in our country and in the world. Explain with examples, "It was aimed at students and analysis of responses is presented below.

Environmental Problems			
Encodings Before Application	Frequency	Encodings After Application	Frequency
Environmental pollution	12	Air pollution	9
Destruction of forests	4	Stream pollution	8
Air pollution	3	Natural disasters	5
Global warming	1	Acid rains	5
Soil pollution	1	Global warming	5
Noise pollution	1	Nuclear pollution	4
Water pollution	1	Soil pollution	4
Unanswered	1	Water pollution	3
		Noise pollution	2
		Affective approach	3

Figure M2-5. Analysis of responses on environmental problems in our country and in the world.

After the first phase of responses, a news report was delivered to the students regarding the learning outcome mentioned in the instruction plan subject to the Six Thinking Hats technique and

EUROCUBE CRESOL LES BOTANIC CAVANILLES
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they were asked to think and discuss on the subject. Later, students were asked to write a composition containing their suggestions on environmental problems in line with the opinions they would convey. As seen in the table above, it was observed that several differences arose in the codifications achieved with respect to environmental problems in our country and in the world and their frequency. A new codes appear to be more specific and an increase in the frequency of codes achieved after application was also observed.

Furthermore, the students indicated that their observation, investigation and questioning skills were developed, reporting: “We began to think and ask much more. For example, we have observed the environment more often since we first experienced these applications . ” We examine further. The practice professor supported such statements by the students, indicating that awareness was increased.

Findings on Instructional Design-5

The goal in the fifth instructional design prepared by the Technical Six Thinking Hats was to ensure that students acquire the following learning outcomes in relation to the areas in which the organisms survive and human impact in such areas; "Make inferences about how an environmental problem in the world can affect our country" and "Suggest solutions and activities aimed at collaboration against environmental problems in our country and around the world" .

The before and after responses and their frequencies are presented below.

Activities Regarding Environmental Problems			
Themes Before Application	Frequency	Themes After Application	Frequency
Ozone- friendly products	3	Ozone- friendly products	11
Use of perfumes	1	Planting trees	10
Planting trees	1	Recycling	9
I don't know	16	Renewable sources of energy	6

Figure M2-6. Analysis of responses on activities that address environmental problems.

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Prior to the application, three themes emerged in the responses given by students regarding activities to address environmental problems.

From the application of the technique, the answers were examined and it was seen that all the students answered the question. Furthermore, it was seen that the themes "recycling and renewable energy sources" arose. The topic "Ozone friendly products" was observed with a frequency of 11;theme "planting trees" was observed with a frequency of 10, the topic "recycling" was observed with a frequency of 9 and theme "renewable energy sources" with a frequency of 6.

When the compositions reflecting ideas inferred by students after their discussion, their sensitivity to the environment was found to increase and the comments reflected their observations. Reflections like this arose:

Human beings are too selfish. We think we are only ourselves. We should leave future generations a beautiful environment for living. On the contrary, we are using products that will damage the ozone layer. Persons are causing more exhaust emissions to the air and damaging the environment going in their own cars. We should attach importance to the use of renewable energy sources and use recycle bins in accordance with their purposes.

2.5 DISCUSSION AND CONCLUSION

After the request, the materials prepared by the students were exhibited at the school in an event organized in the framework of the " World Environment Day". The students were proud of the materials they prepared, and said they were also happy to create awareness of others around them. Interviews with students, field notes of the teacher and observations of the researcher revealed that the design instructional prepared by Six Thinking Hats techniques and SCAMPER ensured that students develop a positive attitude towards the lesson and to show empathy and also improved their research skills and questioning. In addition, the teacher reported that the designs prepared by these techniques increased the awareness of students about the unit "Human and Environment".

The conclusions based on the research results can be summarized as follows:

As a result of the practices within the framework of the instructional designs prepared through the SCAMPER technique, improvements were observed in the students' opinions about the habitats in which the organisms live and what the concepts related to these areas are; the relationship of living organisms in an ecosystem with each other and with non-living factors and also creatures that can exist in different ecosystems. It can be suggested that the SCAMPER technique can

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guarantee the cognitive development of students in related subjects, giving them the opportunity to act beyond mental patterns and encouraging them to think creatively and motivate them to change or combine their opinions. Furthermore, as Serrat (2009) also mentioned, it can be said that this situation arises from the fact that the SCAMPER technique guarantees that an individual questions the situation, and thus generates solutions for the problem and allows the individual to carry out the work individually, group work and exchange of ideas during the solution production process. As a result of applying instruction designs prepared through Six Thinking Hats, it was revealed that students could give examples to plants and animals facing extinction in our country and in the world; their environmental awareness and they could make different suggestions about the problems. As De Bono (2002) also stated, it can be argued that this situation is due to the fact that the Six Thinking Hats technique prevents the ego from being active during the thinking activities of individuals so that the creative brains that are released find an opportunity to fully examine and evaluate the topic. Furthermore, it can be considered that great diversity appeared in the solutions of individuals at the end of the process, due to the fact that this technique prevents different opinions from coming together in one. It can be argued that opinions related to the world and the environment varies as the Six Thinking Hats allow the individual to experience different ways of thinking. In this study, students developed not only their psychomotor skills by using colored cardstocks, scissors, craft papers, crepe papers, modelling clay, pastels, dry paints, stickers, cardboard, markers, colored pencils, etc., but also their cognitive abilities when preparing acrostics, paintings, poems and cartoons. It was found that some students with low success rate and low attendance rate actively attended this process and had a greater interest in the lesson, showing their creativity especially in events such as writing acrostics, drawing cartoons, and painting.

It was discovered that the students who actively implemented the knowledge sharing activity progressed in their abilities to share their opinions through group work, to discuss, to make presentations, to defend their opinions, to express their ideas, to respect their opinions and ask questions. Both techniques can be said to have provided students with these skills in different ways. Students interested in studying reported that their sensitivity increased and their views changed. Therefore, it can be argued that a contribution was also made to the affective development of the students.

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Art-based learning methodologies.

Manual for secondary school teachers.

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3. MODULE 3.

Integrating art-making in environmental education. Experiencing the natural environment through AEE. Creation of “little-me” with clay.

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3.1 INTRODUCTION

This module 3 is based on the experiences carried out by Jan Van Boeckel , an expert in art- based environmental learning and aims to expose how an experience through art and nature can connect with a more internal part of ourselves by activating the awareness and commitment to the environment and discovering new skills and aptitudes.

One reason for the activity "little-me making" is to explore whether the experience with a natural material like clay somehow improve the feeling of connection with the natural world. Furthermore, knowing whether to develop such a relationship through the process of artistic creation would also bring with it new learning experiences.

Participants in the creation of “little-me” are intended to somehow increase their understanding of their surroundings and environment.

It is important to emphasize that a small clay session is not limited to artistic creation, thoughtful group dialogue, and what follows immediately is as important as actual clay molding. The development of this activity is based on a workshop that offers new and creative ways to register and meet the immediate environment; analyzing whether the sensory task of sculpting the body itself with the eyes closed improves the participants' ability to interact with the place, with and through their bodies. There is a dialogue happening between the internal (the corporeal and anatomical) and the external (the environment) as poles in a continuous process of exchange between the body and the place.

Therefore, the artistic theme focuses on making a sculpture based on the body and the inner world to connect at the same time with the environment that surrounds us.

Once the creation process is complete, when the participants have gathered in front of the row of clay figures in front of them, they are invited to give their first reactions now that they have launched their small sculpture into the world, in full exposure to the human gaze.

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3.2 Description and methodology of the activity.

The proposed activity was carried out in an intensive course in April and May 2009. The course was carried out under the auspices of EDDA Norden, a Nordic network of educational institutions offering teacher training in art, media and design. Participants were students from Finland, Norway, Denmark and Sweden. The core of the course was a trip with the sailboat from Kiel, through the island of Gotland to Uusikaupunki in Finland.

Participants carry their own chair from the accommodation to this spot on the shore, one kilometer away. When everyone is present on a grassy hillside overlooking the sea and the natural limestone pillars (raukar), participants are asked to form a circle and spend a moment in silence with their eyes closed, simply observing any perception sensory to which they arrive. After that, the participants form a semicircle with their chairs, and when everyone is seated, we start with some drawing activities so that they become a little familiar with the work with their eyes closed and with the expression, through the art material, feeling in different parts of your body. When this activity also ends, the teacher conducts a warm-up exercise to compensate for the cold environment.

Two clay bags are placed on the lawn and when the movement session ends they all put two fist-sized pieces of clay together and sit down again. They have a pressed wooden plate on their lap, and they put the two pieces of clay on it. When everyone is ready, the activity to do "little-me" begins. There is no time limitation. At a slow pace, with long breaks in between, the facilitator talks about the different parts of the human body. You are invited to express what you feel in those parts through the clay.

Some work a little faster, others slower than the rest. Those who have finished making their little self must wait for others. When the time comes, everyone sits with his eyes open with his " little - me " in front of him.

The figure is placed in a row next to each other and some time is spent talking about the experience.

You are asked to pay specific attention to what is expressed through the backs of the finished little self.

Some of the questions generated for debate and reflection are the following:

• What was it like to do this?

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• What is it like for you to see the clay sculptures when you open your eyes?

• Did you experience something you may not have been aware of before?

• Did you experience a difference in sensations when working on different parts of the body, such as between the internal organs and the extremities?

• How does it feel that your clay sculpture is exposed to the others?

• How would it have been different if you had your eyes?

• Could not see how it was developing, if it was proportional or anatomically correct, did this influence the way you work?

• How was that letting go of control?

• How was it that a stranger was talking about your body?

• Was the process going at the right pace for you or was it too fast?

• If someone tells you to focus your attention: does it make it more difficult? ¿Or easier to do this?

• Do you see any relevance in what we have been doing, in the context of efforts to connect with nature through art?

• Do you see any point in doing this when you try to learn about the environment?

• What do you think of the aspect of using clay: what does that mean to you?

• As you focused on your body, did you also identify in any way with the environment around you?

Some of the observations of the participants are a session especially creation:

“Clay felt more like a part of my body. It felt like home. Clay is really a nice thing to work with. I have memories of being on the beach, making sculptures on the rocks, at my father's house. It was recognizable. It has to do with something from childhood. Digging up something and doing something with it: it's like giving birth. You just go out and find things, and shape them with your hands. But you find them: somehow you feel like you find the shapes with your hands, that they almost want to be something. I have not done so in many years ... The little ones were very formed by the raukar (limestone stems). If you looked closely, they have the same color. They

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grow from the ground. Clay is very much a natural material ... Working with clay in nature is so natural, so much of a human being, and nature is too. It is really easy to connect with that, with clay and nature. ”

"The thoughts went there instead of going to the main topic of concentrating on the senses. If it had been more relaxing, perhaps it would also have been easier to discern the sounds of birds, smells, etc., however, nature was more present. "

"You feel the light through your eyes, the wind, the sound of the birds, and the sound of the waves. You are conscious and you do your thing, you are less disturbed. "

“The air and the light, the sounds; There were many sensations. At the same time, you can focus and get a clearer picture of yourself. Inside a room there is another sensation, it is closed. As a person you erase yourself more. You have the hard shell of the room. It is more like your own temperature, not as defined as it was. The sun was warming me on one side, the skin was soft there. On that side there was no such contrast with the air, but on the cold side it was another sensation. There, I felt a sharp edge in the air, the hardest skin. Higher contrast. It was nice to experiment, with my eyes closed. In this way you get the deepest feeling of place, structure, light, heat, warmth and all the creatures that live there. I heard birds, the bee, I thought it was summer."

“I felt a sense of place: the smell of the sea, the shore, and the waves. It gives you an idea of where you are. Still, I think these feelings are stronger if I am alone, without caring about others. So I liked sitting on the bowsprit in front of the boat, being alone with my emotions. "

"It was like being in two different places. The clay was so nice ... It was a spiritual thing; it would not be if we had no eyes closed. It was a mixture of having closed eyes and the words you said. As he the clay in my hand, it was like being connected to the earth, the place. Through the clay it came together. It was a strange feeling for me, holding it, using the clay. The wind in my ear, blowing around me, goes everywhere. The sounds of some birds."

3.3 Narrative explanation: being touched by an artistic process.

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1.- Introduction

The way the small creation seems to have particularly impacted one participant, Robert.

Robert had enrolled in a course on children and nature and which is part of the small-me activity. It shows me how far participating in a little-me session, which lasts no more than an hour or two, can have a transformative impact. For this reason, this case is presented, adding contextual information that can help highlight the event.

Robert had a difficult childhood. In his own words, he was a "type of ADHD" and had spent a lot of time on the streets. Finally he enrolled in the army. While on mission in armed conflict, he was breathless in various dangerous situations, and at some point was seriously injured. When he returned home, things were on the wrong way; started using different types of drugs. Finally, working on a project with problematic young people who, as part of the treatment, were taken to nature took him out of that spiral. He got the job, even though he lacked education and experience. His strong point was that he knew from his own experience what some of these children were going through. When he received the assignment, he started right away, although he didn't really understand what his work was based on. I didn't feel a connection with nature. But he realized that he was very capable of connecting with children; he understood very well where they came from. The fact that he could train them gave him a lot of self-confidence. After being outside with the teens all day and working hard physically, he would go home exhausted. But the project was of great value, both to the children and to him. Working in this way, he discovered that he had a lot of difficulty, like children, sitting inside a building and having to listen to others explaining things. He was much more outside, busy. It was also in that sense that things became clearer to him: about his personality and how certain characteristics would likely be similar to those of many young people. By practically working with teenagers, he came to different points of view about the importance of nature and his own relationship with it. As we are about to start the little-me session with a group of fifteen people under the canopy of a shady coniferous forest, Robert confides in me that he hopes the course will be different from what has been going on up to that point, sitting inside and passively listening to the speakers. The session takes place in the afternoon of the first day of the course. Robert works very focused on his little self, he takes all the time he needs. He gives himself to the task and is willing to follow closely how I guide the meditative journey through the body. While some of the other participants huff and sigh, he seems calm and engaged. When the little me is finished, we carefully take it into a room and reflect on the experience. Some people claim that they felt it was difficult to enter their own body in this way. Robert, to everyone's surprise, suddenly clears his voice. It is the first time that he speaks in front of the entire group. He says that it is always difficult for him to express what he

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feels; but that he wants to share now that it was the best thing he has done so far in the course. It was something that deeply moved him, he says, and allowed him to have a better understanding of himself: "It wasn't just that the activity was physical, but that I worked with my hands, but also directed my attention specifically to my own body. It was nice to work with my eyes closed. If I hadn't done that, I would probably have the feeling that I couldn't do it: the eyes of others would also be watching and that would prevent me from being able to finish it. For me it has been the most comfortable place I have ever been since I got here. I realized how he could really express how I really feel. A lot has happened here. "He had the idea that a lot of things had fallen into the right place for him. He didn't just experience his body in a way new, but also came to see the work he was doing with young people in a different light. There and then saw clearer for him what was its meaning and importance. At some point Robert saw the connection, as he later told me. It was a revelation to him that artistic creation had something to offer him that he could express through a medium that was previously outside his world of life. Although Robert participates in all subsequent group sessions, he leaves the course prematurely on the last day, four days later. He has left a small note in which he has written that it is always difficult for him to say goodbye and, therefore, he has chosen to leave quietly, ahead of others.

2.- Before: Exhibition.

Preparing participants before artistic creation gets underway tries to break the daily grind, and begins by providing participants with information to achieve a basic understanding of the journey they are beginning to take part in. In these practices, one does not easily move from the everyday world to the world that could be called the Special World, which at first is new and strange. In this new environment, participants are expected to feel like fish out of water.

The story is set in motion, so to speak, when they are presented with a problem or challenge that they must face and overcome. Christopher Vogler (1992) calls this the "call to adventure". In this call, the "game bets" are established. In the "journey of the hero" (Vogler - 1992), there is a specific time called "cross the first threshold" when the protagonist enters the special world of history. Reflecting on this threshold in the context of participation in PREPA, one can speak of the metaphor of a lock, an intermediate chamber in which one must enter in order to move from one environment to the next. When you are in a submarine and want to dive into the surrounding sea, you first enter a lock that is slowly filled with water. Only when the hatch is completely full can the door to the marine environment be opened and entered. Conversely, when you want to reenter the underwater vessel, one must reenter the lock, which must first be emptied of water before

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being able to enter the cabin space and normally breathe oxygen again. The point of this metaphor is that it takes a period of adaptation, of becoming familiar with the new medium, before one can fully engage. It is like an incubator phase, of preparing for what is to come.

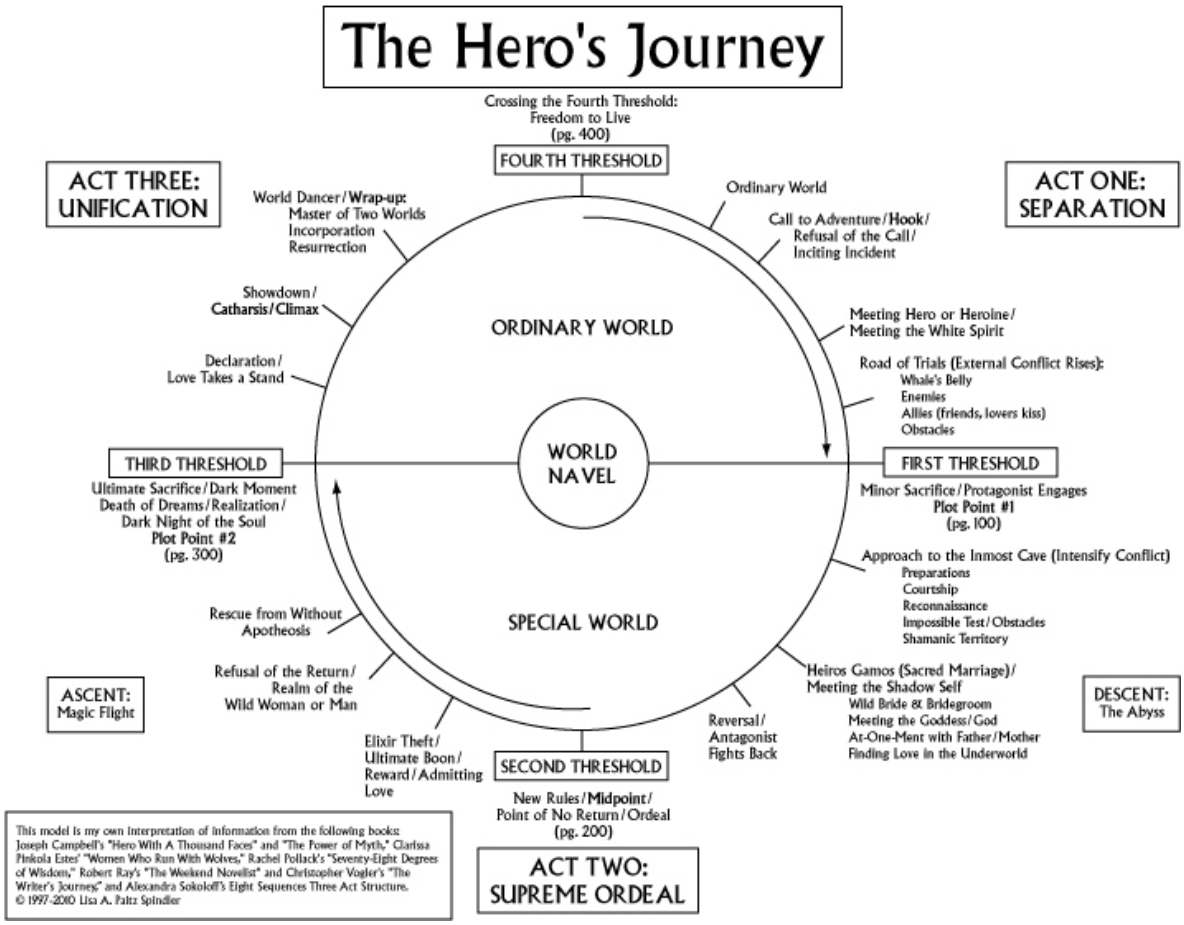

Figure M3-1. The Hero´s Journey

In this context, the concept of established time, as used by the Swedish physicist Bodil Jönsson in his book "Ten thoughts on time" (2005), seems useful to me. Preparation time is the time one needs to prepare for a task. Setup time is the time we need to organize things around us before we can start doing something. We need to prepare both practically and mentally about what we are about to do before we do it. It is necessary to allow a certain start or transition time before the activities start. Mentally we have adjusted to the ways of thinking that the industrial age requires of us. Artificially constructed time has us in its clutches, therefore the difference between our experience of time (kairos or time passing without notice) and sequential or clock time (kronos) has grown. In conventional thinking, set-up time can easily be seen as wasted time, and it may be considered better to take up work as soon as possible. But Jönsson argues that it takes some

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preparation time to be able to work in peace and quiet, and to be able to resolve the thoughts we have, only then can anything significant come out.

In this sense, the experience on the coasts of Gotland stands out, since the participants walked a long way to the shore, taking with them the chair in which they would then sit. Such intervals are not irrelevant, I noted. They allow participants to gradually tune in to do something different from the ordinary. Some participants commented on the aspect of "preparing" for the artistic creation activity. Emilia, a participant, stated that the things that happen before the PREPA activity have a major impact. She suggested that it might be interesting to do a little me after practicing some yoga exercises or after spending time in nature.

3.- During : Ascending action - climax - descending action.

The central part of the story where the protagonist meets all kinds of challenges builds a climax. But before participating and finally overcome the tests must be passed phase "prepares the ground" for principal.

Participants in an EEE activity seem to face confrontations and difficulties caused by the artistic process. Such experiences seem to occur particularly when e l world is taken for granted des-familiarizes. At that point, phenomena that participants originally viewed as ordinary can become experienced as extraordinary. It seems that several participants hesitated to easily leave behind their habitual state of being, that is, the frame of reference that guided their actions before participating in the activity of PREPA.

Mary Catherine Bateson (1994) draws attention to the circumstance that what we call the familiar builds in layers a structure known so deeply that it is taken for granted and practically impossible to observe without the help of contrast: "Seen from a In contrast, from a stranger's point of view, family patterns themselves may be accessible for choice and criticism. In contrast, what seemed radically different is revealed as part of a common and own space. "

In this regard, the criterion of David Wong (2007) what makes a good teacher is someone who allows his students to see the familiar as strange and the strange as familiar. Wong writes this in the context of his discussion of John Dewey's views on what a powerful educational experience consists of. To be profoundly compelling and transformative, Dewey argued that they require both active action and a responsive process. By then, as Wong (2007) clarifies, we begin to have new

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thoughts, feelings and actions; what happens is that "the world reveals itself and acts on us in new ways". Both the person and the world transform each other.

An open attitude

The importance of an open attitude should be highlighted, both for the participants and for the facilitator. This element is a key feature in PREPA activities.

A participant in such a learning activity, especially if it is artistically mediated, must be able to not know and remain open for a time. Otherwise, he or she will only "know" what is already "known" (cf. Kidd , 2013). Furthermore, as part of the open attitude with which both the participants and the facilitator participate in the ESA process, this may also mean, one step further, that for a period of time uncertainty and the unknown are invited to the space. It is not presupposed, general thematic coherence is provided, and much is deliberately left unexplained. When, for example, participants in a wild painting activity are invited to represent the mountain first using "wrong" colors, they are outside the comfort zone of how they usually paint a landscape. Here, in this PREPA activity, there are two threshold moments when I noticed that the participants seemed to enter a new "territory". The first threshold I identified is the time to enter the new color usage space that one would normally not use. Overcoming this threshold, I observed, requires effort. There are many sighs and other vocal and bodily expressions of struggle. The second threshold that I distinguish is again a movement towards a new and unknown terrain, but this time it is, paradoxically, a fight with the usual ways of painting. I noticed over and over again that several participants have an inclination to "correct" the strange colors they have just applied to the canvas, for example, completely covering them with the "appropriate" colors they would normally have chosen if they had not "deflected" the use of wrong colors.

I compare this way of making art according to convention or ingrained habit like "painting on autopilot". In this sense, it is an interesting question for me why children, starting at seven years of age, begin to draw trees according to a certain, almost universal model, at least, for what seems to be in the western world. This common pattern is a straight tree trunk, indicated by two parallel lines whose space is brown. On top of this is a green cloud shape, which is filled with green. If the tree is an apple tree, then in this green cloud there are also red circles inserted. This appears to be the "archetypal" tree that we carry with us, analogous to the characteristic type of horse that most people tend to draw when asked to "draw a horse" (head facing left, body not moving , with rigidity), straight legs, etc.

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It is important to mention here that the degree of openness to new learning can be affected by the intention with which the participants join the EEE activity. At times, his expectations seemed to partially inhibit his full receptivity to what is to come.

There are participants who apparently opted for participation out of a desire to learn a new method for themselves, but also they think they could implement it when they work with students in other settings. Such anticipation can potentially hinder you from allowing the activity to impact your individual self in the first place.

Liminality and initiation

One way to see the crossing of thresholds in an EEA activity is to compare it with moving through an initiation rite, an initiation before diving deeper into the activity: space must be cleared, purified, because entering the Special World requires a referential and attentive attitude that is not easily achieved by itself. Initiation, in indigenous cultures, is the rite that helps young people become men and women. As such, it is the transition from one stage of life to another. The initiations take place in a liminal space created specifically for this experience, apart from everyday life. In that characteristic, there are similarities with an ESA activity in which the participants also withdraw from their usual environment. In the special reality created from an initiation, the initiate is placed in a unique environment where different rules and regulations reign, which are quite strange to him or her. It's like being Alice in Wonderland.

This aspect of disorientation is planned: participants in the initiation rite are challenged to confront themselves and their fears. As Allen Berger (2009) explains, “They will discuss things that they have never openly discussed. This sacred atmosphere enables the elderly to create experiences and trials that transform boys into men. ”The initial stage of an initiation process is known as a transitional period of "liminality". The term is derived from the Latin limen, which means "threshold," the bottom of a door that must be crossed when entering a building.

There are certain actions in life that, as we perform them, completely draw on our understanding of the world, says Arthur Weymouth (2009): “Such actions reveal new spaces and new ways of thinking may emerge. In this liminal space, on the threshold between the common structures of everyday life, the whole paradigm by which we put the clocks of our lives is questioned. "Such a moment is what Turner called antistructure, " The place of birth of art, of revolution, of religion, of genius ". Experiencing a transformative experience means that it is also launched in a liminal zone where it is not possible to operate on the basis of methods that have proven their value and reliability throughout In effect, it implies a radical vulnerability to what the receptive process may

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provoke. It implies an element of suffering in the sense that the world acts on you, often against your own will. Wong (2007) points out that renouncing Control and therefore being receptive to external influence is an essential quality of deeply engaging experiences.

Experiences are made up of more than our intentional actions. Only by fully experiencing the experience, by surrendering to this suffering, do we really learn: perception is an act of energy output to receive, not a retention of energy. To dive into a topic, we first have to dive into it. When we are only passive to a scene, it overwhelms us and, for lack of response activity, we do not perceive what overwhelms us. We must summon energy and put it in a receptive key to be able to assimilate it (Dewey).

In the short term after PREPA activities, people's daily lives tend to exert such a dominant influence that they soon seem to quickly re-absorb into the " profane." Bruce Baugh (1988) argues that we need some degree of defamiliarization to being open to the emanations that arise from the evolving or finished work of art in front of us. By allowing the work of art to organize our experience, it is given "enough power over us to alter our experience of the world from its . foundations "this moment of transformation, however, always be transitory, stressed Baugh .. is a momentary revelation, which coincides duration of the manifestation of the work of art could not have brought this experience on our own. It is essential that the work of art does this in terms of its ends, and not ours.

Return to normal

The descending action phase deals with events that take place just after the climax; they are, so to speak, its aftermath. This is a time when there is an inversion: the conflict in which the protagonist becomes entangled, unravels and leads the hero to win or lose. It is this act that ultimately leads to resolution where things can return to normal. After the thrill of climax, the drop action may seem somewhat anti-climactic.

In storytelling, it is generally kept relatively short and is used to sort the loose ends and bring the elements of the story to a satisfactory conclusion in the resulting final resolution.

The breaks "force" participants to look at their own work from a distance. In doing so, they can see aspects that are easily overlooked when one continues continuously and especially when one never goes back to allow oneself to evaluate what is growing in his work. However, they not only have the possibility to see their own work with new eyes, but also, and this is just as important, they pay attention to the evolution of others, who, each in their own way, are struggling with same task. Lines in manual activities, a similar period of downward action when participants begin

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to tell their story (how they imagined themselves into a landscape evoked r) with other members of their small group. On the basis of these shared revelations, the recovery of the historical memory of the sensory experience seems to present different degrees of difficulty for each sense and for each participant involved. Regarding the creation of little -me, there is only one evaluation phase in the whole session. Indeed, this phase is a combination of descending action and the final stage in the dramatic structure of the story, resolution, in one continuous event. The conclusion of the entire EEE experience is the subject of the next section.

4.-After: Resolution

The resolution phase refers to the period in which the artistic creation itself is completed, but the participants are still together and share their reflections on the meaning of the experience they went through.

Figure M3-2. "Little-me". Jon Van Boekel experience.

In the analogy to the dramatic plot, there is a release of accumulated tension and anxiety. The word for this act is denouement. The complexities of the plot are revealed and the mysteries come to a solution. In analogy, this phase is a preparation of the participants for their re-entry into their daily world, and in anticipation of how the experience and possible lessons can be integrated into

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the development of their lives. In an initiation rite, this would be the ambiguous phase of liminality, where the initiate is outside of society, but where he or she, at the same time, is also preparing to re-enter (La Shure , 2005). Here too there are similarities to the notion of closure, which, in psychology, refers to the moment when a particularly intense experience in a person's life comes to a conclusion.

The closure occurs when a person comes to understand and meaning is created. John Dewey speaks of the consummation of experience: its fulfillment, culmination, and completion. Not just any experience, but an experience is integrated. When we have completed a job satisfactorily and the activity comes to an end, this is not a cessation but a consummation: "through successive actions there is a sense of increasing meaning preserved and accumulated towards an end that is felt as accomplishment of a process. " Dewey stresses that the" acceptance "of any life experience involves more than placing something at the top of consciousness over what was previously known. Necessarily, it involves reconstruction, and this may very well be a painful phase. .

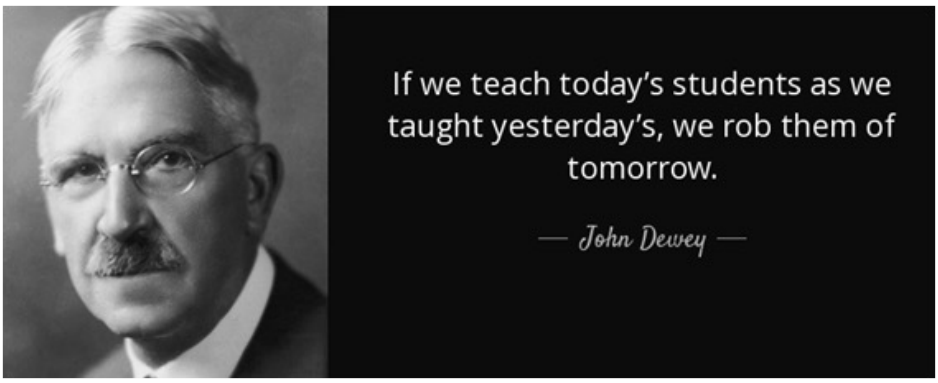

Figure M3-3. John Dewey citation.

The part of the resolution phase where the whole group is still present is an integral part of PREPA activities, it would not only be incomplete to omit this part, so it would not offer the full experience, but would also be reckless. The participants have lived in a liminal space in which the new could manifest itself, whether in the form of epiphanies, feelings of frustration or paradoxes. Exactly because of this unusual state, they may also lack the tools to make sense of what they experienced, and perhaps even more, be deprived of the ability to integrate that meaning into their normal lives.

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3.4 DISCUSSION

A dramatic story structure has been used as a device to differentiate between phases in EEE development activity. There is a significant analogy between the structure of the drama and an ESA process, since similar successive phases can be distinguished in both. The trajectory leads from the period prior to the exposure phase, to the middle part of the confrontation (with its potential peak moment of transformation), to the "decoupling" of dramatic events in the final outcome. It is suggested that the setup phase requires specific attention and an adequate amount of time, as participants are not in tune with a "surrender" to the impending dynamic art process. Activities in which participants were engaged before participating in the PREPA process inevitably cast a shadow and have an impact. Therefore, it appears that participants need, in one way or another, to pass a gate or threshold before they can feel comfortable and confident enough to leave the autopilot mode in their usual ways aside. In PREPA activities, participants often have no idea in advance of what can happen, a circumstance called the "open end" of the process. To improve participants' propensity to face this uncertainty, it seems useful to create a situation in which the ordinary world is defamiliarized. Through the catalytic element of withdrawal, the usual ways are of less use to participants and the best available resource is to be open and vulnerable to the new. This element of the process has much in common with initiation rites in indigenous cultures. The moments of epiphany that the participants can experience in this space, if they occur, can be understood as dynamic instances of transformation, which the participants must then integrate into already established (and therefore more static) patterns of understanding. Reflecting the attention required in the preparatory phase before actual artistic creation is launched, I discovered that it is equally important that new experiences are reflected together, in evaluation or review sessions, and an effort is made to integrate them significantly in what can follow after the EEE activity is completed. Another way to affirm this is that participating in the full intensity of artistic activity can make participants, who live in the eye of the storm, experience a deep sense of uncertainty. Such a state of temporarily residing in a state of "between and among" can have a profound impact, as several of them have testified. This circumstance carries a critical responsibility on the part of the facilitator, demanding that it safeguard that the preparation phase leads to such potential apotheosis and, then, the phase of trying to regain balance and integration of the new, are shaped and guided in the manner more suitable.

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4. MODULE 4. Integrating art-making in environmental education: Theatre as educational tool for environmental awareness

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4.1 INTRODUCTION

This module presents the research carried out by E.Andrikopoulou and K. Koutroub from the University of Harokopio (Greece) and which is included in the article THEATER AS AN EDUCATIONAL TOOL FOR ENVIRONMENTAL AWARENESS.

Thus, this module describes the research carried out and its main results to demonstrate the effectiveness of the use of theater in environmental education and will serve as a base argument for the development of the Intellectual Output 3.

The eco-drama encompasses plays that hint at the link between the human and the non- human world and directly address environmental problems and concerns in hopes of raising awareness and pushing for change. It works exploring the very essence of the natural world in such a way that when the viewer leaves the theater to have a deeper awareness of their ecological identity

Drama can sensitize students to the relationship 'human-nature', and bring them to investigate life in relationship with others and with the environment, express opinions and attitudes, but also to review (Kontogianni 2008).

Based on the literature review, research successfully connects students 'environmental awareness with the use of theater techniques, and I have concluded that drama in education contributes significantly to students' interest in the environment, science, and the environment world around them (McNaughton , (2006), Gale (2008) Çokadar H . , Yılmaz G. (2010), Perdikari (2007), Dorion (2010), McGregor (2012)).

4.2 METHODOLOGY

This research seeks to analyze the use of a method that has theatrical activities with ecological content as a basic educational tool.

The research questions asked are whether the implementation of improvised eco-theater in the context of environmental education of primary school students:

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(i) improves the ability to understand the basic principles and concepts of ecology, more than the traditional form of teaching.

(ii) contributes to the adoption of more environmentally friendly attitudes and values.

The main objective of the research is to examine whether the use of improvised eco- theater as an educational tool can help to increase environmental awareness among primary school students.

To provide answers to these research questions, the 'action-research' method was chosen.

The 'action- research' education is an alternative type of educational research that teachers themselves lead to out on their own or in collaboration with others within a research team. The researchers, called action research professors, participate in all phases of the research, from initial planning to evaluation and redesign to a continuous and successive course

In the educational 'action- research', other participants also participate in the educational process (parents, school counselors ...), as well as the facilitator who coordinates the educational program and acts as the "critical friend".

The main characteristics of educational action research are: its participative and cooperative nature, the unification of teaching and research and the consequent interconnection of theory and practice , the open spiral- circular process : participants act and think to understand, change and improve and its stochastic and reflective dimension (Katsarou and Tsafos , 2003).

The participants were 28 students from two classes, their teacher and the researcher.

Teacher intervention took place from February 2015 until early June 2015 (4 months), which takes rum out sixteen (16) sessions / lessons. Each session lasted 40–45 minutes.

The main idea of the teaching intervention was the students themselves, through their knowledge and experiences, to choose the environmental problem they wish to study and communicate to the broader community through the art of theater.

Following the participative and cooperative nature of the action, two questionnaires written and delivered to the students were investigated. Questionnaires were given to students at the beginning and at the end of the program, to examine the background learning, experiences and knowledge of the students and how they were affected or changed at the end of the "intervention".

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The pre-questionnaire was given to the students before the intervention and the post-questionnaire at the end, to explore the environmental knowledge and opinions of the students and if they have improved after the intervention was completed. The realization of both questionnaires was done in the classroom to ensure both proper completion and the fact that students were not influenced by the opinions of others. The data was then analyzed using the statistical package to find the percentage and frequency.

The teaching intervention was based on the characteristics of the action mentioned above and enhanced by the use of drama techniques in the classroom. The chosen model was the one that follows the four phases of the Lewin model, plan - action - observation - reflection and add more than one cycle of action. During the investigation, the role of the researcher was that of the "facilitator", while the teacher of one of the two classes participated was the “Critical Friend “. The "critical friend" was involved with the auxiliary role in the feedback phases, offering different alternatives and perspectives. The didactic intervention was designed in the patterns of the circular spiral process, and was completed in four consecutive cycles, following the following form:

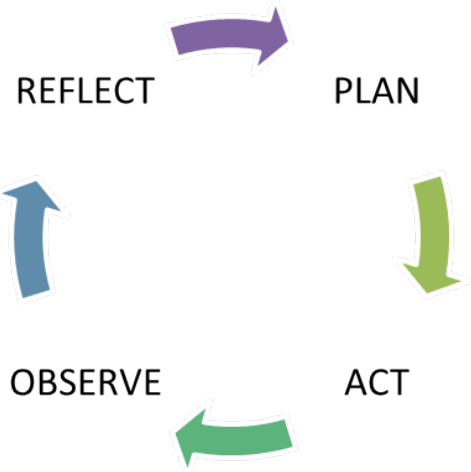

Figure M4-1. Kurt Lewin´s model.

1st cycle of teaching intervention

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- PLAN: Preparation of the questionnaires
- ACTION: Answer the pre- questionnaire
- OBSERVE: Posing the most important environmental problems (according to the students)
- REFLECT: Discussion of the results and the setting of the working groups.

2 º cycle teaching intervention

- PLAN : Definition of an environmental problem by work group
- ACTION: Search for information from the working groups
- OBSERVE: Highlight collaboration problems within groups
- REFLECT: Discuss the problem and define new work groups ("critical friend" intervention).

3 rd cycle teaching intervention

- PLAN : Search for information from new working groups on environmental issues and creating posters (one per working group) -
- ACTION: Poster presentation and environment related problems -
- OBSERVE: Discussion of the data presented by the working groups (intervention of the "Critic - friend") -
- REFLECT: Make enhancement adjustments.

4th cycle teaching intervention

- PLAN: Create small improvised eco- dramas
- ACTION: Presentation of the improvised ecodrama made by the students, their classmates, teachers and parents -
- OBSERVE: Complete the post-questionnaire at the end of the teaching intervention
- .REFLECT: Results of the investigation.

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As mentioned above, the students themselves had to choose the environmental problem that they wanted to communicate with the community in general through the art of theater.

The objective of the first phase of the intervention was teaching students to point out that environmental problem is e l larger today.

After completing the pre- questionnaire, the biggest environmental problem on the planet according to the students was pollution (39.3%) followed by loss of biodiversity and deforestation (14.3%), climate change (17.9%), water shortage (10, 7%) and degradation (3, 6%)

	Frequency	Percent	Valid Percent	Cumulative Percent
climate change	5	17,9	17,9	17,9
degradation	1	3,6	3,6	21,4
loss of biodiversity	4	14,3	14,3	35,7
deforestation	4	14,3	14,3	50,0
pollution	11	39,3	39,3	89,3
water scarcity	3	10,7	10,7	100,0
TOTAL	28	100,0	100,0	

Figure M4-2. The biggest Environmental problem of the planet today

The biggest environmental problem in the country according to the students was waste management (35.7%). Second, protect forests (17, 9 %), followed by energy saving and pollution of air (14, 3 %), climate change and protection of biodiversity areas (7.1%) and finally protection of seas (3 6 %).

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	Frequency	Percent	Valid Percent	Cumulative Percent
climate change	2	7,1	7,1	7,1
waste management	10	35,7	35,7	42,9
Protection of seas	1	3,6	3,6	46,4
Protection of forests	5	17,9	17,9	64,3
Protection of biodiversity areas	2	7,1	7,1	71,4
energy saving	4	14,3	14,3	85,7
air pollution	4	14,3	14,3	100,0
Total	28	100,0	100,0	

Figure M4-2. The biggest Environmental problem of Greece today

Taking into account the results of the previous questions, we decided to focus on different forms of contamination and formed four groups, each of them worked on a different cause of contamination: 1. Waste management, 2. Air pollution, 3. Air pollution water and 4. Soil contamination.

In the second phase of the intervention, collaboration problems within certain groups arose during the search for the information. The intervention of the "critical friend" was crucial, and as a result some of the groups were reformed.

During the third phase of the teaching intervention, the working groups met to look for information on the environmental problem they had undertaken, made posters and presented them to the rest of the class, using team improvisation.

In the fourth phase of the teaching intervention, the working groups combined their improvisations in the team and performed an improvised ecological drama, which was presented at the end of the school year in front of their classmates, teachers and parents.

At the end of the teaching intervention and to triangulate the research results, the “critical friend " was asked for a general evaluation of the program, answering some of the researcher's questions with a semi-structured interview .

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4.3 RESULTS

The results of the teaching intervention were based on the results of the two questionnaires completed by the students and also by the evaluation of the "critical friend".

The pre- questionnaire was divided into four sections: the first two sections provided personal details of the parents and students, the third section aimed to explore the students' environmental knowledge and points of view and the fourth section aimed at exploring the knowledge of pupils and views on drama in education.

The post-questionnaire had thirteen (13) questions, three of which were the same as the pre-questionnaire to examine the understanding of the basic principles and concepts of ecology (cognitive domain), two of them with the objective of examine the adoption of more environmentally friendly attitudes and values (affective domain), seven of them with the objective of examining what socio-emotional aspects and communication skills that the students developed (affective domain) and three of them with the objective of examining the degree of familiarity of the students with the use of drama techniques in the educational process (Psychomotor domain).

Pre-questionnaire

Personal data of parents and students.

This section provides the results for students and their parents' personal details.

Regarding parents, the results showed that the average age rate of the parents was between 41 and 50 years (47.8%), most of them were graduates of Secondary Education (43, 5%) and worked as independent workers (47.8%). The average age rate of the mothers was also between 41 and 50 years old (56.5%), most of them were also graduates of Secondary Education (52.2%) and either working as self-employed or not working in absolute by the same percentage (21.7%).

Regarding the students, the results showed that 53.6% were girls and 46.4% were boys and the ages of the boys and girls were classified.

Exploration of students' environmental knowledge and points of view.

This section provides the results of the exploration of students' environmental knowledge and views.

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The students believe that the biggest social problem in Greece today is the economy (52%), second is unemployment (32%), third comes the environment (12%) and then it is racism (4%).

Questions 2 and 3 were about the biggest environmental problem on the planet in general and Greece specifically. Of the answers given by the students, contamination was the biggest problem, so teaching intervention focuses on that.

The students believe the biggest environmental problem of the planet today is pollution (39.3%) followed by loss of biodiversity and deforestation (14, 3%), climate change (17, 9%), water scarcity (10, 7 %) and degradation (3, 6%).

35.7 % of students believe that the biggest environmental problem in Greece is waste management. Secondly, the protection of forests (17.9 %), followed by energy saving and air pollution (14.3%), climate change and protection of biodiversity areas (7.1 %) and finally protection of seas (3, 6%).

To the question "Who do you think is responsible for today's environmental problems?" 74, 1% answered, "each one of us", 18, 5% answered "factories" and 7, 4% answered "the state"

The results showed that the things students do to protect the environment are mainly recycling (34.7%), energy and water savings (30.7%), tree planting (18.7%), buying environmental friendly products (10, 7%) and being a member of an environmental organization (5, 3%).

The main source of information on environmental issues for students is television (50%), and after that comes their family (46.4%), the third is school (39, 3%) and then comes the internet (28 , 6%), books (10, 7%) and finally his friends (7, 1%).

The results also showed that most of the students would like "very much" to learn environmental problems outdoors (57, 1%), through drama (39, 3%) and audiovisual media (39, 3%), but "never" or "rarely" go outdoors (46.4%), "never" use drama (42.9%) or audiovisual media (39.3%).

Finally, students enjoy using computers "a lot" (46.4%), a medium that teachers use "almost always" (39.3%).

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Explore students' knowledge and opinions on theater in education

This section provides the results of exploring students' knowledge and opinions about theater in education. The majority of students have been taught drama at all class is elementary school (81, 5 %) and some of them have taught drama in most classes (18.5%).

The results showed that students have been taught (even for once) foreign languages through drama (71,4%), literature (57,1%), history (46,4%), science (32,1%), religious themes (7,1%), music (25%), environmental issues (53,6%), geography (21,4%), art (25%), but never mathematics .

In this section there are some questions about why students would like to learn drama and why they would not. According to their responses, the students "would really enjoy" learning through drama because they enjoy teamwork (57,7 %), they would be doing something different (51.9%), they would work with their friends (46,2%)). Then comes the opportunity to express their ideas (23, 1%) and finally it is the opportunity to participate doing something creative (30,8 %).

Finally, the students' responses to possible difficulties in learning through drama are as follows: They "Not at all" feel upset when doing something in front of the whole class (50%), or having to cooperate with others who are not his friends (53,8%). They feel comfortable expressing themselves artistically (54,2 %).

Post - questionnaire

The first three questions in the post- questionnaire are the same as those used in the pre-questionnaire.

The purpose of the questions "What is the biggest social problem in Greece today?" and "Who do you think is responsible for environmental problems today?"

It is to examine students' understanding of the basic principles and concepts of ecology (cognitive domain). The objective of the question "What you do to protect the environment" is to examine the environment and the friendly attitudes and values developed by the students and also the socio-emotional skills (affective domain).

Six questions examine the thoughts and fillings students after the f in her show (affective and psychomotor domain).

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After intervention teachers, students believe that the biggest social problem in Greece today is the environment (75%), the second still is unemployment (14.3%), the third the economy (10.7 %) and racism has no answers.

In the question "who do you think is responsible for the environmental problems today?" 85, 7% answered, "each one of us" and 14, 3% answered "the state".

The results of the question “Things you do to protect the environment” showed that students still do mainly recycling (36,8%), the number of tree plantations increased (20,6%), but the % of savings decreased energy and water (13.2%). Most impressive, the response from being a member of an environmental organization went from 5.3% to 19.1%.

The results of the question "What do you think after the end of the program?" They showed that the students: Feel good about being part of a work team (24.8 %) and proud of completing their effort (22.8%). 20, 8% of them will consider the environment more. 17.8 % of students believe "a lot" that the public understood the meaning of the program and that they will consider the environment more (12.9%).

4.4 CONCLUSIONS

According to research results, the use of drama as an educational tool is a method that students prefer over traditional forms of education that would give them the opportunity to have something different in class. They like dramatic techniques because they are based on teamwork (such as team improvisations) and give them the pleasure of cooperating with their friends. Students also feel more comfortable expressing their ideas through drama, because it gives them the feeling of freedom. Students also prefer the drama because they rarely have the opportunity to participate in the class doing something creative.

The use of drama activities in the classroom, and more specifically the implementation of eco-theater in the context of environmental education, can help to increase students' environmental awareness. The findings show made a significant improvement in all three domains basic of human behavior as well as increased awareness of students about the environment.

The research results showed that there has been a positive change in the cognitive domain.

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Students' opinion about the importance of environmental problems has changed and they understand that the environmental crisis is part of the social problems that we face today. It is also very important that the students understood that each of us is responsible for the environment and we must adopt more attitude is and values respectful with the environment. According to the evaluation of the "critical friend ", "The students' contact with environmental concepts and terms was achieved and questions and queries were generated that were answered."

Regarding the affective domain, we can say that the students developed positive attitudes, disposition to act and be part of an environmental change. They also developed environmental values and empathy. We can say that the feeling of inclusion is enhanced during the teaching intervention, and also the teamwork and cooperation between them. Quoting from the "critical friend" evaluation, "it was very promising to see the students working together, even during intermission their improvisations appeared as a team. Children with a strong personality have learned to control themselves and to help others who have a natural contraction. All the children worked together and a climate of solidarity and sympathy was created. "

Regarding the psychomotor domain, we can affirm that the students are familiar with the use of drama in the educational process and feel comfortable expressing themselves artistically.

They think drama gives them an opportunity to express their ideas, work in groups, and participate by doing something creative.

As a final conclusion, a phrase quoted by the "critical friend" "Through interactive activities, students have learned not only to care about the environment but also to use their skills and talents."

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5. MODULE 5. Unpacking the process and effects of Art-Based Education.

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5.1 INTRODUCTION

This module 5 is the result of a research of literature about the effects of Art Based Teaching and Learning, and some recommendations and barriers for the implementation.

This module is based in a study of Robin Rooney (2004) in Arts-Based Teaching and Learning Review of the Literature.

The literature also describes an array of effects targeted and attributed to arts-based teaching and learning. Targeted effects, or outcomes, influence the model selected for implementation. To affect knowledge of the arts, for example, schools may provide instruction in visual arts, music, dance, or drama, perhaps integrating these four disciplines. To affect general learning, schools may adopt a model that integrates the arts into the general curriculum.

As for effectiveness, the literature reports data to support the influence of arts-based teaching and learning on various aspects of learning. Researchers who have compared results across multiple independent studies have found some relationship between arts instruction and affective and cognitive skill development. Because some of these relationships are either very narrow or very broad, most conclude that research findings, especially those relating arts-based teaching and learning to academic achievement, are inconclusive. Others note that the effectiveness of arts-based teaching and learning depends upon the implementer's desired outcome and should not necessarily be judged by academic achievement test scores. In sum, various authors argue that arts-based teaching and learning should be implemented for its own sake, for its influence on motivation and interest in learning, or to improve general cognitive development.

5.2 EFFECTS ATTRIBUTED TO ARTS-BASED TEACHING AND LEARNING

The literature attributes various effects to arts-based teaching and learning. Organizations that became involved in arts partnerships were said to experience improved climate and cooperation.

Teachers participating in professional development reportedly became more creative. Arts-based teaching and learning practices raised students' interest and motivation levels and, according to some reports, improved cognitive skills for gains in academic achievement.

From the Center for the Study of Art and Community. (2000). CSA&C services. Retrieved March 19, 2004, is said, at the community level, arts-based teaching and learning improves relationships and, therefore, cooperation among partners. The literature reported positive effects associated with

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community involvement. Community arts partnerships, for example, were said to build relationships among organizations. Such relationships resulted in better cooperation and more creative problem solving

Whole-school reform models that involve the community create partnerships with other organizations, as well as with parents. Partnerships increased access to resources from other organizations. Parent participation increased as parents became more involved in their child's education through arts-based school activities. Involvement in arts-based teaching and learning activities made parents more aware of the curriculum guiding the education of their children. These conclusions are obtained from "Artfirst: Mississippi Arts on the Move. (2000). Mississippi Institute of Arts and Letters: 2000 Arts and Letters Awards. Retrieved March 19, 2004" and " North Carolina A+ Schools Program: Schools that work for everyone. Executive summary. The arts and education reform: Lessons from a four-year evaluation of A+ schools".

Arts-based teaching and learning improves classroom and school climate. Increased attendance, student participation, communication, and flexibility associated with arts-based teaching and learning practices improve classroom climate, according to the literature. Students who participated in an artist-in-the-classroom project, for example, showed improvement in test scores, in part due to better attendance. The success of such activities, researchers noted, can vary according to the regular classroom teacher's level of interest and participation ("Fogg, T., and Smith, M. (2001). The artists-in-the-classroom project: A closer look. Educational Forum, 66, 60-70.").

Authors reported that implementation of a whole-school arts-based curriculum increases student levels of participation. Authors linked student interest in learning with increased communication, and attention to creativity and self-esteem. Seaman found that arts-immersed schools demonstrate positive social and environmental factors, or "strong school ecologies" (Seaman, M.A. (1999). The arts in basic curriculum project: A ten year evaluation. Looking at the past and preparing for the future. College of Education, University of South Carolina).

Burton, J. and Horowitz, R. observed both art-rich and "low-arts schools." He described learning in arts-rich schools as complex, continuous, open, and flexible. In "low-arts schools," arts-based teaching and learning was described as "inconsistent and sporadic" and, therefore, less beneficial for students.

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Arts-based instructional practices improve teacher quality. The literature asserts that teachers who implement arts-based instructional strategies achieve are more enthusiastic, do their jobs better, and develop a "higher order" of thinking. According to Eisner (2002), academic teachers who learnarts-based instruction become more artistic and creative. A collaborative, interdisciplinary teaching experience provides deeper learning experiences for both teachers and students. Teachers who became involved in whole-school reform also became more enthusiastic about teaching. Teachers in high arts schools, according to Burton, are more innovative, more flexible, and more likely to participate in professional development activities.

Arts-based teaching increases a teacher's repertoire of engaging instructional strategies. Participating in the instruction of a blended curriculum, for example, helps teachers become more childfocused, more aware of student capacity, and better able to assess child progress.

The literature describes both affective and cognitive benefits for students who participate in arts-based learning. In Critical Links, a compendium of arts education research, Catterall discussed relationships among affective development, cognitive development, and learning. As a learner develops cognition, according to Catterall, he develops abilities and expertise that support academic and social learning. Affective development, on the other hand, increases a learner's interest in learning and feeling of self worth which, in turn, increase his willingness to learn and apply new skills (Darby, J.T., and Catterall, J.S. (1994). The fourth R: The arts and learning.). Thus, affective and cognitive effects of arts-based teaching and learning are closely related. In this section of the literature we will present them separately, but in later sections we will discuss their relationship further.

Effects of Arts-Based Teaching and Learning on Affective Development

As defined by Catterall, affective development in this context means an increased interest in learning, self-worth, and willingness to try new things. According to the literature, arts-based teaching promotes affective development by increasing the learner's interest, motivation, and enthusiasm for learning. Improved enthusiasm and motivation can be the result of the higher expectations for students associated with whole-school reform, or from specific art and academic activities that engage students, such as art and reading activities that build upon children's literature.

Arts-based instruction increases interest and motivation. All students, including diverse learners and those at risk for academic failure, can reportedly achieve more and are more likely to stay in school when they have a "love for learning". Students who struggle with school because they are not part of the dominant culture benefit from arts in education because the arts make education

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more equitable. According to a review of national projects, arts-based teaching broadens and increases access to education by providing multiple ways, along with representation from multiple cultures, to derive meaning from academic and social curricula. Equitable access to education motivates learners, especially those at risk for disenfranchisement. In Critical Links, Catterall noted that Howard Gardner's multiple intelligences theory supports the use of a wider range of instructional strategies than those typically found in school to motivate learners. Arts-based teaching and learning strategies are among those that appeal to multiple types of intelligence and engage multiple ways of learning.

Arts-based instruction increases self-esteem and willingness to try new things. As students become more engaged in learning, their attitudes toward school, and toward themselves, improve. Students with a positive attitude toward learning are more willing to try new things. As Eisner put it (2002), the arts allow people to "invent and reinvent themselves" (Eisner, E.W. (2002). The arts and the creation of mind. As attitudes improve along with a willingness to experiment, arts-based learning activities give students skills with which they can "explore uncertainty". Burton found, for example, that students in high-arts groups were better able to express thoughts and ideas than their peers in low-arts groups. Better communication skills allowed high-arts students to "act on their imaginations and curiosity," cooperate with other students, and display their learning publicly.

Effects of Arts-based Teaching and Learning on Cognitive Development

As defined by Catterall, cognitive development in this context means areas of ability and expertise that can be applied successfully to academic and social learning situations (23). Authors describe these abilities and areas of expertise to include creativity, self-direction, and complex thinking.

Arts-based teaching and learning practices reportedly influence the development of such skills.

Arts-based instruction develops learning abilities. The literature provides some evidence of cognitive skill development through the arts. Standardized tests of creativity showed more highly developed creativity in students who participated in arts-based reform. Burton noted that students in high-arts groups performed better than those in low-arts groups on measures of creativity. He concluded that creativity is a "capacity" for learning that can be developed through an arts-based curriculum. In related areas, high-arts students also demonstrated better capacity than low-arts students in the areas of fluency, originality, elaboration, and resistance to closure.

In addition to creativity, arts programs help students develop self-assessment, organizational, and planning skills. Students in high-arts groups, compared with students in low-arts groups, also

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demonstrated better rapport with teachers and more sustained focus (Burton, J., Horowitz, R., and Abeles, H. (1999). Learning in and through the arts: Curriculum implications). Such abilities help students connect with themselves, each other, and the outside world. These connections, along with self direction and self-assessment skills, help prepare students for the workplace.

Arts-based instruction develops thinking skills. Thinking skills attributed to arts-based teaching include improved comprehension, interpretation, and problem solving. The cross-disciplinary learning environment associated with arts-based instruction, in particular, helps students develop deeper, broader, or "higher-order" thinking skills. Such skills enable the learner to recognize, contrast, and compare varying elements of the world around him and, therefore, to comprehend its complexity.

Efland (2002) relates higher levels of thinking to the comprehension of symbols: the ability to interpret symbols and construct their meaning. The arts, in its various media and approaches, offer abroad range of symbols and other ways of representing ideas. Students who experience the arts learn to interpret symbols and understand abstract ideas. Students of the visual arts, for example, learn visual problem solving by interpreting the symbolism of visual artworks. The ability to construct meaning through various representations leads to deeper, more conceptual thinking. As Eisner put it (2002), the arts allow representation of ideas that are not otherwise easy to process. Once an idea is represented, it can be processed through comparison and discussion. Processing of information and communicating about it lead to new learning.

Arts-based instruction develops neural systems. Its influence on neural systems is another way to associate arts with learning. By engaging the brain, the arts enhance neurobiological systems that support cognitive, emotional, attention, and immune systems. Music, for example, has been found to synchronize neural firing patterns. Instruction in music promotes and maintains this synchronicity, which increases the efficiency and effectiveness of the brain. Authors attribute such brain activity with increased ability in the areas of spatial reasoning, creativity, and general math. Catterall asserted that any experience will change the brain and, therefore, will influence cognition. The influence of art on cognition is in its development of thinking abilities and motivation for learning. These capabilities generalize from arts learning to non-arts learning.

Social development may be related to arts-based learning. The arts help students develop communication and cooperation skills. When students learn to express themselves more effectively, their relationships with other students and teachers improve. Arts-based teaching and learning also helps link students with the community. In terms of social behavior, researchers for the New American Schools noted that students involved in music activities exhibit fewer at-risk

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behaviors than those who are not involved (New American Schools. (2003). The Leonard Bernstein center for learning. Retrieved March 19, 2004).

Arts-based learning generalizes to other learning. The question of "transfer" emerges in this discussion of effects. Some authors have questioned the extent to which effects from an arts-based activity can transfer to more general learning and, ultimately, to academic achievement. Mardirosian and Fox (2003), for example, found that a performing arts reading program increased third-graders' comprehension primarily for the story the students performed, with less impact on general reading and writing skills. Authors concluded that arts-based teaching is more likely to produce "near" learning – the understanding of the arts-based activity in which students engage, than "far" learning -- the ability to generalize or transfer learning to academic areas that were not part of the arts-based activity.

Critical Links also addressed the question of transfer. Some studies in this compendium of arts education research compared transferred learning with original learning; others compared the transfer of cognitive learning with the transfer of affective learning. In a summary of this research, Catterall concluded that problem solving learned in one circumstance does not necessarily generalize to a different circumstance, or even to a similar circumstance. Because it is difficult to achieve, he recommended a broader view of transfer that encompasses skills and abilities that are related to cognition. Drama, for example, increases interpersonal relationship and communication skills which improve learning. This, Catterall noted, may be considered transfer.

A study of Learning In and Through the Arts (LITA), as noted in Champions of Change supports this notion that arts learning has a positive, albeit indirect, effect on general learning. Authors suggest that learning across subjects and domains goes back and forth, stimulating one another, and creating a "constellation" of influence. This complex web of stimulation and influence creates an enhanced learning environment in which the arts contribute critical opportunities for engaged, active, cross-disciplinary teaching and learning. An enhanced learning environment such as this is key to academic achievement.

In a similar assertion, Burton discussed the capacity of arts instruction for developing skills and abilities that support student achievement. The arts teach students to solve problems, elaborate ideas, and to structure and organize different kinds of experiences. Such skills are transferable to science, math, and language, although this transfer cannot be characterized as "one-way." Similar to the conceptualization of a web or constellation of influence across learning domains, Burton described the dynamic, reciprocal relationship in which learning activities, such as visual art, music, literature, reading, and social studies, are combined so that one subject challenges another.

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In a review of studies from 1950–99, however, Reviewing Education and the Arts Project (REAP) researchers did not find a strong relationship between arts instruction and academic performance. Authors such as Winner and Hetland (2000) concluded that, given this lack of evidence, educators should not base an argument for arts instruction solely on what it can do to improve academics. Although it is tempting to seek funding for the arts by associating it with improved academics, this argument could actually backfire when improvement does not occur or cannot be attributed to involvement in the arts.

Schools should include the arts in their curriculum based on “inherent merit,” rather than effect on academics, according to Winner and Hetland.

Academic development may be related to arts-based learning. In terms of specific academic skills, the literature presented some data to support relationships with art. Burton noted that “competencies and dispositions” developed through arts-based teaching also emerged in other subject areas, such as science, math, and language. In Critical Links, Catterall and others found evidence to support positive relationships between arts and academics as follows:

- Drama develops higher-order language and literacy skills;
- Music enhances language learning;
- Music enhances spatial reasoning;
- Art experiences develop writing skills; and
- Arts experiences develop literacy and numeracy skills

Arts-based teaching may be particularly effective with diverse learners. Across the literature, authors seem to agree that arts-based teaching engages a wide range of learners. As Fiske put it, the arts challenge all students—including the hard-to-reach, the gifted, delayed learners, and others who may be, for a variety of reasons, at risk for academic failure. Arts-based teaching and learning work as a school reform strategy because the arts give everyone a chance to learn and succeed. Instruction in the arts involves different kinds of learning activities that are meaningful for different kinds of learners.

According to some authors, arts-based teaching and learning practices are particularly effective with learners from diverse cultures. Ingram (2003) reported a significant relationship between arts-integrated instruction and improvements in reading and math, especially for disadvantaged

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learners and students whose test scores form the lower end of the race and ethnicity achievement gap (Efland, A.D. (2002).).

In addition to providing alternate forms of learning, art teachers also appeal to multicultural learners. High school students who participated in interviews about arts instruction reported that art teachers are more likely to promote multiculturalism, and are more likely to be diverse themselves, than their academic counterparts.

5.3 RECOMMENDATIONS FOR THE IMPLEMENTATION OF ARTS-BASED TEACHING AND LEARNING

Based on these effects, the literature makes recommendations for implementing arts-based teaching and learning models and practices. Recommendations address professional development, infusing arts into the general curriculum, implementing interdisciplinary curricula, co-teaching, and developing community relationships.

Teach teachers arts-based instructional strategies to engage learners. Because students demonstrate various learning styles and interests, teachers must use an array of instructional strategies to engage them. Teachers can learn to use arts-based instruction as a vehicle for a broad range of learning experiences, including trial and error, experiential, real-life, inquiry-based, hands-on, and metacognitive learning. On assessments of learning, students who experience an arts-infused curriculum outperform peers who experience traditional instruction. Stronge noted that most teachers do not use engaging instructional strategies and need professional development to broaden their teaching repertoires.

Once teachers learn arts-based instructional strategies, administrators must support their use. Administrators must expect and encourage teachers to continue arts-based practices and ensure that such practices are rich and in-depth. Administrators must also help teachers maintain environments that foster arts learning; children will not necessarily develop artistic skills without instruction and nurturance.

Give the arts a permanent place in education. Throughout this review, the literature makes a strong argument for placing and keeping arts in the curriculum. The argument is based in part on learning experiences the arts can provide for which there is no substitute. According to Eisner, the arts provide a way to view the world through an aesthetic framework. From this viewpoint, learners may understand the qualities of various aspects of the world around them, learn to judge and compare these qualities, and thereby comprehend the complex relationships among them.

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Experimenting with different media allows students to make decisions, problem solve, and think in different ways.

Art adds richness and depth to learning and instruction, helping learners with communication, expression, and perception. As one report concluded, the arts help disadvantaged students learn, re-energize teachers, and encourage out-of-school learning for students who are preparing for the workplace.

Although this review emphasizes arts-based teaching and learning, the literature also emphasizes art for art's sake, not for the sake of its effect on general learning. Project Zero researchers (2003) conducted a meta-analysis of arts education research and concluded that the arts are critical regardless of their impact on other subjects. Eisner (2002) and others agreed that art in the curriculum need not by justified by what it can do for learning outside the arts. It should be justified by its unique contributions to learning. Through the aesthetic experience, learners can communicate distinct and different forms of meaning and develop creative and perceptive forms of thinking. Eisner further observed that there is not "one true aim" for the arts, but many different aims, depending upon the circumstances. Horowitz called the argument between art for art's sake and art for augmenting academics a "false dichotomy" because the arts, he said, do both.

Catterall reached similar conclusions in his discussion of "near" versus "far" transfer of learning. Because the literature searches for evidence that arts education generalizes to very different contexts, it would seem that "far" transfer is considered superior to "near" transfer. Students who demonstrate better story comprehension and writing after acting out a story, for example, are considered to have experienced near transfer. But if drama improves comprehension and writing, Catterall asks, does it matter whether transfer is considered near or far? Regardless, he concludes, results show that the arts, drama in this example, are an effective strategy for teaching language arts.

Provide an interdisciplinary curriculum. The literature also strongly recommended the integration of arts and academic curricula. An integrated curriculum ensures interaction among various learning domains and disciplines. Students learn from these interactions by categorizing new information, which can be compared with old information, and by using art metaphors to construct meaning. According to the National Research Council (2000), an integrated curriculum also offers an opportunity for students to apply knowledge to new problems and practice new skills in multiple contexts.

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Applying concepts across domains and disciplines allows learners to identify subtle differences in meaning, providing the basis for deeper understanding of those concepts.

Authors further tout the interdisciplinary curriculum as a multimodal education strategy that reaches students with varying learning styles and strengths (8). The arts help develop communication skills, providing alternative “languages” through which students can process and express information.

Support co-teaching to implement interdisciplinary curricula. Optimally, team-teaching, or co-teaching, brings educators together from various arts and academic disciplines. This kind of collaboration, co-planning and co-instruction, brings a “mix of different skill sets” to the learning environment. The variation creates an in-depth teaching and learning experience in which both teachers and learners must think across disciplines. In a co-teaching model described earlier in this report, art and academic teachers participate in professional development activities to learn how information links across disciplines. They then co-teach, and in their teaching they both make cross-disciplinary linkages “explicit” by making those linkages explicit for the learner.
Several factors contribute to the success of co-teaching. Flexibility, particularly in scheduling, is required for teachers to communicate regularly and to teach side by side. This calls for strong school leadership. Administrators must ensure that teachers have the time to devote to this level of collaboration.

Connect with the community. A study of school districts with strong arts education across the country found that the “single most critical factor” in sustaining the arts was “active involvement of influential segments of the community.” Parents and families, artists, arts centers, businesses, civic leaders, and cultural institutions were among those who contributed resources when they were involved in arts education. A program in Redondo Beach, California, for example, trained parents as volunteer art teachers. The district offered evening adult education classes that strengthened the presence of art in the schools and “gave back” to the community. Districts also engaged community members by inviting them to student art exhibits and performances. Even parents who avoided their children’s schools tended to assist with or attend arts events.

Especially in light of budget shortfalls, schools must look for much-needed support from the local arts community. School collaboration with organizations such as local institutions of higher education and community art centers can mean added resources as well as networking opportunities and shared decision making. Resources are sometimes available to assist schools in developing partnerships. The Kentucky Arts Council, for example, offers grants to county school districts for establishing arts programs (Snyder, S.. Total literacy and the arts).

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Schools can also partner with community organizations to develop and operate programs for special populations. According to an issue brief prepared for the National Governors' Association (NGA), arts educators should collaborate with the community to prepare at-risk students for success in the workplace. Partners in such endeavors may include schools, community art centers, and juvenile retention centers.

School partnerships with arts-based programs in the community also help students develop important relationships with the "outside world". As described by the National Research Council, connections to the outside world benefit students by providing them with the opportunity to interact and develop relationships with adults who are unrelated to school. Involvement in programs outside the school can motivate students, teach them about responsibilities and consequences, and instill in them a "sense of community".

5.4 BARRIERS TO THE IMPLEMENTATION OF ARTS-BASED TEACHING AND LEARNING

The literature describes two major barriers that can impede the successful implementation of

arts-based teaching and learning models. One is the question of research to prove the effects of the arts; the other is the current push for test scores to show academic achievement.

Research cannot prove that arts-based teaching and learning will result in higher academic achievement. Although many small studies show that arts instruction can help students learn, the results of research to prove a relationship between arts and standardized academic tests are, overall, inconclusive. According to Horowitz and others, it is difficult to study the complexity and multiple dimensions of arts education. Especially when integrating a whole-school curriculum, for example, it is difficult to use random sampling and control groups. Researchers must adhere to the methods of classic experimental design in order to prove a causal linkage between arts and academics.

Research may ask the wrong questions. According to Eisner (1998) arts education can focus on different kinds of outcomes. He described targeted outcomes to include arts-based, arts-related, or ancillary. Perhaps research should study arts-based and arts-related outcomes, with less emphasis on ancillary outcomes such as improved academic achievement.

In Art and Cognition (2002), Efland differentiated between expected outcomes in terms of science versus arts. Academics are associated with science, which is highly valued in our society because science is associated with intelligence. In the same vein, the arts may not be considered a valuable

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part of education because its effects on academic achievement are not consistently proven. Efland proposed that arts education avoid the need to prove itself by focusing on higher order thinking and learning, rather than specific academic achievement.

Schools must prepare students for high-stakes testing. Goals 2000, the Educate America Act of 1994, supported the arts in education, particularly for diverse learners. But today at the Federal level there is less focus on diversity in learning. The No Child Left Behind (NCLB) Education Act of 2002 emphasizes test scores as the way to hold schools accountable for student learning. Although the arts are part of NCLB's recommended core curriculum, arts are not part of its required assessment of student progress.

With mandatory high-stakes testing in place, arts compete with academics for teaching time. Teachers may resist the use of arts-based teaching and learning when the curriculum is already packed with test preparation activities. In a study of arts-integration initiatives in 25 North Carolina schools, investigators found that high-stakes accountability systems created barriers to implementation.

Teachers expressed concerns about curriculum constriction, teaching to the test, and low morale that prevented them from using arts-based teaching strategies.

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