Use of AR in Environmental Education to Increase Green Awareness
Interview Report

Green Deal Awareness through Augmented Reality in Primary School Education
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INTRODUCTION

This report was prepared within the scope of the project of Green Deal Awareness through Augmented Reality in Primary School Education in order to determine the views of pre-service teachers, teachers and academicians on the use of augmented reality applications in environmental education. For this purpose, the evaluation of the interviews with pre-service teachers, teachers and academicians on Augmented Reality Applications in Environment Education is included in this report. In this study, which was designed based on scientific principles, it is aimed to determine the opinions of pre-service teachers, teachers and academicians about the use of augmented reality applications in environmental education. The answers of the pre-service teachers, teachers and academicians to the interview questions were collected through an online form consisting of 4 open-ended questions created in Google Forms. In the first part of the interview questions, gender, age and status information was requested from the participants. In the second part, answers were collected about the use of augmented reality applications in environmental education. The interviews were held between 01.10.2023 and 07.11.2023.

1. BULGARIA

1.1. Number of Participants and Profile

This analysis represents an essential step for the qualitative and effective implementation of the project "Green Deal Awareness through Augmented Reality in Primary School Education", as it provides objective assessment and recommendations, guaranteeing the effectiveness and efficiency of the remaining planned project activities and the sustainability of the project results after its completion. The prepared analysis shows the problems, shortcomings and benefits of augmented reality.

The conducted survey covers 16 respondents. All of them meet the basic requirement to be teacher candidates, primary teachers in General and Biology fields and faculty members. The purpose of the study is to identify the attitudes and needs for implementation of AR in the classroom.

1.2. Summary of Results

Question – 1: What comes to mind when you think of environmental protection and green awareness? What do you think are the problems with these issues?

The Interview starts with an analysis of survey results with the assessment that the participants give to their own competence in knowing of environmental protection and green awareness and what the problems are. With this question, we establish: 1 – to what extent the participants think there is a connection between the environment and green awareness; 2 – to what extent they expect daily work and activities to have a beneficial impact on the environment and climate change.

Question – 2: Do you think Augmented Reality (AR) makes students more motivated? Can we teach learning outcomes better with AR apps?

In the second place, we look at the results of the questions that concern the importance of augmented reality. This is a very natural question to examine their attitude. It is absolutely possible to get a substantial discrepancy in their assessment of their own competencies. The answers show that their assessment of the importance of the work for themselves is positive. By reviewing the answers, we see that in fact they express almost the same semantic content.

For a large part of the respondents, AR will motivate children/students, and several topics and activities are expressed in one place and will arouse the children's interest. The overall attitude is for joint and interactive work of the team. Of course, some skepticism was also observed in the answers of some of the respondents.

Question – 3: How can we apply AR in primary schools to increase environmental awareness? What do you think should be the priority issues?

The third significant element of participants' attitudes is related to the key question: How can we implement added reality in primary school to raise environmental awareness? What do you think should be the priority issues?

The way participants perceive augmented reality completely determines their personal motivation at work. A large part of the respondents create a connection in the introduction of virtual reality between the learning process and augmented reality and give specific examples and topics for this. The review of the respondents' answers clearly shows the positive attitude and awareness of changing the educational process.

Question – 4: What opportunities or disadvantages does the use of educational technology through AR in the learning environment provide?

The fourth element is connected with the empathy of the users towards the topic and the readiness of the Bulgarian society to support the process of implementation of virtual reality in a learning environment. From the review of the responses, a large part follows the opinion that virtual reality will support information literacy and improve students' knowledge and skills. Undoubtedly, the respondents consider the favorable effect on the environment and climate change.

At the same time, a large group of survey participants report that not every school is yet prepared for introduction of virtual reality in their educational processes, and teachers should possess the skills and competences to present objects with AR technologies. Emphasis is also placed on the still insufficient financing of schools for introduction of AR. As a significant problem, emphasis is placed on the still unprepared child's psyche to use ready-made models

for acquiring new knowledge, i.e. he/she will not be able to develop his imagination and will exacerbate the problem of "standing in front of the screen".

1.3. Conclusion

In conclusion, we can say that the interview shows that the respondents have become familiar with the Principles of using augmented reality in primary school education to raise awareness of the Green Deal, but some administrative rules are still observed in the full-fledged application in the classroom. There are still some fluctuations in competences and knowledge, but a large number of respondents indicate that the topic and the way of presentation among the younger generation is significant for a fulfilling lifestyle. Thirdly, the respondents show an absolute readiness to apply augmented reality in the classroom and a positive request to introduce the change in the training program in order to meet the needs of the younger generation. This will enable experiential learning where students can immerse themselves in any environment making the learning experience much more engaging and memorable. Finally, however, there is skepticism in the introduction of AR technology, as the respondents believe that there are some financial challenges in the smooth introduction, as well as the emphasis is placed on the still unprepared psyche of children to use the technology correctly in the educational process. It is indisputable that the opinion of the respondents is that there is a need to prepare teachers in this process.

2. GERMANY

2.1. Number of Participants and Profile

The Interviews with Teachers were held by GEDONSOFT Company. The 3 of them are from High School and female and the other 2 are Male and from Secondary School. Interviews with Academicians were held by GEDONSOFT Company, one of the project partners, with 2 participants. 1 of the participants are female and 1 is male. Pre-Service Teachers are 5 participants. 3 of the participants are female and 2 is male.

2.2. Summary of Results

Question – 1: What comes to mind when you think of environmental protection and green awareness? What do you think are the problems with these issues?

The participants found it is necessary to solve dangerous environment-related problems, such as pollution, climate change and Environmentally friendly and sustainable management come to their midn in all areas of the economy, starting with agriculture and ending with industry etc.

The main problems are related to the lack of serious awareness. On the one hand, people know that such problems exist, but, on the other hand, they are not ready to give up their comfort, energy and time to get involved in solving them or to change their usual way of living on an everyday basis and they also described that today's global society is too concerned about climate change and greenhouse gases, forgetting about other environmental problems such as water and soil pollution, species conservation, etc.

More and more people nowadays begin to realise the importance of being aware of the environmental problems we are facing on a daily basis. This is a problem that affects our future as a species, so schools should pay more attention to the way they are presented and taught, in all levels of education. Unfortunately, not all countries seem to understand the importance of these issues, so the world citizens are not really informed on them.

Question – 2: Do you think augmented reality (AR) makes students more motivated? Can we teach learning outcomes better with AR apps?

Using AR in teaching process can be attractive to students, as, for many of them, it is more stimulating, interesting and engaging than "classical" ways of studying, such as reading texts. AR can provide more realistic and visible representation of problems and situations.

After the pandemics, people realised that traditional education need to keep up with the latest technologies so more and more apps and online resources started to be used in teaching and evaluating students. Children at a very young age are familiar with tablets and phones, as games have become an important part of their life. Sometimes AR can make students more motivated, but not always. As primary school teachers, they report that they can see the difference in their students, so they think that combining AR with traditional school is a better solution.

Question – 3: How can we apply AR in primary schools to increase environmental awareness? What do you think should be the priority issues?

Such tools should be relatively simple and easy to use. They should provide colourful and attractive images, as well as sounds. The textual/ audial information provided should be short and simple.

The issues to be addressed when teaching primary school students: pollution and waste of natural resources; what each child should do in his/her everyday life to help solve/prevent environmental problems and moreover with the help of AR, people can illustrate various natural processes in motion, such as water circulation, biochemical processes, air flows, morphological changes of plants and animals in different stages of development, etc. In addition, it would probably be interesting if a "friend" of the students or a cartoon character helped them learn all the material with the help of AR. With the help of AR, many things and processes in nature can be better visualized and personified.

As a child at this age tends to learn through mimicking and repeating, offering them some apps to make them environmentally aware could be the solution. The priority is to create such an app adapted to each level, so as each age group can discover things according to their level of comprehension. Interactive games where we can use the smartboard could be a solution,

especially if the protagonists are close to the students; age, so they can relate to what is happening in the game.

Question – 4: What opportunities or disadvantages does the use of Educational Technology through AR in the learning environment provide?

AR provides more information and understanding for young students, but on the other hand it can lead to distraction of attention and decrease the ability to memorize new knowledge to some extend probably.

The use of AR in the learning environment can improve the learning outcomes as students become more engaged and they gain more first-hand experience. It can reach all types of students, even the ones with learning difficulties, so it can help them keep up with the rest of their classmates.

As far as downsides, I can find only the fact not everybody has access to these kinds of resources. Some schools would be disadvantaged.

2.3. Conclusion

As these technologies continue to evolve, it's increasingly likely that learners will encounter them in higher education and even in their careers. Digital literacy evolves along with technology, and using technology for learning requires a distinct set of skills, separate from using similar technology for play. It's critical that students have opportunities to use AR in the context of school, in collaboration with peers, and against learning objectives. When they encounter AR in college or career, they'll be confident to leverage the tools at hand to achieve their goals.

Studies show that when implemented properly, AR/VR can dramatically improve educational outcomes in core content areas and future-ready initiatives. The tricky part is ensuring the program is implemented properly, to deliver ongoing value for students throughout the school year.

3. LATVIA

3.1. Number of Participants and Profile

Interviews were held by University of Latvia, one of the project partners with:

- 4 teachers. All participants were female. All participants teach subjects related to natural sciences or social sciences;
- 5 students, who are currently studying pedagogy or educational sciences and have experience in a school, working there on a daily basis or as a teaching practice. 3 participants were female, two male participants;
- 2 academicians, both female, from University of Latvia, Faculty of Education, Psychology and Art

3.2. Summary of Results

Question – 1: What comes to mind when you think of environmental protection and green awareness? What do you think are the problems with these issues?

Teachers

As the main key words when thinking about environmental protection, educators mention specific actions. Keywords that repeat in all interviews are reducing CO_2 emissions, recycling, energy saving. The main problem with this topic is the inability of each individual person to believe the consequences of their actions and how each person affects climate change through their actions. One of the interviews also mentions the insufficient education of society in relation to the daily actions of a person.

Academicians

Also among academics, describing the topic of nature protection, similar keywords are heard, mentioning environmental protection as a set of measures that are carried out to maintain the sustainability of the environment. As the main problems related to environmental protection, academics cite the reluctance of each individual to make environmental protection a unified goal, as each individual prioritizes short-term convenience

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Students

Similar to the interviews with educators and academics, when asked about environmental protection, students also mention similar keywords, saying that environmental protection is a set of actions that include recycling, emission reduction, energy conservation and nature-friendly daily choices. The students also recognize the inability of each individual to see the consequences of their daily actions as the main problem in the topic of environmental protection, saying that people are used to living in comfort and this does not always coincide with nature-friendly choices.

Question – 2: Do you think augmented reality (AR) makes students more motivated? Can we teach learning outcomes better with AR apps?

Teachers

All educators agree that the use of augmented reality could increase students' motivation and desire to engage in the learning process. The interviewed educators themselves have not used augmented reality in their lessons. Educators immediately mention that they are not sure whether in all cases augmented reality will help to achieve the achievable result provided for in the standard. In interviews, educators emphasize that it is not the use of the technology itself that is important, but the content that is offered through the specific learning tool (in this case, augmented reality) - if augmented reality as a learning tool can help achieve the standard's achievable result, then educators could use it in their teaching in hours. Educators emphasize that the use of technology should be meaningful, and technology should not be used only because it motivates students - pedagogues value appropriate content the most. One of the educators mentions in the interview that due to the lack of time and teachers' professional competence, the implementation of augmented reality in the learning process could be challenging.

Academicians

Academicians emphasize in interviews that an interactive and immersive environment can significantly increase students' motivation and make them engage in the learning process more actively, thus learning the subject better. However, it is emphasized that despite the technology's ability to motivate students to engage in the learning process, the content of

each augmented reality application should be evaluated according to the results to be achieved, as well as the use of technology should be included in the learning process by organically supplementing existing methods, not replacing those that already support an active learning process.

Students

Students are convinced that the use of augmented reality in the learning process can increase students' motivation to engage in the process. Above all, students have observed that children are fascinated by technology and the process of using the technology itself could be engaging. At the same time, students also mention that the use of technology in the learning process must be justified and related to the curriculum

Question – 3: How can we apply AR in primary schools to increase environmental awareness? What do you think should be the priority issues?

Teachers

As an opportunity to use augmented reality in the provision of the primary school learning process, teachers mainly concentrate on appropriate content that would help achieve the standard's achievable result. As an example, teachers mention a game or simulation that would help to understand the impact of each person's actions on nature and the climate. Educators suggest that the activity should be as short as one part of a full lesson for meaningful use of technology to occur. Also from the point of view of the content, the developed learning tool should be quite simple to be used in primary school - the game should be based on real-life examples so that the student can base new knowledge on his previous experience

Academicians

AR apps can be designed to simulate environmental scenarios, such as the impact of pollution on ecosystems or the effects of deforestation. That could help students visualize and understand environmental concepts, making learning more engaging and memorable. Also some examples could be virtual field trips, looking at endangered species, recycling and waste reduction, and cleaning up polluted areas like rivers. It is important to include immediate feedback on students results and activities to learn better and achieve learning outcomes

Students

Students believe that at the primary school stage, the activities planned during the learning process with the help of AR should be short and based on the students' previous experience. Technology should be included as an organic part of the lesson and as one of the activities that provide for learning the subject. The application itself could include topics about recycling, natural resource saving and other daily activities that a primary school student might encounter.

Question – 4: What opportunities or disadvantages does the use of Educational Technology through AR in the learning environment provide?

Teachers

Educators mention the following as the main advantages of using augmented reality in the learning process:

1. The ability to involve all students, especially in moments when it is impossible to keep track of what each student is doing and whether they are fulfilling the task responsibly;

2. Students' motivation and desire to learn the intended topic in an interactive and new way;

3. The possibility to look at such complex processes and simulations, which would be more difficult to understand without the help of technology;

4. The possibility to create a connection between subjects, learning the achievable result from several subjects with the help of one method

5. Ability to work practically and with game elements.

The following are mentioned as disadvantages and risks in the use of augmented reality in the learning process:

1. There are no content-appropriate teaching aids in the augmented reality environment

2. There are no teaching aids available in the augmented reality environment in Latvian (language barrier for primary school students)

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3. In several educational institutions, the use of personal mobile phones or tablets is prohibited, while schools provide only computers - it is technically difficult to use augmented reality;

4. Lack of professional competence of educators - lack of knowledge about technology, including the use of augmented reality in the learning process, lack of opportunity to ensure a productive learning process if technology is used, also lack of time.

Academicians

As advantages of augmented reality, in addition to teacher interviews, academics mention:

1. The technology's ability to create content adapted to the student's interests or learning needs

2. Make a connection between theory and real life situations

3. By increasing motivation, students become interested in the subject to be learned

As disadvantages, academics mention:

1. Costs required to develop a quality AR application

2. Incompatibility of technology with developed applications, possible application glitches

Students

As advantages of using augmented reality, students mention:

1. Involvement and motivation of students in the learning process

2. Possible game elements

3. Novelty of technology

As disadvantages of using AR in the learning process, students minL

1. Unavailability of technology and teaching aids

2. The possible language barrier if the teaching tool is not developed in the national language

3.3. Conclusion

Evaluating the responses of all the groups involved in the interviews, it can be concluded:

1. One of the main problems in the topic of environmental protection is the desire of each person to live more comfortably, not more environmentally friendly, as a result, when educating society or students, emphasis should be placed on the consequences of each person's daily choices on environmental protection issues

2. Augmented reality can significantly increase students' motivation to learn the subject, but the learning tool must be related to the educational standard and the use of technology in the learning process must be meaningful

3. Elementary school students should use augmented reality in the learning process as a small activity during the lesson. The activity should be related to students' daily activities and their impact on the environment, or as a simulation that could not be represented in any other way than by AR technology.

4. The main advantages of using AR in the learning process are increasing motivation and a learning process that engages students and leads to the achievable result. The main disadvantages are the difficult availability of the technology itself, possible technical problems or the lack of competence of educators to work with AR applications and manage the learning process while students use technology in the classroom. This means that the learning process itself could be exciting and meaningful if AR technologies are used, but the current concern is the technical performance of AR itself, which is a problem to be solved.

4. ROMANIA

### 4.1. Number of Participants and Profile

Interviews were held by Lucian Blaga University of Sibiu, one of the project partners, with 13 participants. 12 of the participants are female and one of them is male.

Gender

■ Female	92%
■ Male	8 0%
■ Other	
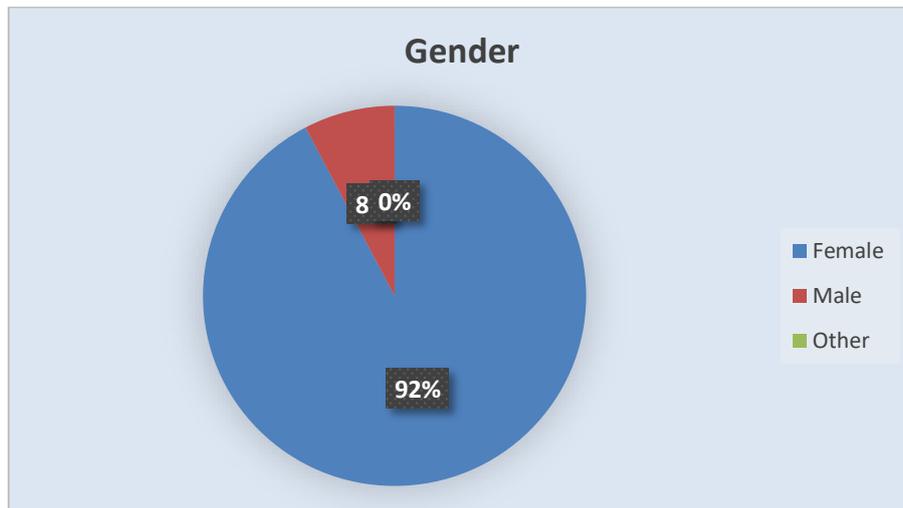
Seven of the participants were aged 35 or older, two were between 18 and 22 years old, three of them were between 23-28 years old and one was between 29-34 years old.

2. Your age?

■ 18 - 22 years	15%
■ 23 -28 years	23%
■ 29-34 years	8%
■ 35 years and over	54%
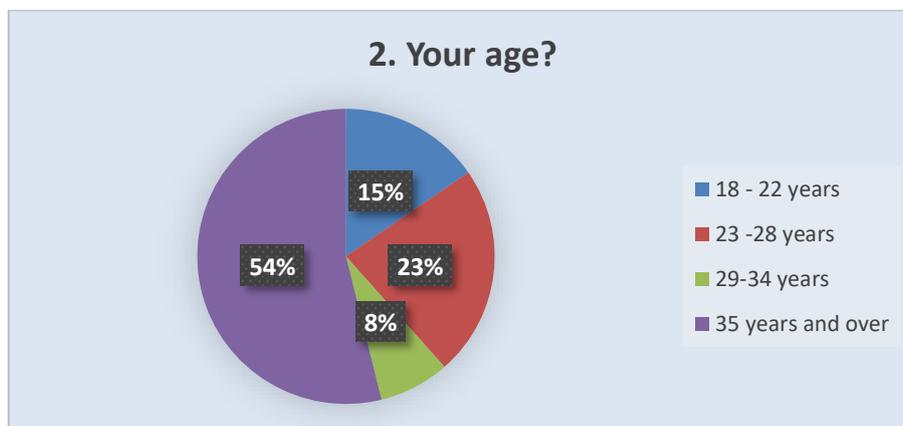
Four of the participants were academicians, four were teachers and five two were pre-service teachers.

Occupation/profesion

- Pre-service teacher: 38%
- Teacher: 31%
- Academician: 31%
- Other: 0%
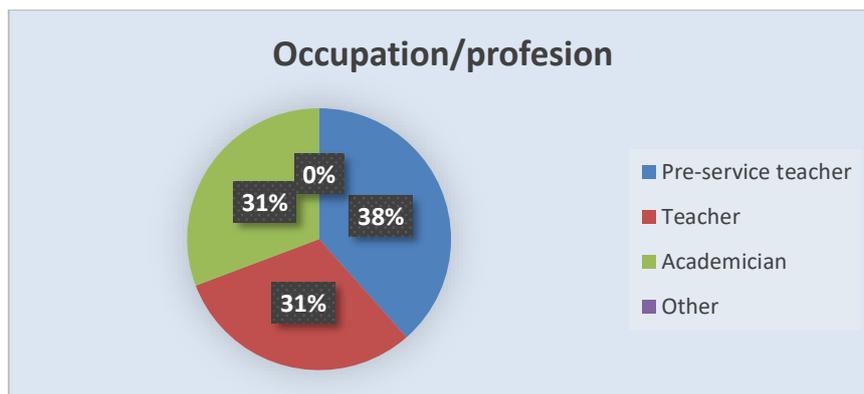
4.2. Summary of Results

Question – 1: What comes to mind when you think of environmental protection and green awareness? What do you think are the problems with these issues?

Participants' responses were as follows: keeping the planet in a life-sustaining state for future generations; an issue is how industrial agriculture is destroying soil, conservation of natural resources, climate change mitigation, biodiversity conservation. Issues are lack of awareness, economic considerations, political obstacles, technological limitations, global cooperation.

Question – 2: Do you think augmented reality (AR) makes students more motivated? Can we teach learning outcomes better with AR apps?

Participants find that the use of AR applications is more effective and applicable to the current and future needs of students, is an exciting way to teach students, has the potential to increase student motivation and engagement, and offers teachers the opportunity to create dynamic and personalized learning experiences. When well designed, AR apps can improve learning outcomes by providing engaging, practical, and visual learning opportunities that address different learning styles and facilitate better understanding and retention of educational content.

Question – 3: How can we apply AR in primary schools to increase environmental awareness? What do you think should be the priority issues?

AR apps could be used to show students how they can help protect the environment. In this way students can become aware of the importance of recycling, reducing energy consumption, and protecting endangered animals and plants.

In terms of priority issues, teachers should focus on the following:

-Accessibility: Ensuring that all pupils have access to AR technology and that it is integrated into the school curriculum to benefit as many pupils as possible.

-Balancing technology and direct interaction with the environment: AR should be a complementary tool for learning, not a complete substitute for outdoor experiences or hands-on environmental activities.

-Impact assessment: Monitor and evaluate how the use of AR influences students' environmental awareness and their internalisation of environmental values.

- How to keep the planet clean, where to dispose of rubbish, what can happen if we don't take care of the environment.

- To focus on key elements, thus presenting situations of all kinds that can happen in their daily lives but have a global effect. AR applications can help to create such representations that have an impact on children.

Question – 4: What opportunities or disadvantages does the use of Educational Technology through AR in the learning environment provide?

Regarding the opportunities created by the use of AR in the learning environment, the participants stated the following:

- Exploration and discovery

- Visualization and better understanding

- Accessibility and flexibility

- AR can be a more interesting and engaging way to learn, can help assimilate information in an engaging way and can help increase student motivation.

- The advantages of this app are that absolutely all children can learn with its help, providing opportunities for children with ESC.

Regarding the disadvantages and limitations of using AR in the learning environment, the participants stated the following:

-Dependence on technology: The use of AR can lead to an over-reliance on technology, which can have a negative impact on concentration and traditional learning skills.

-Cost and accessibility: Implementing AR can be expensive and not all schools or learners may have access to the necessary equipment.

-Need for teacher training: Effective use of AR in learning requires adequate teacher training, and some teachers may find it difficult to integrate technology into teaching activities.

-Social isolation: Excessive use of AR can lead to social isolation, as students may be more preoccupied with their devices than interacting with peers or teachers.

- High costs and possible health problems associated with prolonged use of technology.

4.3. Conclusion

In terms of environmental protection and green awareness, participants emphasised expressions such as respect for nature, being sensitive to the environment, having ecological literacy, protecting the environment against harmful situations, using natural resources efficiently, taking precautions against situations that may harm the environment and being conscious and sensitive about these issues. The participants stated that the problems related to environmental protection and green awareness are lack of awareness in individuals, lack of action by individuals, insufficient education of individuals and insensitivity of individuals towards environmental protection. This situation reveals that individuals should be educated and raised awareness about environmental protection and green awareness.

When the participant views are analysed, it is seen that the participants generally think that Augmented Reality (AR) motivates students more. It is also concluded that the participants generally think that learning outcomes can be taught better with AR applications. Participants mentioned recycling, respect for the rights of living beings, social issues, climate change, the dissolution time of wastes in nature and the global climate crisis as priority issues related to the use of AR to increase environmental awareness.

Participants emphasised that the use of AR in the learning environment would create many opportunities. In this regard, they emphasised expressions such as new learning opportunities, interesting and permanent learning, concrete thinking, and gamification. In addition to these opportunities and advantages, the participants also stated that the use of AR in the learning environment has disadvantages and limitations such as the risk of not establishing a relationship with real life, not being sustainable, classroom management problems and problems related to intensive technology use.

As a result, considering the advantages of AR applications and the opportunities they will create, it is thought that the use of AR in environmental education will provide significant benefits for increasing environmental awareness and green awareness.
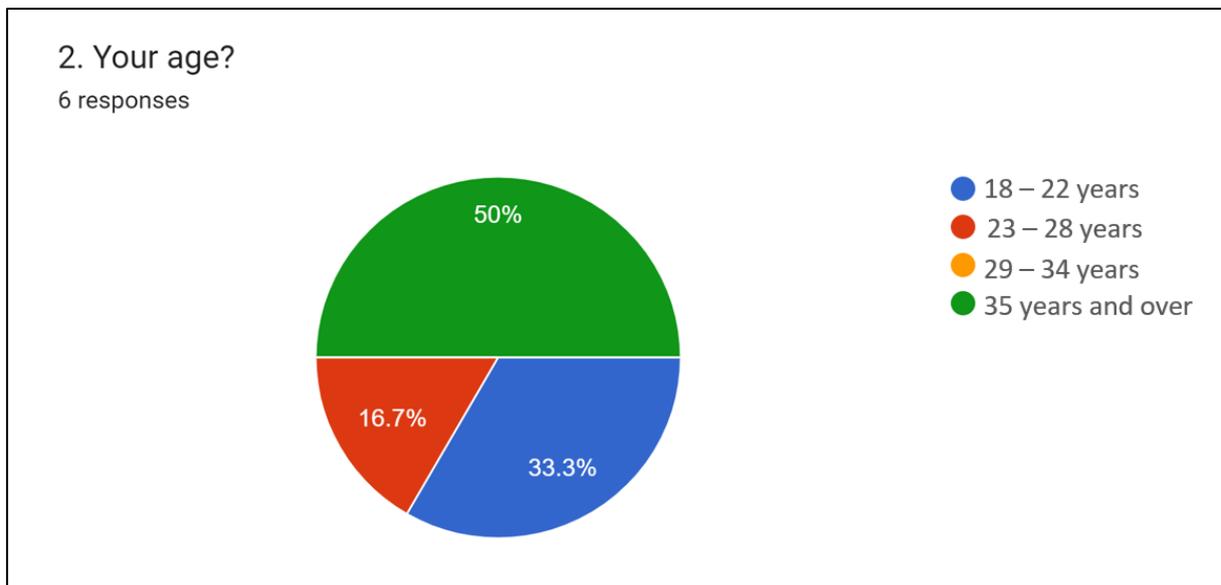
5. TURKEY

5.1. Number of Participants and Profile

Interviews were held by Çanakkale Onsekiz Mart University, one of the project partners, with 6 participants. 4 of the participants are female and 2 is male.
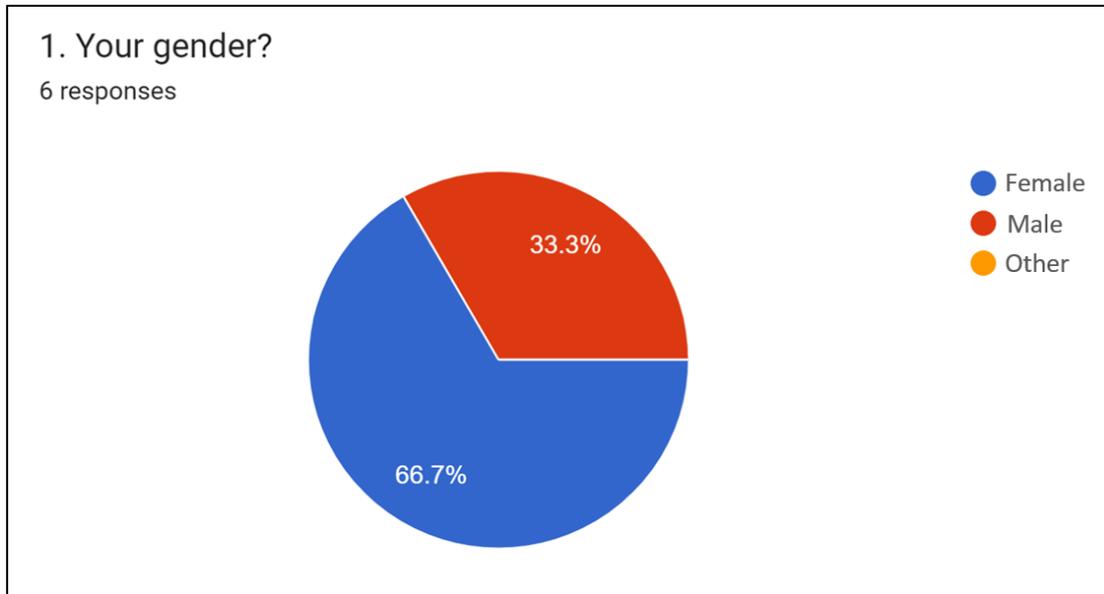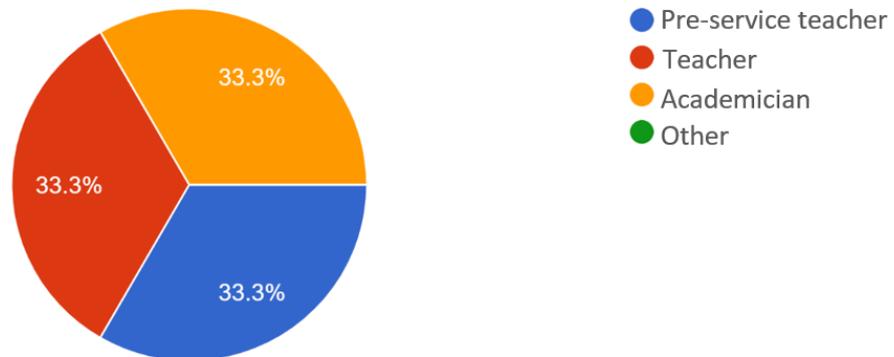

Three of the participants were 35 years of age or older, two were between the ages of 18 and 22, and one was between the ages of 23 and 28.

Two of the participants were academicians, two were teachers and two were pre-service teachers.

3. Your occupation/profession?

6 responses

- 🔵 Pre-service teacher
- 🔴 Teacher
- 🟠 Academician
- 🟢 Other

5.2. Summary of Results

Question – 1: What comes to mind when you think of environmental protection and green awareness? What do you think are the problems with these issues?

Participants emphasised the following statements about environmental protection and green awareness: respect for nature, being sensitive to the environment, having ecological literacy, protecting the environment against harmful situations, using natural resources efficiently, taking precautions against situations that may harm the environment and being conscious and sensitive about these issues. One of the participants stated the following about this issue: *"When I think of environmental protection and green awareness, I think of taking precautions against situations that may harm the environment and being conscious and sensitive about these issues"*. The participants stated that the problems related to these issues are lack of awareness in individuals, lack of action by individuals, insufficient education of individuals, and insensitivity of individuals towards environmental protection. One of the participants stated the following about this issue: *"The most important problems related to these issues are that individuals are not sufficiently educated, individuals are unconscious and insensitive to environmental protection"*.

Question – 2: Do you think augmented reality (AR) makes students more motivated? Can we teach learning outcomes better with AR apps?

Participants generally think that Augmented Reality (AR) motivates students more. Participants emphasised the following while stating that learning outcomes can be taught better with AR applications: presenting more materials, learning by experience, learning by example, more permanent learning, increasing motivation. One of the participants stated the following about this issue: *"AR applications open new doors in children's minds and support the development of new connections. In this case, more permanent learning can be realised."* However, one participant emphasised that AR applications alone would not be sufficient. The participant stated the following: *"However, I am not sure if augmented reality alone can provide this. Because AR applications are limited in creating learning outcomes appropriate to the nature of each subject."*

Question – 3: How can we apply AR in primary schools to increase environmental awareness? What do you think should be the priority issues?

Regarding the use of AR to raise environmental awareness, the participants gave the following examples;

- to visually show the differences between a polluted, damaged environment and a protected environment,
- to show the situations that may occur due to low environmental awareness,
- to show examples related to climate change and recycling,
- to show examples for the dissolution times of wastes in nature.

One of the participants stated the following as an example of the use of AR: "*A study can be conducted on the dissolution times of substances/wastes in nature. For example, when substances are filmed, information and visuals about this can be placed on them*". Another participant made the following suggestion: "*By using AR, students can be made aware of the clean and beautiful places of the world by first showing their clean and beautiful peaceful states and then showing what those places can become as a result of the damage to the environment.*" Participants mentioned recycling, respect for the rights of living things, social

issues, climate change, the dissolution time of wastes in nature and the global climate crisis as priority issues related to this situation.

Question – 4: What opportunities or disadvantages does the use of Educational Technology through AR in the learning environment provide?

Regarding the opportunities created by the use of AR in the learning environment, the participants stated the following:

- opportunity to learn by doing and experiencing
- new opportunities for learning
- being attractive and arousing curiosity
- attention and motivation
- increasing permanence
- development of creativity
- increased capacity to develop products
- conversion from abstract to concrete
- concrete thinking
- Games and gamification
- Better teaching of learning outcomes

One of the participants stated the following about the opportunities created by the use of AR: "It can create new opportunities in terms of meaningful learning. Since the generation born into technology is not very unfamiliar with this management, it may attract their interest. It keeps the element of curiosity alive, which is very important in education. For primary school children in the concrete processing period, seeing through AR can increase retention."

Regarding the disadvantages and limitations of using AR in the learning environment, the participants stated the following:

- risk of not establishing a relationship with real life
- AR applications are not sustainable
- problems related to the intensity of technology use
- problems of collecting students' interest

- classroom management problems

One of the participants stated the following about the disadvantages of AR use: "Although the use of AR technology in the learning-teaching process provides advantages in attracting attention to the lesson and motivation, the fact that teaching activities are based only on AR and the whole lesson and subject is designed in this context is a situation that limits the teacher and the student."

5.3. Conclusion

In terms of environmental protection and green awareness, participants emphasised expressions such as respect for nature, being sensitive to the environment, having ecological literacy, protecting the environment against harmful situations, using natural resources efficiently, taking precautions against situations that may harm the environment and being conscious and sensitive about these issues. The participants stated that the problems related to environmental protection and green awareness are lack of awareness in individuals, lack of action by individuals, insufficient education of individuals and insensitivity of individuals towards environmental protection. This situation reveals that individuals should be educated and raised awareness about environmental protection and green awareness.

When the participant views are analysed, it is seen that the participants generally think that Augmented Reality (AR) motivates students more. It is also concluded that the participants generally think that learning outcomes can be taught better with AR applications. Participants mentioned recycling, respect for the rights of living beings, social issues, climate change, the dissolution time of wastes in nature and the global climate crisis as priority issues related to the use of AR to increase environmental awareness.

Participants emphasised that the use of AR in the learning environment would create many opportunities. In this regard, they emphasised expressions such as new learning opportunities, interesting and permanent learning, concrete thinking and gamification. In addition to these opportunities and advantages, the participants also stated that the use of AR in the learning environment has disadvantages and limitations such as the risk of not establishing a relationship with real life, not being sustainable, classroom management problems and problems related to intensive technology use.

As a result, considering the advantages of AR applications and the opportunities they will create, it is thought that the use of AR in environmental education will provide significant benefits for increasing environmental awareness and green awareness.

CONCLUSION

Analysis of the interview results suggest several key findings related to the use of augmented reality (AR) in primary school education to promote awareness of environmental issues, particularly focusing on the Green Deal. Here's a summary of the main points:

Familiarity with AR Principles:

- Respondents have become familiar with the principles of using augmented reality in primary school education to raise awareness of the Green Deal.
- Some administrative rules are observed in the application of AR in the classroom, but there are still fluctuations in competencies and knowledge.

Importance of Topic and Presentation:

- Many respondents consider the topic and the way of presentation significant for the younger generation's understanding of a fulfilling lifestyle.
- There is an absolute readiness among respondents to apply AR in the classroom, with a positive request to introduce changes in the training program to meet the needs of the younger generation.

Readiness and Skepticism:

- Respondents express a readiness to apply AR in the classroom but also exhibit skepticism about the introduction of AR technology.
- Financial challenges and concerns about the unprepared psyche of children to use technology in the educational process are highlighted.

Need for Teacher Preparation:

- Respondents emphasize the need to prepare teachers for the implementation of AR in the educational process.

Role of AR in Education:

- AR is seen as a tool that can significantly increase students' motivation to learn.

- Learning outcomes are believed to be taught better with AR applications.

Environmental Awareness:

- Participants emphasize expressions such as respect for nature, ecological literacy, and protecting the environment against harmful situations.
- Lack of awareness, insufficient education, and insensitivity are identified as problems related to environmental protection and green awareness.

AR Opportunities and Challenges:

- Participants believe that AR in the learning environment creates opportunities for new learning, interesting and permanent learning, concrete thinking, and gamification.
- However, there are concerns about the risk of not establishing a relationship with real life, sustainability issues, classroom management problems, and challenges related to intensive technology use.

Positive Impact of AR in Environmental Education:

- Considering the advantages of AR applications, it is believed that the use of AR in environmental education will provide significant benefits for increasing environmental awareness and green awareness.

In conclusion, while there is enthusiasm for the potential benefits of AR in education, there are also challenges and concerns that need to be addressed, including financial considerations, teacher preparation, and the careful integration of technology into the learning environment.