



Survey on the Knowledge, Skills, Interest and Attitudes of Secondary Education Teachers, Students and project Stakeholders in relation to the WaterSTEAM Educational Approach

## EXECUTIVE SUMMARY

Greece – Hungary – Italy – Turkey



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### WATERSTEAM

Landscape, water and active citizenship: a nature based STEAM teaching methodology

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This Executive Summary was carried out in the frame of the WaterSTEAM project (“Landscape, water and active citizenship: a nature-based STEAM teaching methodology”), in order to present the results and main findings of the Synthesis Report. A questionnaire survey has been conducted among secondary education teachers and students, as well as specific stakeholder organisations, in four involved countries: Greece, Hungary, Italy and Turkey. The aim of the school survey was to define the knowledge, skills, interests and attitudes of the secondary school students and teachers in STEAM-related school subjects connected to the main theme of the project: landscapes. The stakeholder questionnaire was aiming to define their attitudes and interest towards being included as outside experts in the learning methodology promoted by the project.

In order to measure the above, three questionnaires have been designed and shared online. The questionnaires have been translated and administered by the following respective partners:

- PRISMA Centre for Development Studies in Greece
- Centre for Economic and Regional Studies in Hungary
- Consiglio Nazionale delle Ricerche, Istituto per la BioEconomia in Italy
- International Council of Associations for Science Education in Turkey

The online questionnaires were available from May to June 2020, and they were completed altogether by 515 respondents. The data analysis and the examinations were primarily performed by using Excel. After the data collection, as a first step of the examination, National Reports were compiled based on the results in Greece, Hungary and Italy, focusing on the national characteristics. After the national examinations, a Synthesis Report was compiled, building upon the results of the previously prepared National Reports, however the main aim of the Synthesis was to give a thorough overview of aggregated results from the survey in all four countries. Differences and similarities among the results in the participating countries were highlighted, and in addition the aggregated data were also analyzed in order to measure overall current and general tendencies.

*Total number of participants in the questionnaire survey*

	STUDENTS	TEACHERS	STAKEHOLDERS
GREECE	64	21	24
HUNGARY	147	27	54
ITALY	86	34	20
TURKEY	14	(4)*	24
<b>TOTAL</b>	<b>311</b>	<b>82</b>	<b>122</b>

\*: Due to the low number of responses, Turkish teacher results were excluded from the analysis

The Executive Summary presents the main findings of the Synthesis Report, focusing on the three individual target groups involved in the survey (i.e. students, teachers and stakeholders). The WaterSTEAM project specifically targets the data analysis in three participating countries (Greece, Hungary and Italy), as the future locations of a pilot educational program aiming to test the proposed WaterSTEAM learning methodology. However, the partnership also decided to broaden the survey, conducting an experimental survey also involving Turkish participants.

### Focus of the international analysis

As previously mentioned, the questionnaire survey had three main parts, focusing on three well-designated target groups. Regarding students, firstly, their impression and knowledge was examined on issues related to landscapes, the role of water in transforming them, and how global environmental issues connect to their protection and management. Secondly, their attitudes were measured towards several elements of the proposed methodology of the WaterSTEAM project (especially regarding their interest in group work, fieldwork, and identifying the connection between different school subjects). This methodology will adopt an inquiry-based, student-centred and interactive STEAM approach and will integrate the element of social and civic awareness, encouraging students to fully participate in social and civic life. It will embed STEAM subjects into the contextual theme of landscape protection and management, as well as water as an element that shapes and transforms it. And last but not least, the questionnaire survey also focused on the educational use and interest on using Augmented Reality (AR) tools (the respondents' previous experience on using different IT and AR tools, and their willingness to learn about these tools.)

The questionnaire survey for teachers was designed in a way to define the knowledge, skills, interests and attitudes of the secondary school teachers towards three main topics. Firstly (similar to students), the survey measured the teachers' impression and knowledge on the proposed theme of the project (issues related to landscapes, the role of water in transforming them and how global environmental issues connect to their protection and management). Secondly, the teachers' attitudes towards the proposed WaterSTEAM learning methodology was analysed (especially their familiarity regarding the STEAM approach, inquiry-based learning and collaboration of teachers from different disciplines). And last but not least, the educational use and interest on using Augmented Reality (AR) tools was examined (i.e. their previous experience on using different IT and AR tools, and their willingness to teach and learn about these tools).

The stakeholder questionnaire was conducted among associated partners and other stakeholders in the four involved countries (like science associations, education authorities, research institutes, universities, NGOs, etc.). The aim of the questionnaire was to define the stakeholders' attitudes and interest towards being included as outside experts in the learning methodology promoted by the project, thus contributing to the learning process and fostering their future collaboration with the schools.

## Main results of the international survey

After analysing the responses, there are several observations that need to be emphasized in order to prepare a corresponding methodology for secondary education. The WaterSTEAM methodology should take into account the needs and interests of the students as well as the teachers. The following findings are highlighted, taking into account the aggregated results in the 4 countries:

### 1) Perceptions on landscapes: nature dominates

Regarding the impression on landscapes, all countries have highlighted that students **tend to link landscapes primarily to natural surfaces/areas**, and usually tend not to consider urban contexts and built environments. As for teachers, a general tendency is that they have a wider understanding on the concept of landscapes (not only and exclusively containing natural elements). Especially Greek teachers tend to accept almost all of the listed options as a part of a landscape, including such elements (like bridges, roads, quays or humans) that the other respondents generally opposed. This means there are basic differences in the understanding and perception of landscapes.

The results show a high dominance of nature when it comes to assessing landscapes, and a very strong connection was formulated between natural beauty and landscapes. However, it was interesting to see, that **almost half of the students find low or even no connection between culture/heritage and landscapes** – and this is a trend identified in all survey countries. This is definitely an area which needs to be further promoted (also in formal education).

### 2) Moderate knowledge on landscape-related topics

A crucial part of the analysis was to measure the existing knowledge about landscape-related topics. As the WaterSTEAM project will offer a methodology that will focus on landscape and water-related issues, understanding the current situation and knowledge-gaps among students and teachers are crucial.

Generally, according to the aggregated data, it can be seen that there is **a moderate knowledge on landscape-related topics** among students and also among teachers. The top-three familiar topics for students were “human intervention affecting landscapes”, “climate change affecting landscapes” and “difference between natural and artificial landscapes”. However, even in these topics, around one third of the students only reported some or no knowledge at all. Regarding teachers, a major difference compared to the students’ results is that “climate change affecting landscapes” was not mentioned among the top three.

By looking at the analysis per country, it can be established that Greek and Italian students possess a significantly higher knowledge in several of the listed topics (also including the top-three themes). It is undeniable that **“climate change” is the most widely known term**. High knowledge was also reported on “landscape protection” and “sustainable development”. The definition of landscape management is more or less known among respondents, except for the Hungarian students, who showed a significant gap compared to the other countries.

Since the methodology will be pilot-tested in three countries, it is important to also realize the differences among the participating student-groups. These differences most probably originate from the differences of the secondary (national) school system and curricula.

### 3) High levels of interest and environmental consciousness, but low personal connection

Although the knowledge on landscape-related issues is moderate, there is **a recognizable interest towards learning and teaching about landscapes**. The aggregated data show a general interest among students, especially when it comes to climate change. The least favorite topic among students is the history of water elements, however, even in this case almost half of the respondents would be moderately or very interested in learning about it. As for teachers, although they come from different disciplines, they have a great interest in climate change, problems connected to landscapes and benefits of landscape management.

The interest towards learning and teaching about landscape-related topics can also originate from the **strong environmental consciousness of the students and teachers**. Both the aggregated, as well as the data per country demonstrate a strong interest in global environmental issues. The overwhelming majority of the respondents agree that people should care about the protection of the environment more, and that they themselves would like to do more in order to protect the environment and landscapes. When offering an educational methodology, it is important to highlight these topics (protection of environment and global environmental issues), as these can generate a wide interest among students and teachers.

Despite the strong environmental consciousness, the **personal connection (use) of surrounding landscapes can be rather rated as low or moderate**. It is a bit surprising that only a quarter of the students visit water surfaces often for nature observation. The rate is a bit higher when it comes to visits for recreation, however even in this case almost half of the students only visit water surfaces rarely or never. Furthermore, it is also visible that only few students read about nature and science, visit a science centre or a protected area. Last on the list, visiting a water plant is clearly the activity that the majority of the students has never done. Teachers' personal connection with the surrounding landscapes was quite similar to the results of students. Generally, it can be stated that the WaterSTEAM methodology should also aim to motivate both students and teachers to know (and connect to) their local surroundings and their local landscape better.

### 4) Methodology knowledge gaps

The WaterSTEAM methodology will adopt an inquiry-based, student-centered and interactive STEAM approach. It will embed STEAM subjects into the contextual theme of landscape protection and management. Clearly, the STEAM approach enhances and encourages the collaboration between different school subjects. However, when analyzing the linkages between landscapes-related topics and school subjects, the results showed **a significant presence of Geography in all of the topics proposed**, also identifying differences between

countries. Both in Greece and Italy, the dominance of Geography was lower, and there were topics where Geography was only the second or even the fourth in the list. However, in Hungary the dominance of Geography is unquestionable, in all of the cases this school subject got at least half of the total votes.

It is also crucial to analyze to what extent teachers are familiar with the STEAM approach. As the results demonstrate, there is a **considerable knowledge gap among teachers**, especially in Hungary. Therefore, it is no surprise that very few of them have already used or implemented STEAM. Furthermore, most of the teachers do not feel well-prepared to implement this methodology. This confirms the gap in the teachers' experience and competence, therefore the WaterSTEAM methodology should aim to put a serious attention to the exchange of good practices.

Even if STEAM itself is not well-known or widely used, previous experience and familiarity with other educational methods can be a good starting point for further work. As it is visible from the aggregated results, **project-based teaching and inquiry-based learning (IBL) have a better awareness** among teachers, although it is still rather moderate. It can be established, that there is a huge experience in guiding students to keep deadlines and guide students to communicate ideas verbally. Less experience was shown in guiding students to work in teams (group work), and working in collaboration with other teachers. The least expertise was reported in doing fieldwork. This is basically in line with the students' responses regarding their experience on group work and fieldwork. WaterSTEAM methodology should also **put an emphasis on gathering and collecting information on site**, as fieldwork can be a very good hands-on learning experience for students.

## 5) Keeping distance from ICT tools

Regarding the attitudes towards the proposed methodology elements, it can be stated that students and teachers generally have a very positive attitude. Most of the respondents agreed that they like to work as a member of a team, and they also confirmed that new technologies make school science more interesting. That means they believe that there is a growing need for new methods and technologies in education. On the other hand, there is a certain unfamiliarity with the application of the proposed tools.

As for their experience on using different IT and AR tools, it is visible that besides using smartphones and tablets, students are also familiar with most of the Office tools (like Word or Power Point), while teachers are mostly familiar with text processing, spreadsheet and presentation software. In both cases, the **least experience was reported on geographic information software (GIS) as well as location-based games (LBGs)**. Even though some of the students have already played location-based games, there is an obvious lack of knowledge in using the available platforms to develop such games. Furthermore, when asking about the interest in learning or teaching about these tools, moderate (or even low) interest was expressed.

However, the reason for the low evaluation can be derived from the lack of familiarity with these tools (and the fear of the unknown). These tools at first glance can be categorised as

something difficult and close to ICT-programming, however all of the suggested tools are easy to apply. This result confirms that **ICT tools need to be introduced in the classes in an easy and fun way**, in order to significantly increase the interest to learn the application of these tools.

## 6) Collaboration with external experts

The results of the stakeholder-questionnaire investigated the **possibility to involve external experts** to the implementation of a landscape-related educational methodology in secondary schools. Although the composition of the responding stakeholders varies from country to country, it is true that generally they are involved in environmental issues (protection, planning, research and activism), and almost half of the stakeholders are interested in educational activities as well. Therefore, the positive attitude towards landscape-related issues and the offered methodology is not surprising.

As for their area of interest (very similarly to the school results), **climate change was rated most relevant** for stakeholder activity, followed by the role of water in shaping the landscape and benefits of landscape management. The least interest of the respondents was shown towards the history of water elements.

The results show that involving external experts to secondary education is not a novelty, as about **half of stakeholders have already cooperated with the education system**, but this number fluctuates among countries. When stakeholders are involved in education, the most common cooperation is **organizing project-based learning courses, clubs or study classes**. Usually, these activities are focusing on environmental protection, but water management was also frequent.

Although there is a considerable amount of previous experience, the majority of stakeholders are not familiar with the STEAM approach, and the results reveal an existing knowledge gap regarding these methodologies. However, this is not very surprising, taking into account that educators themselves also reported a lack in knowledge.

The main aim would be to introduce some of the stakeholders to secondary school education, allowing them to present their activities and cooperate with schools in certain topics. Stakeholders could act as external experts, giving answers and inspiration to topics that are in line with their daily routines. The results confirmed that this seems feasible: the majority of stakeholders agreed that **formal education should put more emphasis on the topic of landscape management** and that experts should collaborate with secondary education and contribute to the learning process.