



4th Intercontinental Geoinformation Days

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Exploring maps from childhood to adulthood: a journey to basic map knowledge with field experts

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Keywords

Map Reading
Sketch
Compass
Map Making
Orienteering

Abstract

The need for maps and map information is increasing every day. This need is felt not only for the preparation of zoning plans, the implementation of technical infrastructure projects, but also for the ability to read the map, find directions in nature, use the compass together with a map, detect the shapes, positions and movements of the moon, earth and other planets. In this context, within the scope of the project titled “Journey to Basic Map Information with Field Experts” supported by TÜBİTAK-4004, it is aimed to provide basic map information to participants covering a wide range of segments from kindergarten to university students with practical training, to eliminate deficiencies experienced in this field, to introduce and implement orienteering based on map use. The target audience of the project was formed by 7 groups of 30 students and teachers at the university level from kindergarten located in Osmaniye. The participants were asked to be able to produce a map using cartography measurement tools, to be able to use and interpret it easily, and to have basic map knowledge. A suitable program has been prepared for this. At the end of the project, “map information” was removed from being just an educational tool and the map was ensured to be a constantly used auxiliary material. The findings revealed that the participants' desire to learn basic cartography knowledge and to use maps increased at the end of practical project activities.

1. Introduction

Improving the quality of education, training qualified individuals in all areas can only be possible with teamwork. It is of great importance that specialists in various fields work together to improve the quality of education. At this stage, a number of tasks also fall on the Map Engineers (Buğdaycı and Bildirici, 2009). The project called “Journey to Basic Map Information with Field Experts” was also planned in order to transfer the developments in this field to students in the educational community with modern methods and techniques.

With easily learned information, orienteering sports can be done by everyone from a 3-year-old child to a 100-year-old (Güler, 2003). Orientation is the finding of the current location and the way to go with the help of a map and compass. Orienteering sports can be performed in everyday life, business life, recreation and entertainment activities, outdoors, in the rain, in the city / village

environment. This sport can be done on foot, as well as use transportation vehicles such as horses, cars, bicycles, boats and kayaks (Sevim, 1997).

Osmaniye kindergarten, elementary school, middle school, high school, undergraduate and graduate level students at the contributor group of 30 people for a total of 6 experts in the field, accompanied by practical training in an office environment aims to give basic information and land map with this project, which with;

- Learning basic map information, which is becoming increasingly important, learning how to make a map using tools and computer CAD programs used in land measurement, calculation and drawing stages,
- Types of navigation in nature, using a compass, using a map and compass together,
- Orienteering sports applications, Sketches and characteristics, the concept of the northern direction used in cartography, its importance and types,

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Cite this study

Erdem, N. (2022). Exploring maps from childhood to adulthood: a journey to basic map knowledge with field experts. 4th Intercontinental Geoinformation Days (IGD), 82-86, Tabriz, Iran

- Reading the map and learning the meaning of special signs on it, the concept of projection (Projection) used in map making, its importance and types, Types of maps, explaining where and for what purpose they are used,
- Concept of scale, importance, types and representation of scale-map relationship, types of plans, stages of urban planning,
- Map making from ground laser and lidar scanner, aircraft, UAV and satellite images,
- Introduction of developments in satellite-based geolocation (GNSS), its types and artificial satellite technology,
- Providing information on visual materials and moving models about the importance, shape and movements of the Moon, which is the natural satellite of our world, introducing the measuring instruments necessary for the production of maps and conducting land applications,
- Making 2D and 3D drawings with the basic menus of the programs used in map drawing,
- Visualization using cartographic techniques, Visualization of the created maps by transferring them to a paper medium with the help of a plotter, organizing competitions by providing information about the sport of orienteering,
- Raising awareness in the community about basic map information in groups of participants that will be created from different segments of society, especially starting with children in kindergarten,
- Teaching the shape, position, movements, obliquity of our world, the number of meridians and parallels, their use and what they do on a moving and illuminated globe model by enabling participants to make a globe model using various stationery materials,
- On the other hand, young participants have discovered the fun side of science by making their own science toys about the moon, earth and other planets in the solar system,
- Simultaneously with the new educational methods developing in the world, to introduce our children to the basic concepts of the future on the subject of maps, it is intended to.

2. Material and Method

During the study, the “Regulation on the Production of Large-Scale Maps and Map Information-(BÖHHBÜY)”, which was put into effect by the Council of Ministers on 23/06/2005 on the basis of the Article No. 684 dated 29.04.2005 of the Ministry of National Defense, was taken as the basis. In accordance with the articles of the regulation, maps were produced and named according to their scale (URL_1). Maps of various purposes, forms and scales are produced for all kinds of construction, planning and infrastructure projects around the world. Regardless of what needs it is for, the creation of a map is generally divided into land and clerical work. It is possible to divide land studies into fixed point facility and measurement parts, office studies into calculation works, map drawing, printout and archiving studies (Yıldız, 1999). In this context, some of the simple application

examples that are planned to be made at the office stages of the project have been planned by using the Map Drawing (Linear-Numeric) book. For example; in order to create the substrate necessary for map drawing, the source book was used for the issues of information about the edge of the sheet, framing, scale selection, placement of special signs and inscriptions in the appropriate place.

Many of the problems in today's cities are caused by the fact that the relevant zoning plans are not made correctly, forward-looking and long-term. In this context, Zoning Information Planning-Implementation-Legislation was used for issues such as reading zoning plans that constitute an important part of the maps produced about the city, their importance, planning stages, existing maps used as underlays, special signs on zoning and cadastral sheets, and their meaning.

First, the basic map information was given theoretically in the classroom environment, and then land and laboratory applications were made. The measurements obtained were uploaded to map drawing programs and color drawings were made. The created maps were visualized by transferring them to paper media with the help of a printer. Information about the sport of orienteering was given and competitions were organized. Drawing, painting, direction finding and orienteering sports applications have been made especially for kindergarten and elementary school student groups accompanied by special games that develop the concept of maps.

One of the important events considered in the project is that a map of a small region with participants is made in different scales and sizes. The aim of this application is to see and understand the stages of obtaining the shape of a map belonging to a region on paper media, which is the result of the first measurement stage, in practice (Figure 1). During the project, practical activities such as obtaining 2D and 3D color drawings, making digital maps were also planned to be carried out. During these applications, studies were carried out such as finding out what signs such as settlements, lakes, streams, roads, hills are located on the topographic map that will be used as an example (URL_2).



Figure 1. Land measurement study of high school students with a GPS device

3. Findings

All groups of participants participating in this study were given preliminary tests to measure their scientific infrastructure about basic map information in accordance with their age and educational status (Table

1). In these tests, for basic map information according to age groups; map, sketch, scale, etc. questions were prepared in the fields and the knowledge levels of the participants were determined. The results obtained have been evaluated and the deficiencies seen during the applications have been corrected.

Table 1. Pre/final test questions applied to the participants

Class	Pre/Post Test Questions
KINDERGARTEN	<p>A country map is shown and asked to point to the mountains. A map of the area is shown and asked to point out roads. A country map is shown and asked to point to the lakes. An island and country map is shown. Ask the candidate to point. He is asked to describe the geographical features of the island on the map. Students are asked to describe what the mountains on the map look like in the real world. Students are asked to comment on what the roads they see on the map do. Ask them to describe how the lakes on the map look like in the real world.</p>
PRIMARY SCHOOL 4th GRADE	<p>Is it true that weather maps can show values such as average temperature, coldness and precipitation? Which of the following statements describes a roadmap? Which of the following maps shows elevation, slope, or other physical characteristics of the terrain? What maps show where people live? Which of the following can help you read or understand a map? In which of the following can we see the round view of the earth? How can map scale help with map reading? Some maps show us what types of crops are grown in a particular area. What are these maps called? Which of the following maps is used to show the past boundaries of an area?</p>
MIDDLE SCHOOL	<p>How many continents are there in the world? Which of the following is not a continent? Which is the biggest mountain in Turkey? What is not included in the neighborhood map? What is the function of the map scale? Which is the largest continent? Which is the smallest continent? Which of the following is the largest lake in Turkey? What does island mean in cartography?</p>
HIGH SCHOOL	<p>On which map can we see the districts of Istanbul? Why is that? On which map can we not see the Golden Horn? Why is that? Streets and roads are more prominent on which map? Why is that? On which map can we see larger areas? Why is that? Rank the maps according to their scale from largest to smallest. Which map has the smallest scale? Can you rank the maps according to their scale from largest to smallest? In which of maps B and C are streets and alleys more prominent? What is the reason of this? Which of the maps A and B is smaller in scale? Why is that? Which of the B and C maps is larger in scale? Why is that? We cannot see Kule Site AVM on map A. What could be the reason for this?</p>
ASSOCIATE AND LICENSE AND TEACHERS	<p>What is the reduction ratio of maps called? What is a space-conserving projection? What is the name of the part that shows the meaning of the special signs used on the map? What is a drawing that shows a bird's eye view of a place called? Which type of map shows the shape and elevation of the earth? Which type of projection preserves the shape of the earth? What is the distance from a point on earth to the equator called? What are imaginary curves connecting points of the same height called? What is the imaginary line assumed to lie between two poles called? What is the name of the map that shows the borders of the countries in the world? What is it called when the bird's-eye view of the earth is transferred to the plane within a certain ratio?</p>

According to the results of the pre-test; The deficiencies in the basic map information of the participants were determined, the theoretical explanations in the classroom environment and practical field / laboratory applications were shaped accordingly. Care was taken to ensure that the expressions of the professional literature used in the theoretical lectures in the classroom were as appropriate for the level of the participants as possible and that they included the information that students should use in their classes.

However, since the experts and trainers in the project are academicians, this desired level could not be achieved in kindergarten and primary school students.

As another result of the pre-tests, it was decided which of the map making stages, land measuring instruments and measurement methods should be explained in more detail. Field applications were also shaped according to this test result. For example, more time was allocated to electronic total stations and GNSS

receivers from measuring instruments and participants were enabled to use them actively.

In addition, a great interest in advanced cartography was aroused, especially among the participants of associate, undergraduate and teachers' groups, and many questions were received from the participants on special topics such as cadastre and zoning practices during breaks and other free times. Since the trainers in the project team are experts and experienced in their fields, they gave satisfactory answers to these and similar questions. This has been pleasing in terms of solving the problems experienced by the participants in this area and making the project more efficient.

According to the pre-test results; The infrastructure of the participants on orienteering was measured, and the theoretical explanations and practical field applications in the classroom were shaped accordingly (Picture 2). According to the results of this test, it has emerged that the basic map information subjects should be explained in more detail. Although a few of the participants were at an advanced level in these subjects, it caused them to get a little bored, but the applications in the field measurement applications and Netcad map drawing program environment attracted the attention of everyone. While choosing Netcad program applications, it was determined which subjects should be applied according to the results of these pre-tests.



Figure 2. Orienteering sport activity

At the end of the activity studies of the relevant groups in the project, post-tests were also applied (Table 1). The post-test questions were kept the same as the first-test questions to observe the improvement in the group members. As a result of the 2-day theory and practical training given to each participant group in accordance with their age group, it was observed that the participants' knowledge of basic map information and orienteering increased and an awareness could be created on this subject. The final test results were at a much better level than the first test results.

One of the important activities implemented in the project is the mapping of a small region in different scales and sizes in a place where no measurement and mapping work has been done before by the participants. With this application, the stages of obtaining the shape of the map of a region in the paper environment, which is the result from the first measurement stage, is to be seen and

understood in practice. During the applied field studies, activities such as the introduction of the compass and its use in the field, and the finding of direction in the field were carried out, improving the social and technical skills of the participants and increasing their self-confidence.

During the project, practical activities such as obtaining 2D and 3D-colored drawings, digital map making, and creating a smart interrogative map in Netcad were also carried out. Especially in the studies carried out with Netcad program, applications such as map coordinating, map digitization, digital elevation model creation were emphasized.

During the activities, map-land comparison studies were carried out through observation, enabling the participants to learn basic map information permanently, and their knowledge and skills in this field increased.

Basic cartography information consists of measurements, calculations and observations in the field. The values obtained do not mean much unless they are written on paper by drawing. Therefore, it has been one of the most important studies to transform the data we have into map format by drawing. The accuracy of the map depends on the precision, attention and care to be shown in the measurements made in the field and the drawings to be made in the computer environment afterwards. Within the scope of the project, map drawings were made in computer environment in accordance with the Large-Scale Map and Map Information Production Regulation.

4. Conclusion

In the researches, it has been seen that there are deficiencies in reaching and using this information correctly in every part of the society about basic map information, and that teachers cannot provide sufficient number and quality of tools and materials that they can use in their lessons.

The measuring instruments, map drawing programs and other materials used in the project process were used to support applied teaching. Materials chosen in accordance with the subject and purpose make the taught subject alive, enrich the teaching process and increase learning. With this idea, applications made in the field and office environment will accelerate learning and ensure that the information becomes permanent.

As a result of the project, the participants, who permanently learn their basic map knowledge by practicing and doing sports competitions, will be able to follow the current developments in this field, learn the necessary skills for everyone, such as reading the map, finding direction in nature, using a compass, and raise awareness in the society with their knowledge of space, earth and other planets. In addition, students will be able to do their own map-based studies more easily.

Acknowledgement

This study was supported by TUBITAK 4004-Nature Education and Science Schools program in 2019 within the scope of TUBITAK Project (Project No: 218B149)

titled "Journey to Basic Map Information with Field Experts".

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