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Technology and Mathematics Education: A Comparative Study on The Use of Dynamic Geometry in Turkey and Albania[1]

Sabina SULEJMANI*, Bursa Uludag University / Institute of Education Sciences, Turkey, ORCID ID: 0000-0003-2400-202X, 802052011@ogr.uludag.edu.tr
Menekşe Seden TAPAN-BROUTIN, Bursa Uludag University / Faculty of Education, Turkey, ORCID ID: 0000-0002-1860-852X, tapan@uludag.edu.tr
Gül KALELİ YILMAZ, Bursa Uludag University / Faculty of Education, Turkey, ORCID ID: 0000-0002-8567-3639, gulkaleli@uludag.edu.tr

Abstract: The use of digital technology is becoming increasingly important in mathematics education, particularly in Geometry and Algebra with the use of dynamic geometry software. The purpose of this study is to examine the use of dynamic geometry software in secondary schools in Turkey and Albania. The research is conducted using qualitative research methods and techniques. The research was conducted in two parts. In the first part of the study, textbooks and official programs were examined to determine the place of dynamic geometry within them. In the second part, interviews were conducted with teachers from both countries in order to better understand how teachers use dynamic geometry in their lessons. Two Albanian and two Turkish teachers participated in the second part of the study. The results of this research indicated that Turkish teachers used dynamic geometry more frequently to structure their lessons. Nevertheless, the analysis of official curricula and the interviews with teachers revealed that teachers were lacking in technological knowledge, as well as technical pedagogical and content knowledge.This study emphasizes the need for both countries to improve the training of teachers in using dynamic geometry software, particularly as it relates to the preparation of teaching scenarios using dynamic geometry software.
Keywords: *Mathematics Education, Dynamic Geometry, Turkey, Albania.*

1. INTRODUCTION

Technology-assisted teaching has a greater effect on student achievement than traditional teaching, it is more attractive to students and more understandable. Mathematics teaching can be examined in two categories as technology tools, namely dynamic geometry software and computer algebra systems, which are software that enables geometry constructions in 2 and 3-dimensional environments. It has been studied, that "there are enough similarities but also differences in curricula and textbooks of countries with a different history, culture, language, economy and geographical stretch, every country has its system of education (Alajmi, 2012;

*** Corresponding Author**
Bursa Uludag University / Institute of Education Sciences, Turkey.
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Charalambous, Delaney, Hsu & Mesa, 2010; Cheng & Wang, 2012; Delaney, Charalambous, Hsu & Mesa, 2007; Erbaş, Alacalı & Bulut, 2012; Özer & Sezer, 2014)".

This study analysis textbook and official programs concerning the place of dynamic geometry in Turkey and Albania. "By considering the textbooks as an important part of classroom life, as very important tools for quality assurance (Nicol & Crespo, 2006; Pehkonen, 2004) and as an important indicator that enable students to reflect on school curricula (Erbaş, Alacalı & Bulut, 2012)". Teaching and learning influence textbooks, that make curriculum important in educational life. "The effective use of personal computer technology in supporting mathematics curricula is in the hands of teachers. Teachers need to know more about the use of technology, which can be found in various textbooks, teaching materials, and other sources of information." (Oldknow, 2000). One of the principal elements of the teaching and learning environment in our society is the teacher. Hence the teacher must be trained in the use of new technological tools and resources to help students to be more creative. Technological knowledge cannot be isolated from content knowledge. "Effective mathematics teaching requires an understanding of how technology is related to the pedagogy and mathematics" (Hughes, 2005).

Today, although different constructions can be made with different tools such as computer software, constructions made with compass and ruler correspond to the constructions that emerge with the axioms in Euclidean geometry; constructions made with compass and ruler ensure the maturation of geometric constructions in the mind (Sezen, 2007). It is mentioned that there are different types of comprehension of geometric figures from different angles. These different types of comprehensions affect the performance of mathematical operations (Duval 1994; cited in Tapan-Broutin, 2016). We can examine the use of technology in mathematics education in three categories: general technological tools, math-making tools, and mathematics teaching technological tools (Köse, 2008).

The studyimed to examine the basic geometric problems in using dynamic geometry software and to reveal the teachers' opinions about this subject. The teacher encourages students to think creatively and orients problems in teaching mathematics through the use of GeoGebra. GeoGebra software provides a perfect link between math books and "Information Technology" (IT) textbooks and desirable environments for problem-solving situations. It is primally focused on secondary schools, in order to improve students' skills and help them develop a concept from geometry, algebra, and calculus. Math teachers have begun to use these systems to organize math learning, but even further, most math curricula are not taking advantage of the available new technology. The software can be used as a learning and as a teaching tool, also can be actively used at home or in the classroom for mathematical experiments and discover more for mathematic problems.

According to the opinions received from the teachers, the teachers stated that they can easily apply this software in various mathematical and geometric subjects in the classroom, among which the most important are geometric constructions. In order to teach Mathematics lessons in a better-quality day by day, different teaching methods and activities are offered by comparing different countries. Today, the examination and comparison of curricula and textbooks applied in different countries have an important place among comparative

education studies (Böke, 2002; Kayhan, 2007). As a result of the literature review, while previous studies compared countries such as Finland, Japan, and Singapore (Erbilgin & Boz, 2013), Kazakhstan (Khalidova, Tapan-Broutin, 2017), etc. comparing with Turkey, no comparative analysis was found with Albania. It is thought that this study may contribute to the literature.

In this study, similarities and differences were determined by the comparative analysis of Turkish and Albanian mathematics textbooks and programs. This study aims to examine the use of dynamic geometry software in secondary schools in Turkey and Albania. It is aimed to investigate the use of dynamic geometry software and its place in curricula.

This research offers a comparative analysis of mathematics curricula for the 6th grades of Secondary Schools in Albania and Turkey by comparing teaching plans and curricula (teaching programs). The research problems of this study are the following:

1. What are the differences and similarities of mathematics curriculum systems and teaching programs of the 6th grade of Albania and Turkey?
2. What are the differences and similarities in the teaching programs?
3. What is the place of dynamic geometry usage in textbooks and in curricula in Albania and Turkey?
4. What are the views of mathematics teachers about the use of dynamic geometry curricula in Albania and Turkey?

2. METHODOLOGY

This section contains information about the research model, data collection sources, data collection, and evaluation.

2.1. Model of Research

A qualitative research method was used in this study, which includes the comparative analysis of Turkey and Albania Elementary Mathematics Textbooks. Yıldırım and Şimşek (2005) define qualitative research as "a type of research in which qualitative data collection methods such as observation, interview, and document analysis are used, and a qualitative process is followed to reveal perceptions and events in a natural environment in a realistic and holistic manner". In this study, the document analysis model of the qualitative research method was used. The document analysis model includes the analysis of written materials that contain information about the phenomenon or phenomena that are aimed to be investigated. In this study, a descriptive analysis of the data was made. In the descriptive analysis, the data obtained according to the framework created earlier is read and organized. The edited data is identified and supplemented where necessary with direct citations (Strauss & Corbin, 2008). In the study, the data were summarized and interpreted according to the previously determined themes.

2.2. Data Collection Resources

As data collection sources in the research, the 6th-grade mathematics textbook was used by the Ministry of National Education in Turkey and the 6th-grade mathematics textbook was used by the Ministry of National Education in Albania. Mathematics textbooks were examined based on the curriculum. Google advanced search engine and Higher Education

Council (HEC) of national thesis centre; “Technology”, “mathematics education”, “Geogebra”, “teacher”, “Turkey” and "Albania" scanning with keywords were made. Open questions were asked to the teachers, so we gathered information about whether dynamic geometry was used in teaching or not. The data is open-ended questions form consisting of 10 questions in total. Besides that, the curriculum in Albania and Turkey was examined through scanning.

2.3. Data Collection and Evaluation

In this study, two different curricula of primary school 6th-grade mathematics textbooks approved by the Ministry of National Education of Turkey and Albania were evaluated. In the process of interpreting the data, they interpreted each unit separately and compared these interpretations.

3. FINDINGS

In this section, the distribution of the themes used in the studies comparing the mathematics curriculum of Turkey and Albania by country is examined.

> “The role of the curriculum in higher education is quite important for the provision of quality and relevant educational programs to the students. Regardless of sizes, types or origins, the curriculum is considered the heart and soul of all educational institutions” (Khan & Law, 2015).

The new technology in the mathematic curriculum must be constructed including activities that help students and teachers to have efficient lessons. In the first part, we will analyze textbooks and official programs concerning the place of dynamic geometry. In a second part, interviews were carried out with teachers from both countries in order to better understand the use that teachers make of dynamic geometry in their lessons. The mathematic program aims to equip students with mathematical thinking patterns, basic mathematical ideas, and structures, as well as to develop their computational and problem-solving skills in everyday life. Sixth-grade mathematic program, during implementation: selects and implements problem-solving strategies; makes observations, investigations, which help in understanding knowledge and mastering mathematical skills; communicates his mathematical thinking by observing mathematical symbols; creates presentations of mathematical concepts by linking them and applies them to problem-solving.

3.1. Comparing Turkish and Albanian Mathematics Curriculum

In this section, studies comparing the mathematics curriculum implemented in Turkey and Albania between the years 2020-2021 are examined. In some studies, it was noted that more than one country was compared at the same time, but in this study, only two countries were compared. Information on mathematics teaching plans for the observed grade in secondary schools in Turkey and Albania is presented in the following table.

Table 1. *The Mathematics Teaching Plan of Albania and Turkey*

Country	Number of Weekly Classes	Number of Annually Classes	Grades
Turkey	5	180	6
Albania	4	140	6

Albania has a national curriculum but any of fifteen commercial series of textbooks may be used in Albanian schools. In Albania, the number of school days in a school year in compulsory education is 180 days 36 school weeks, from that 35-week teaching and 1-week extra curriculum activities. Teaching time in Albania is the same, so 5 days per week. The mathematics course is developed for 35 teaching weeks with 4 hours each (45 minutes), so a total of 140 hours for each class.

And the mathematic course in Turkey is developed for 36 teaching weeks with 5 teaching hours each (40 minutes), which is a total of 180 hours. The math program specifies the weight (suggested hours) of each topic for the sixth grade. The number of suggested hours for each topic is equal to the number of annual hours defined in the Basic Education Curriculum. The distribution of hours is intended to orient the users of the program to the weight that each topic occupies concerning the total annual hours.

Table 2. *Compulsory Education Period in Albania and Turkey*

Country	Period
Turkey	12 years (4+4+4)
Albania	9 years (5+4)

Compulsory education in Albania starts for children aged 6-7 years and lasts for 9 years. In all cantons, it is composed of the primary and secondary cycle of the first degree. School attendance is compulsory for both locals and immigrant children. Tuition is free and books are free until the fourth grade. School results will be assessed with grades, graded assessment, or learning reports. The grading scale ranges from 1 to 6 (6 is the best grade, 4 is sufficient, and below 4 is not sufficient. The grading scale consists of: very good, good, sufficient, and not enough.

In Turkey, compulsory education starts for children aged 6 years and students are last for 12 years, 4 years of Primary School, 4 years of Secondary School, and 4 years of High School. They are placed in schools by making a central examination at the end of each stage without any direction. Textbooks are distributed to students free of charge by the Ministry of National Education since the academic year of 2003-2004. From the beginning till now, 2.850.288.456 free textbooks have been delivered to our students for sixteen years.

Those who get high scores in these exams are placed in schools that provide qualified education, while students who fail in the exam are placed in schools where vocational education is given.

Table 3. *The Hours of the Sub-Learning Areas of the 6th Grade Geometry Learning Area*

Learning Area	Turkey	Albania
Number	101	80
Algebra and function	10	10
Geometry & Measurements	58	42
Statistics and Probability	11	8
Total	180	140

In Albania Secondary School Mathematics Teaching Program consists of five learning areas: Number; Measurements; Geometry; Algebra and function; Statistics and probability. And in Turkey Secondary School Mathematics Teaching Program consists of five learning areas: Numbers and Operations, Algebra, Geometry and Measurement, Data Processing, and Probability.

In the table is detected the difference of the course schedule, also the difference in the course time. The annual plan in Albania is drafted according to the Oxford textbook on mathematics and contains all the knowledge foreseen in the program for 140 hours. The annual plan in Turkey is prepared according to the curriculum of the courses in the weekly course schedules of formal and non-formal education institutions affiliated with the Ministry of National Education. Also, we see a difference of course time between Turkey and Albania on Geometry and Measurement part, there is a difference of 16 hours. Now we will see the difference in the curriculum in the geometry section.

3.2. Findings Related to the Similarities and Differences Between the Sub-Learning Domains of the Geometry Learning Area in the 6th Grade Mathematics Curriculum in Turkey and Albania

In this section, the similarities and differences between the sub-learning fields of the geometry learning field in the 6th-grade mathematics curriculum in Turkey and Albania are examined, and the findings are presented in Table 4.

Table 4. *Sub-Learning Areas of 6th Grade Learning Areas in Turkey and Albania*

Learning Area	Sub Learning Area of Turkey	Sub Learning Area of Albania
Geometry and Measurement	Angles	Length, mass, time, angles
	Measuring Area	Perimeter and surface
	Circle	Volume
	Geometric Objects	Geometry in plan
	Measuring Liquid	Geometry in space
		Geometric transformations

When Table 4 is examined, it is seen that there are differences between the sub-learning areas of geometry and measurement learning in the 6th-grade mathematics curriculum of the countries. It is observed that the number of sub-learning areas in the Turkish program is less than the Albanian program.

While the sub-learning areas are given in more detail in the Turkish program, the sub-learning areas in the Albanian program are more general and combined into a single sub-learning area. Since "Measurement" and "Geometry" in Albania are separate learning areas, they are normally separate sub-areas, but in Turkey "Geometry and Measurement" belong to a single learning area together.

“Length, mass, time, angles” and “Perimeter and surface” sub-learning areas in the Albanian curriculum are included in the “Area Measurement” sub-learning areas in the Turkish curriculum. The “Volume” sub-learning domain is included in the “Liquid Measurement” sub-learning domain in the Turkish curriculum. If we look at the sub-learning areas of the

geometry learning area, the “Plane geometry” sub-learning area is located in the “Angles” sub-learning area in the Turkish curriculum. "Geometry in Space" and "Geometric transformations" sub-learning domains are included in the "Geometric Objects" sub-learning domain in Turkey.

In addition, the sub-learning area that is in the Turkish curriculum but not in the Albanian curriculum is "Circle". In other words, it can be said that the number of sub-learning areas covered in the Turkey and Albania program is small, but the content is wide.

3.3. Findings Related to the Similarities and Differences in the Number and Content of the Geometry Learning Field in the 6th Grade Mathematics Curriculum in Turkey and Albania

In this section, the similarities and differences in terms of the number and content of the achievements of the geometry learning field in the 6th-grade mathematics curriculum of Turkey and Albania are examined, and the findings are presented in Table 5.

Table 5. *Turkey and Albania 6th Grade Geometry Learning Outcomes*

Turkey	Albania
6th Class Achievements	**6th Class Achievements**
M6.3 Geometry and Measurement	**Measurement**
M6.3.1 Angles	***Length, mass, time, angles***
M6.3.1.1 Knows the angle, the formation of two rays with the same starting point, and shows it with a symbol.	-Choosing the appropriate unit and tool to measure in a specific case.
M6.3.1.2 Draws an angle equivalent to an angle.	-Exchange of units of measurement (kg with g; km, m, cm, mm) with decimal numbers up to three digits after the comma.
M6.3.1.3 Explores properties of adjacent, complementary, supplementary, and opposite angles; Solves related problems.	-Approximate forecast of measuring activity in cm or nearest mm.
M6.3.2 Measuring Area	-Drawing and measuring a segment.
M6.3.2.1 Creates the area relation of the triangle, solves the related problems.	-Units of measuring time (seconds, minutes, hours, days, weeks, months, years, decades, centuries) and their exchange.
M6.3.2.2 Creates the area relation of the parallelogram, solves the related problems.	-Watch with a 24-hour system.
M6.3.2.3 Recognizes area measurement units convert m2-km2-cm2-mm2 units to each other.	-Table schedules with the 24-hour system.
M6.3.2.4 Recognizes land measurement units and associates them with standard area measurement units.	-Calendars.
M6.3.2.5 Solves the problems related to the area.	-Time in different areas of the world.
M6.3.3 Circle	-Reporter for measuring angles
M6.3.3.1 Recognizes the center, radius, and diameter by drawing a circle.	***Perimeter and surface***
M6.3.3.2 Determines by measuring that the ratio of the length of a circle to its diameter is a constant value.	- Formula for the perimeter and area of a square.
M6.3.3.3 Solves problems that require calculating the length of a circle given the diameter or radius.	- Formula for the perimeter and surface of the rectangle.
M6.3.4 Geometric Objects	- The surface of an irregular figure.
M6.3.4.1 Understands that the number of unit cubes placed inside the rectangular prism is the volume of that object, calculates the volume of the given object by counting the unit cubes.	- The surface of a simple composite figure.

Table 5 (continued). *Turkey and Albania 6th Grade Geometry Learning Outcomes*

Turkey	Albania
M6.3.4.2 Different rectangular prisms with a given volume measure form their prisms with unit cubes, explain that the volume is the product of the base area and the height, because it is grooved.	***Volume***
M6.3.4.3 Recognizes standard volume measurement units and converts between cm3, dm3, m3 units.	- Use of units of measurement of volume erliters and ermilliliters and their exchange.
M6.3.4.4 Creates the volume relation of a rectangular prism, solves related problems. Can benefit from information and communication technologies, for example, three-dimensional dynamic geometry software.	**Geometry** ***Geometry in the plan***
M6.3.4.5 Estimate the volume of a rectangular prism.	-Polygons and their classification.
M6.3.5 Measuring Liquid	-Rectangle (rhomboid, parallelogram, rectangle, square, trapezoidal) properties of angles and ribs without proof.
M6.3.5.1 Recognizes liquid measuring units and converts them to each other.	-Drawing of narrow angles and wide angles (from 90 to 180).
M6.3.5.2 Relates liquid measuring units to volume measuring units. Heat measurement units are associated with volume measurement units, emphasizing that liquid measurements are special volume measurements.	-The sum of the angles of a triangle is 180. ***Geometry in space*** -Description of geometric bodies according to their properties.
M6.3.5.3 Solves problems related to liquid measuring units.	-Elements of geometric bodies (faces, ribs, roofs).
	Geometric transformations
	-Using coordinates in the coordinate grid.
	-Finding the coordinates of a figure during symmetry, displacement, and rotation 90.

According to Table 5, it is seen that the two programs have a similar approach as a result of the comparison of the mathematics curriculum in Turkey and Albania in terms of their achievements. Behaviors that should be taught to students in both programs are expressed in short, clear, and extended sentences. In Turkey, achievements are listed under each subject, each class has its code, learning area, and sub-learning area. There is no such code in Albania, but in general, the achievements in sub-learning are listed.

On the other hand, the Turkish program includes 19 learning outcomes in 5 sub-learning areas under the "Geometry and Measurement" learning area. In Albania, sub-learning areas and achievements are also more. In the Albanian program, Measurement and Geometry are divided into two separate learning areas; “Measurement” has three sub-learning domains and "Geometry" has three sub-learning domains. It has been seen that there are 23 gains in the Albania program, which is more than in the Turkish program. Therefore, since there is a “Geometry and Measurement” learning area in Turkey and there is a “Geometry” and “Measurement” learning area in Albania, in this study, the achievements were compared qualitatively, not quantitatively, and an example comparison is presented in Table 6.

Table 6. *A Sample Comparison of the Achievements of the 6th Grade Geometry Learning Area in Turkey and Albania*

Turkey	Albania
M6.3.3 Circle	***Geometric transformations***
M6.3.3.1 Recognizes the center, radius, and diameter by drawing a circle.	-Using coordinates in the coordinate grid.
M6.3.3.2 Determines by measuring that the ratio of the length of a circle to its diameter is a constant value.	-Finding the coordinates of a figure during symmetry, displacement and rotation 90.
M6.3.3.3 Solves problems that require calculating the length of a circle given the diameter or radius.	
M6.3.1 Angles	***Length, mass, time, angles***
M6.3.5 Measuring Liquid	-Units of measuring time (seconds, minutes, hours, days, weeks, months, years, decades, centuries) and their exchange.
M6.3.5.1 Recognizes liquid measuring units and converts them to each other.	-Watch with a 24-hour system.
M6.3.5.2 Relates liquid measuring units to volume measuring units. Heat measurement units are associated with volume measurement units, emphasizing that liquid measurements are a special volume measurements.	-Table schedules with 24-hour system.
M6.3.5.3 Solves problems related to liquid measuring units.	-Calendars.

In the Turkey program "Angles" sub-learning area is included and in the Albania program there is the "Length, mass, time, angles" sub-learning area, in which length, mass, and time are not included in the Turkey program. The "Circle" sub-learning area in the 6th grade is not included in the Albanian curriculum. While the Albanian program includes the subject of "Report. Reporters with Exercises", using appropriate tools and materials such as compass, ruler, square, creating/drawing planar figures in the Cartesian coordinate system, and using heuristic strategies, it is seen that these achievements are not included in the Turkish program at the level of achievement. These gains appear as different gains of Albania and Turkey.

In 2015 in Albania, 5800 tablets were purchased and this project aimed at creating digital classrooms initially in 60 high schools in the country and equipping 120 classrooms with tablets, and then extending the investment to all schools in the country. From the global Covid 19 pandemic all this investment was not in operation, this project failed.

Table 7. *Teachers' opinions on Dynamic Geometry Software*

	Albania	**Turkey**
Age	A1: 33 A2: 38	T1: 35 T2: 39
City	Shkoder	Bursa
Grade	A1 & A2 : 6th grade	T1 & T2: 6th grade
School	A1 & A2 : state school	T1 & T2: state school
1. What training did you receive on the use of digital technologies for teaching? Explain?	A1: We had no training A2: As a start in the centers where courses for learning technologies are developed and then in Trainings offered by the training agency approved by the Ministry of Education.	T1: I took smart board usage training and a Cabri course at the university. T2: Geogebra, smart board usage

Table 7 (continued). *Teachers' opinions on Dynamic Geometry Software*

2. How often and in what situations do you use technology in teaching mathematics? How do you integrate?	A1: Mainly in designing tests. The integration of technology in teaching in the current conditions in Albania is very difficult as there is a lack of material base and textbooks are not adapted for this purpose. Low level of students' knowledge of technology, etc. A2: We have used technology in the subject of mathematics mainly in the presentation of projects and especially in the time of the pandemic. Now we use it more often to show a proof such as the Pythagorean Theorem	T1: I have always used it in distance education. T2: I use it mostly when solving questions. I also used Geogebra at the beginning of geometric figures.
3. Which mathematics subjects do you use Computer Technology programs to teach?	A1: Mainly building graphs and themes from statistics A2: Mainly verifications, programs that do different calculations as well as fun games with different mathematical operations.	T1: Apart from the distance education process, I often used technology on subjects such as polygons, angles, prisms, pyramids, reflection, and translation. T2: Prisms, coordinate system, translation and reflection, patterns
4. Does technology offer good opportunities for you and your students? If so, what are they?	A1: The obstacles are for the students because there is a part of the students who are not systematic users of ICT, the reason is the lack of internet or its insufficient speed to complete the tasks within the deadlines. A2: Of course, yes. Concepts are better understood and more clearly perceived. The visual side corrects misconceptions that students may create. Through technology, students can immediately check their answers	T1: It is more appropriate to explain the subject in a visually smoother way. In addition, the lessons made with technological tools are more remarkable. T2: Of course, there is. It facilitates faster and more understandable three-dimensional figures and objects. It is a great advantage to save time and appeal to visuality.
5. Are there any difficulties that technology is causing to you and your students? If so, what are they?	A1: Addiction to it and its use for non-educational purposes A2: They read less, listen more and work less in notebooks because through the screen many things get ready.	T1: Often it can be distracting. Some students are busy with other tasks because it eliminates the writing issue. Technology will be beneficial when it is provided to all students on equal terms. T2: None (except internet connection)
6. How do you think the use of computer technology affects the teaching of mathematics? Please explain?	A1: It has a positive effect but if developed properly, the acquisition of new concepts and their correct imagination will be greatly improved. A2: Somewhat good because it allows a student who expresses less in class to express himself more through technology.	T1: I think it makes visualization and the teacher's job easier. T2: I think it has a positive effect. However, I think face-to-face training is more beneficial.

Table 7 (continued). *Teachers' opinions on Dynamic Geometry Software*

7. What do you think about whether the use of technology improves mathematics teaching or not?	A1: Yes, some programs, I really work with them and I know them well enough during the work I do. A2: It is increasing success because more students are participating in the lesson	T1: I don't think technology has increased math education. On the contrary, it may be harmful to an abstract lesson such as mathematics by reducing writing. T2: I do not think that the use of technology increases the teaching of mathematics.
8. Which of these programs do you use: Geogebra, Cabri, Sketchpad, Mapple, 2D&3D, Teams, smartboard	A1: Teams, Sketchometry A2: Geogebra, 2D&3D, I do not know Cabri, I am interested in recognizing it as a program if it is available to me from any training agency?	T1: Geogebra, Cabri Geometry T2: Geogebra, I usually use smartboard presentations.
9. Why do you prefer to use the above programs? Where did you learn from?	A1: It is an innovation in Albanian schools, a new reconceptualization in teaching/learning. Spontaneously without holding any training. A2: For the use of algebraic formulas. To build 2D and 3D figures accurately.	T1: I use it for more efficient processing of lessons. I know because I took it as a course at university. T2: Theoretically, I prefer to visualize the information given.
10. What do you think about the place of computer-assisted mathematics teaching in the curriculum and why? Explain?	A1: In the context of technological developments, the school must also keep pace with the times. The time has come for all classrooms to be equipped with interactive whiteboards and curricula need to be adapted for this purpose. As much training as possible should be done with the pedagogical staff in this regard. The school infrastructure should be adjusted as much as possible. A2: I think that the use of computers in schools should be widely introduced, but not all schools offer the necessary conditions to achieve this good thing in the development of the subject of mathematics. The interest of the students, in general, is driven by technology, so it would be very good if for special classes to use the computer and the necessary programs for a better performance of the students in the subject of mathematics.	T1: The curriculum is very lacking in this regard. A special guide to geometry topics can be made. T2: It has an important place in terms of facilitating the visualization of figures in applications.

We conclude that the use of technology can work under good planning and equal conditions. Otherwise, it can do more harm than good. And it turns out that mathematics teaching is better understood with face-to-face education and computer-assisted applications.

It is observed that, with the frequency of using the computer, the opinion on CAMT has changed positively (Yenilmez & Karakuş, 2007). The importance of computer literacy for CAMT should be explained to prospective teachers and if necessary, pre-service and in-

service seminars should be given. The use of smart boards in educational environments and computers in schools for computer literacy should be made widespread in order to be able to conduct CAMT in classrooms.

4. RESULTS AND DISCUSSION

In the study, the curriculum of the 6th-grade mathematics textbooks approved by the Ministry of National Education of Turkey and Albania was examined, and a comparative analysis was made between the books. The current situation of Albania has been compared with the situation of Turkey. In Albania's and Turkey's pre-school education is not compulsory, in case if families want to. It is noticed that students who are sent to these schools before starting compulsory education are more ready for education. Compulsory education is free in both countries. However, the books are free from primary school to high school by the Ministry of National Education in Turkey, but in Albania, the books are free only in primary school.

While secondary education in Turkey has a “4+4” system, a “5+4” system is used in Albania.

It has been determined that the annual course hours of the countries compared differ. It has been determined that there are 180 lesson hours in Turkey for the mathematics lesson, and 140 lesson hours at the secondary school level in Albania. In addition, it has been determined that the duration of the lesson is 40 minutes in Turkey and 45 minutes in Albania. Therefore, considering that the duration of a course is similar in both countries, it can be said that mathematics is given more place in an academic year in Turkey.

When the learning areas are compared, it has been determined that there are a total of five learning areas, namely Numbers and Operations, Algebra, Geometry and Measurement, Data Processing, and Probability, in the Turkish secondary school mathematics curriculum. Albanian learning areas consist of a total of five: Numbers, Algebra, Geometry & Space, Measurement, Statistics, and Probability. 6-9 in the Albanian mathematics curriculum. While the learning areas determined for the 1st grade are found at each grade level, it has been determined that in the Turkish mathematics curriculum, the learning area of Algebra starts from the 6th grade, and the probability learning area is started to be applied from the 8th grade.

The sub-learning areas of the Turkish curriculum are higher in number, presented in more detail, and distributed by dividing into two grade levels; It has been concluded that the sub-learning areas of the Albanian program are more general, simple, and combined as a single learning area.

It has been determined that there are differences between countries in the sub-learning domains related to the geometry and measurement learning field. In the study conducted by Uğur-Arslan (2015), it was emphasized that the time given to geometry is not enough in the mathematics teaching process, in which deficiencies arise in the case of dealing with the related subjects together in the geometry teaching process according to the Turkey curriculum, and that the geometry subjects are divided into different grade levels. In this study, it was concluded that less time was given to geometry in the mathematics teaching process in the Albanian curriculum.

It has been determined that the use of calculators is emphasized in some subjects of the Albanian mathematics curriculum. However, no suggestions were found regarding the calculator in the Turkish mathematics curriculum. Ersoy (2003) emphasizes that the education program should include the use of calculators in Turkish schools in mathematics activities. He also draws attention to the fact that the calculator will make a significant contribution to the development of basic skills, conceptual understanding, and developing a positive attitude towards mathematics.

It is an indisputable fact that with the development of technology, conveniences are provided in various parts of life. With the development of technology, its use has been positively received by teachers in the field of education.

Despite the ongoing discussions about the use of technology as a pedagogical tool among academics and policymakers, technology is still not used enough in schools as educational tools (Kurt, 2014). This comment was made in 2014, however, technological tools are not being used enough in secondary schools in Turkey in 2021, and in Albania, we are suffering from a shortage of technology in our education system.,,Books are considered as the traditional method of education which were time-based, now our current educational system is a technology-based system that help students learn efficiently and to boost concentration and engagement; using digital games is easier and more entertaining. In this context, integrating technologies suitable for geometry learning into the education process and designing the learning process with digital games can lead to a more permanent and effective learning environment.

The next generation of teachers needs opportunities to experience and practice technology-supported activities. This will increase motivation, connection, and understanding to effect teaching environments. Teachers who support technology will help to develop these environments. With good planning and on an equal footing, technology can be used effectively. Otherwise, it may be detrimental rather than helpful.This study also concluded the Geogebra software's used in mathematics, especially in Geometry and Algebra, but the teachers find difficulties. In universities, the Geogebra program is taught to the teacher candidates but meanwhile, Geogebra is not used in secondary school programs. Teachers have to be more trained on how to use and explain the Geogebra program, which will help them to be more adopted with Geogebra Software. Availability of technology is a key in enhancing teachers' competence in teaching Geometry.

From the interviews with the teachers, concludes that the successes and shortcomings of the students in Turkey are the weaknesses and strengths of the curricula. And also, it has been revealed that there is a big lack of technology in Albania.

5. RECOMMENDATIONS

In this context, suggestions for new researches based on the results of the research are given below.

- This study is limited to the comparison of geometry and measurement learning areas of the 6th-grade mathematics curriculum in Turkey and Albania from various perspectives. In future studies, it is recommended to carry out a broad analysis to cover the entire

mathematic units of the secondary school in the textbooks of the countries to be compared or all of the textbooks.

- Mathematics textbooks of Turkey and Albania and the training programs and competencies of teachers applying mathematics can also be compared.
- In this study, it has been determined that the number of achievements of the Albanian program is high. For this reason, it was deemed appropriate that the number of Albanian gains should be reduced and simplified.
- In this study, a document analysis method was used to collect data. In future studies, interview and observation methods can be used, and "diversification of data" is provided and the validity of the research can be increased significantly.
- Technology and digital programs have indeed developed nowadays, but how about some secondary schools in Eastern Turkey or secondary schools in Albania. What can we do for lacking technology systems in these secondary schools in Eastern Turkey and Albania?
- The education system of each country may differ. When countries encounter a problem in their education system, they investigate how other countries solve the problems. Comparisons can be made with other countries that are successful in the field of mathematics education.
- In this study, secondary school programs in Turkey and Albania were examined together and details could not be entered in terms of subject breadth. Therefore, each country can be examined in-depth for secondary school mathematics curriculums separately.

6. ABOUT THE AUTHORS

Sabina SULEJMANI: He is from Albania, completed undergraduate education in Mathematics Education at Uludag University Faculty of Educational Sciences. She is currently studying master's degree at Bursa Uludag University on the use of technological programs in Mathematics Education. As part of her career in the coming years, she is planning to continue my efforts to adapt the developments in technology to mathematics education in order to offer a more useful education curriculum in mathematics education to future generations.

Menekşe Seden TAPAN-BROUTIN: Assoc. Prof. Dr. TAPAN-BROUTIN is a researcher and teacher trainer in mathematics education at Bursa Uludag University. She received her Ph.D. in 2006 in the field of informatics and didactics of mathematics at Joseph Fourier Grenoble 1 University in France. Her main research interests concern Euclidian geometry, geometry teaching and learning, use of dynamic geometry softwares, and argumentation in mathematics education.

Gul KALELI-YILMAZ: Assoc. Prof. Dr. YILMAZ works as an associate professor at Bursa Uludag University. She received her undergraduate and graduate degrees (Ph.D. in 2012) in the field of mathematics teaching from Karadeniz Technical University. Her research is mainly on technological pedagogical content knowledge, mathematics, and geometry education. She has journal articles published in international and national indexes, book chapters, and papers presented to international meetings.

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