

The Learning of Mathematics Supported by GBL – A Novelty for Albanian Preschool System

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Doi:10.5901/jesr.2012.v2n3p297

Abstract *This study aims to explore the impact of including digital technology in teaching, compared to the traditional teaching methods that are actually being used in our school environment. Digital technology is a novelty in Albanian schools and based on the priorities of this method we suggest that it should be used extensively in our education system, for all the pupils comprising those with disabilities. The use of GBL (Games-Based Learning), especially in Elementary Education helps to promote a more consistent learning, improve students' communication with each other, especially within the class environment, enable pupils to put ideas into practice, as well as make them familiar with new technologies at an early age. This is a qualitative study that will analyze various theories concerning teaching with digital technology, especially the use of GBL in front of traditional teaching methods. It will also be illustrated with numerous examples from practice, which will make the difference between these two methods of teaching clearer and more convincing. The results of the study will be based on the observation of the phenomenon from the point of view of traditional teaching methods, as well as from the perspective of digital technology methods in teaching. Furthermore, in this paper will also be listed and analyzed the main advantages and disadvantages of implementing this contemporary method in the Albanian school and further on. As a conclusion, we should emphasize that the findings of this study will be of use to all pupils, especially the disabled ones and to the teachers, because it facilitates teaching and learning processes as well as his/her communication with pupils.*

Keywords: *GBL, smart board, digital technology, disabled pupils*

1. Introduction

Being an innovative and advanced practice, GBL has recently appeared even in Albanian educational system as a novelty that we believe should be implemented throughout our educational system. Smart board - a new interactive tool – is a way of learning by playing in groups. It is used in class as "Smart table with her magic stick." This "magic class" which works with the motto: THINK-PLAY-DANCE-SING-ENJOY-LEARN, describes the philosophy of our school. Smart board, connected to the Internet and placed in front of the pupils and between two classic blackboards is a near and far away dream for the Albanian pupil. "The Magic Blackboard" provides the advantage of functioning as an open window of the world contemporary Encyclopedia which is updated every moment from the web, as a tireless assistant of every teacher and what is more, as a friend for children.

2. Research Literature

The interest in game-based learning has increased considerably in these recent years. This way of learning has become more popular, among others, because of the increasing power of PCs. Games today are recognized for their universal attraction and ability to involve learners in concepts that are otherwise difficult to teach and understand. Both, teachers and learners appreciate the effectiveness of games in overcoming apparent barriers to learning. Most importantly, games are no longer regarded as just tools for kids.

Marc Prensky (2001) explains that "the emergence of digital game-based learning came in the last decades of the 20th century, when there was a global technology boom. He adds that recent generations of students in grades K-12 have lived their entire lives with access to technology — not only computers, but also digital music and video players, cell

phones, video games, and a host of other gizmos that require technology." Because of this he argues that today's students "think and process information fundamentally differently than their predecessors."

When using computer games, and games in general, for educational purposes several aspects of the learning process are supported: learners are encouraged to combine knowledge from different areas to choose a solution or to make a decision at a certain point, learners can test how the outcome of the game changes based on their decisions and actions, learners are encouraged to contact other team members and discuss and negotiate subsequent steps, thus improving, among other things, their social skills. This supports the view of most researchers in the field of GBL who conceptualize learning as a multidimensional construct of learning skills, cognitive learning outcomes and attitudes. Akilli (2007) in his study about GBL mentions that cognitive abilities as e.g. visual abilities or problem-solving skills are improved by game based learning. For example the lessons of history and geography would be much more interesting if students would visit the places described their virtually.

The GBL model is implemented in formal education very successfully. If used effectively and in a relevant way, it can support both the option of more choice for how the learner can learn as well as offering the potential for personalizing the learning experience. In addition it offers a way of integrating a range of different learning tools (e.g. social software) into a more coherent view of learning from the learner's perspective. There are specific educational domains where game-based learning concepts and approaches have a high learning value. These domains are interdisciplinary topics where skills such as critical thinking, group communication, debate and decision making are of high importance. Such subjects, if learned in isolation, often cannot be applied in real world contexts. Duchenaut et al. (2006) assume that collaborative online games can foster mutual support and encouragement. Thereby collaborative online games can help learners to learn more effectively.

Furthermore, the use of GBL can influence motivation and engagement of the learners in a positive way. As we know, motivation is a key aspect of effective learning, but it needs to be sustained through feedback responses, reflection and active involvement in. Game-based learning offers a particular strength of motivating users and this is why many learning games have been developed for particular groups that have difficulties with sustaining motivation. This view is also supported by Malone (1980) who suggests that general, computer games are supposed to result in positive effects because of the increase in motivation.

3. Objectives

The main objective of this paper is to analyze the positive impact of introducing digital technology in contemporary game based teaching. This study aims to argument that the involvement of GBL in teaching process, particularly in primary education will help:

- To promote a more stable learning;
- To improve communication of pupils with each other;
- To create a climate of cooperation within and outside the classroom;
- To enable pupils to use their knowledge in everyday life;
- To familiarize pupils with digital technology at an early age;
- To implement this new technology in pupils with disabilities;

4. Methods

Methods we have used in this paper to process the data are: analysis, comparison, and observation.

4.1. Subjects

The study was conducted in the private college "Turgut Ozal" and in a public school. Furthermore, students of "Aleksander Moisiu" University, Albania, more specifically, those who study in the branch of Elementary Education were part of the survey. The target- groups included in the survey were: pupils in primary school, teachers, students of "Aleksander Moisiu" University and parents.

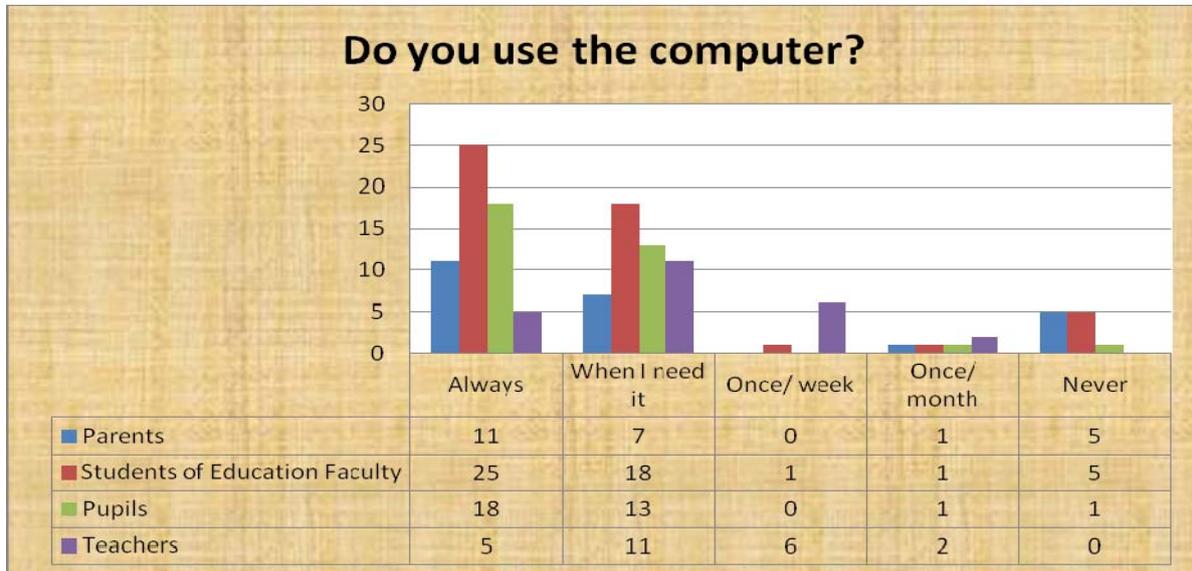
4.2. Instruments

The instrument used to collect the data was a Likert type questionnaire, which consisted of eight questions. The people

surveyed expresses their view concerning the implementation of Information and Communication Technology (ICT) in the teaching process.

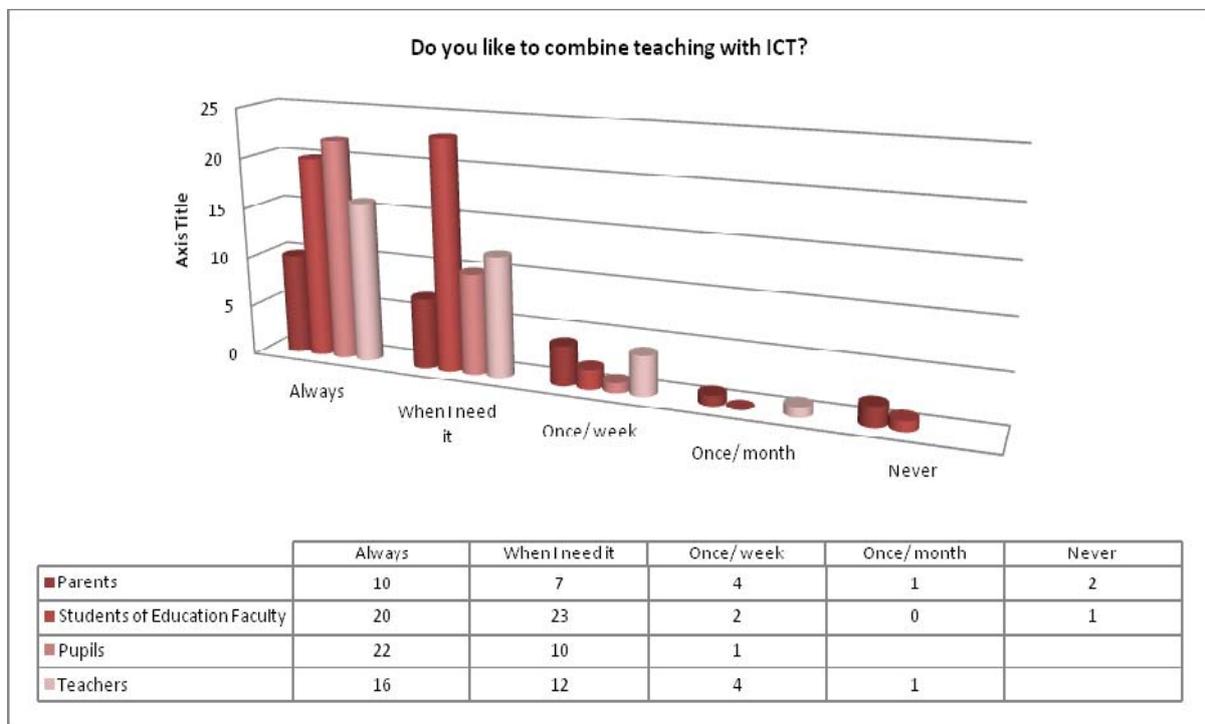
4.3 Data Analysis

We will analyze only three of the questions of the questionnaire.



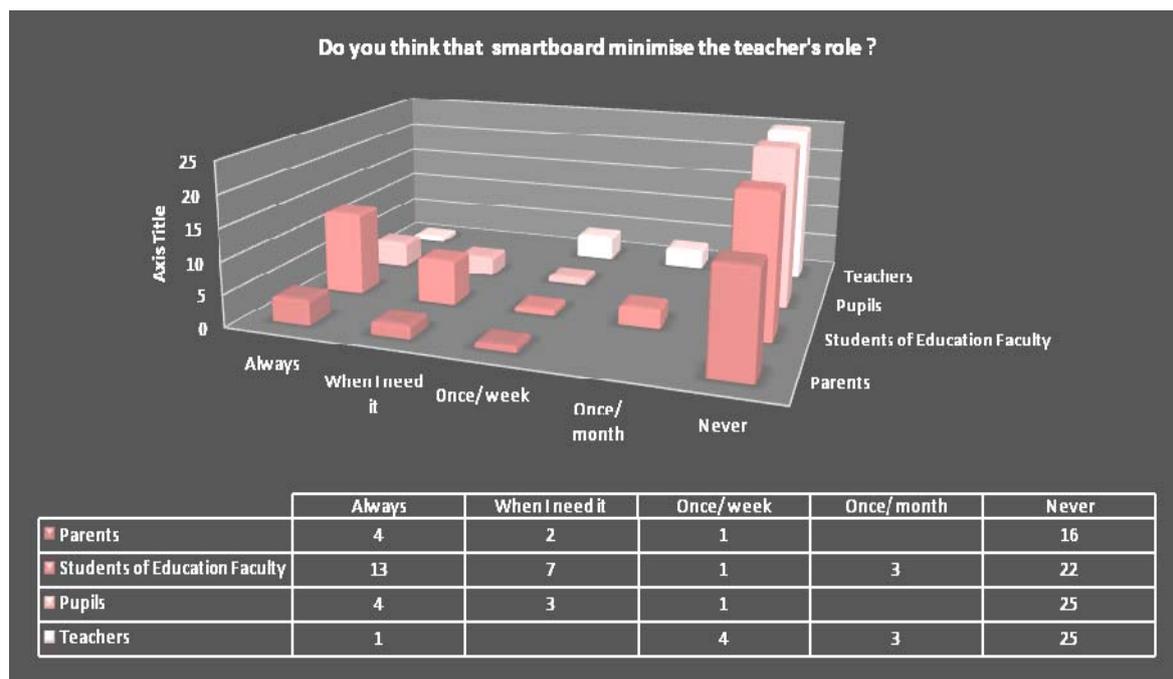
Graphic 1.

The results of graphic 1 indicate that the target group that uses computers more frequently is that of the students.



Graphic 2

As we can see from the second graphic, the target group that is more interested to introduce ICT in teaching is that of the pupils. Whereas students express the view that ICT should be part of the teaching process only when it is necessary or for specific topics.



Graphic 3

From the analysis of the third graphic it is noticed that almost all the target groups surveyed expressed the opinion that the role of the teacher is not minimised by the use of smartboard.

5. Discussion

5.1 Two models of teaching in our classrooms

In this paper will be presented two models: A – the traditional teaching model (teacher centered), B – the contemporary teaching model based on ICT (pupil centered)

Model A - the teacher's word dominates the class. It is already known that the regular model of transmitting information is usually followed by a specific recapitulation of this information by the students. The main feature that is noticed in these classes is the physical appearance of the class itself. The teacher's table is placed in front of the students. Students are set in their desks and in front of the teacher. The walls of the class are relatively naked, in this way they do not attract students' attention.

Model B - follows the teaching method that respects the individual efforts and abilities of each child to build his own system of learning. The understanding of this concept is the basis element in the complex process of learning. For the teachers who follow this view, the child is at the center of learning. They work hard in order to create the environment that reflects this idea. Teachers should invite students to recognize the benefits of the surrounding environment, urge them to ask questions and find answers themselves, while encouraging them to understand the complex parts of the world (Brooks 1993).

MASH-SKAP, (2009) The Albanian National Pre-university Education Strategy suggests that "The extensive application of ICT in the teaching process aims to make our students confident and effective users as well as active competitors in European labor market." Based on that, our teachers are required to be equipped with basic ICT skills and contribute to enhance the quality of teaching through the integration and the extensive use of ICT in the teaching process. In order to reach this objective, it is aimed the development of a contemporary curriculum in the field of ICT in pre-university education with the aim to enable students in ICT in accordance with European standards. This will be based on the improvement of technological infrastructure by equipping schools with computer laboratories and peripheral units and supplying every class with a computer.

The main goal is to achieve the standard "one computer for 10 students" in pre-university education. This process will be accompanied with:

- The development of educational digital content and multimedia materials;

- The equipment of schools with mobile laboratories and applicable programs in order to improve consequently the quality of teaching;
- Integration of ICT in different subjects of the curricula.

This will be followed by the improvement of internet service in all schools and its use as a way of providing teaching materials for both teachers and students. Providing the necessary capacities through the continuous training of all pre-university teachers will make the latter more confident concerning the use of ICT in the teaching process. So we think that it is the time that *computer –the child's friend*, becomes a tireless assistant of the teacher.

How can this be realized?

The first step includes the presence of ICT infrastructure in schools. This can begin with a personal computer equipped with a digital projector and a package of games for each class.

The second step includes the alternative of training all in-service teachers to use ICT. However at this point it is emphasized the idea that it would be a very effective practice one teacher per school was trained concerning the use of ICT and then he/she could train all the other teachers in the school.

Thus, the innovation of this study is the concept of "ICT-trainer". The ICT trainer can be a teacher with good computer skills and who is acquainted with the computer, the Internet and the software that are suitable for pupils. The ICT trainer will train other colleagues in his/her school and will support them with multimedia materials for every unit. ICT will make a significant change in the classroom.

5.2 The computer - A tireless teacher even for disabled children

The question raised at this point is: Can the computer become a friend as well as a tireless teacher for children with disabilities who are included in our classrooms?

Based on literature and on our observations, it results that children with disabilities approach the computer with pleasure and are attracted by digital games. By nature disabled children are inclined to self-isolation and the "silent" computer apart from being a good friend to play games can also become an "indefatigable teacher" for him.

Studies conducted by experts have gone so far as to consider the interaction with the computer as vital for the disabled child, thus "... thanks to the tremendous benefit of the computer, it should be considered as an integral part of the curricula of special education not simply as a game" Susan Stokes (2008).

Students with motor disabilities can enjoy the use of smart board as well. Due to the large format, it may be easier for students to use the table by touching it than by using the mouse. It has been noticed that the use of Smart board has proved very successful with preschool children and primary school children, who have just learned how to write. They could better write by using their fingers rather than using a piece of chalk or other writing tools.

This might possibly require the use of a "special" computer customized according to the abilities the disabled children lack.

Griffiths, a researcher in the field of digital games, supports the view that using digital games with special-needs children has many benefits. He mentions a case where digital games had a tranquilizing effect on a seven-year-old child with autism. In his study Griffiths provides data that suggests that adolescents with attention deficit disorder experienced improvements in grades and organizational skills when they used educational digital games. It is said that cognitive abilities such as memory retention and analytical skills are improved by repeated playing of digital games, even to the extent of assisting with the offset of learning disabilities (Klingberg, Forssberg and Westerberg, 2002)

5.3. A Game based teaching class

In "Turgut Ozal" college all children starting from those aged 4 visit each day of the smart board with the magic stick and learn mathematics, foreign languages and scientific or experimental topics by playing with specialized software carefully prepared for each class.



Figure 1: This picture presents GBL teaching in a mathematics class, in "Turgut Ozal" college



Figure 2: This picture presents GBL teaching in an English class, in "Turgut Ozal" college

5.4. Advantages and disadvantages of GBL

Advantages of game-based learning

Using GBL in teaching has many advantages. First of all, it has been noticed that using games can increase considerably students' motivation and engagement in learning. Game-based learning offers a particular strength of motivating learners, for this reason many learning games have been developed for particular groups that manifest difficulties with sustaining motivation and have proved successful. Druckman, (1995) states that games enhance motivation and increase students interest in subject matter .yet the extent to which this translates into more effective learning is less clear.

In addition, games promote the acquisition of different skills, especially complex ones like decision-making, communication and collaboration skills, problem solving skills, strategic thinking skills, social skills etc. Also there is some indications that cognitive abilities as e.g. visual abilities or problem-solving skills are improved by game based learning Akilli (2007). GBL enables students/pupils to learn from their mistakes where failure is considered to be the point where the teacher provides feedback. As Prensky suggests this is the only way we learn from computer games. He maintains that in game-based learning, making a mistake – or trial and error – is a primary way to learn and is considered the motivation for players to keep on trying.

Furthermore, games have a positive impact even in collaborative learning. During the games students can exchange information as well as give solutions, simplify problems, provide examples etc. Deubel (2006) also mentions the important role of game-based learning in the development of vocabulary skills and the enhancement of mental quickness. The interactive nature of games promotes learning and encourages students to challenge new topics or

issues.

Another advantage of Using GBL in teaching is that it improves pupils' general performance at school and increases his/her cognitive development. From the studies conducted in this field it has been noticed that it has a positive impact in the improvement of psychomotor abilities of children. GBL based on ICT stimulates children's imagination and their desire to know the world. It is a well known fact that children who use the computer at home and in class are familiarized more quickly with it compared to the other children.

Disadvantages of game-based learning

Among the disadvantages we can mention the fact that teachers often lack the required skills of computer technology, consequently, they may not be able to integrate successfully the new games with the topic of the lesson.

Secondly, developing and producing digital learning games of a good quality have a high financial cost.

Thirdly, teachers are expected to spend a greater amount of time in order to plan each step of the lesson when using ICT in teaching.

Fourthly, another disadvantage is related to the uncontrolled use of computer games, which may be more specific at home than at school.

Fifthly, using the computer excessively brings a series of risks for the health of the children such as:

- Progressive myopia, which seems to aggravate during the process of following the moving picture in the monitor compared to the process of following the letters when reading a book. Another cause is related to the fact that the child may not be able to adapt the light in the room with that of the monitor.
- Problems with eye irritation caused by playing computer games for a long time. Furthermore, stayin for a long time in front of the computer may cause deformations in the shoulders, neck and spinal cord of children.

Finally, not all the schools are fully equipped so that we can use GBL there.



Figure 3: This presents a child with "Progressive myopia"

6. Conclusions

In conclusion, we support the idea of the extensive use of GBL based on ICT, despite the high financial cost that it presents for the Albanian school. This could be one of the national priorities in our system of education and should be included in the national strategy for the Albania school.

The future in the Albanian school belongs to the alternation of teaching methods and the use of GBL based on ICT. The traditional classrooms with the blackboard in front of the students should leave it place to e-classroom with smart board connected to the Internet and placed between two blackboards, with the contemporary teacher that manages the class by alternating teaching methods and interacting with students in an interactive lessons designed with a game scenario.

7. Recommendations

- GBL, based on ICT, has made a revolution in teaching. Therefore, it is time to introduce and apply it massively in it Albanian schools.
- Children are already familiarized with their PC at home. This facilitates the use of computer as teacher's assistant in school, which would make lessons more attractive for students.
- In order to reduce the risk to children's health it is recommended that parents and teachers create a "posture neutral" for the child when he is in front of the computer.
- Not every topic can be explained with the help of GBL, but it is time to introduce GBL in smart classroom.
- Teaching with the help of technology and alternating teaching methods presents the need for changes in the curricula of universities that prepare future and changes in the infrastructure of pre-university education institutions.
- Teachers should start training in order to acquire the skills needed to work with ICT based on GBL, initially the "ICT-trainers" and then the others.
- Specialized institutions of pre-university education should begin to set up specialized teams of teachers and computer experts with the aim to prepare software packages for the preparation of the curriculum by implementing GBL method based on ICT.

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ANEKS I*Questionnaire for pupils*

Dear teacher, please interview the students and fill out the questionnaire carefully and correctly, that we have designed to make an intervention in teaching, to be close to modern models, in relation with the role of computers in teaching. Digital technology in teaching should be understood as assistant of the teacher, for all children no matter how different they may be.

Indicate with X in the box that corresponds to your response.

Nr.	Type of question	Always	When it seems reasonable	Once a week	Once a month	Never
1.	Do you use the computer?					
2.	Do you like that the digital technology to be included in teaching?					
3.	Do you use Smart-Board (computer table)?					
4.	Do you think it is necessary to use it in the case of Albanian language?					
5.	Do you think it is necessary to use it in the case of Nature Science?					
6.	Do you think it is necessary to use it in the case of Mathematics?					
7.	Do you think that the use of Smart-Board removes the attention of students to the topic?					
8.	Do you think that the use of Smart-Board reduces the role of teachers in learning?					

ANEKS II*Questionnaire for teachers*

Dear teacher fill out the questionnaire carefully and correctly, that we have designed to make an intervention in teaching, to be close to modern models, in relation with the role of computers in teaching. Digital technology in teaching should be understood as assistant of the teacher, for all children no matter how different they may be. Indicate with X in the box that corresponds to your response.

Nr.	Type of question	Always	When it seems reasonable	Once a week	Once a month	Never
1.	Do you use the computer?					
2.	Do you like that the digital technology to be included in teaching?					
3.	Do you use Smart-Board (computer table)?					
4.	Do you think it is necessary to use it in the case of Albanian language?					
5.	Do you think it is necessary to use it in the case of Nature Science?					
6.	Do you think it is necessary to use it in the case of Mathematics?					
7.	Do you think that the use of Smart-Board removes the attention of students to the topic?					
8.	Do you think that the use of Smart-Board reduces the role of teachers in learning?					

ANEKS III

Questionnaire for students of branch of Elementary Education, of UAMD

Questionnaire for teachers

Dear students fill out the questionnaire carefully and correctly, that we have designed to make an intervention in teaching,

to be close to modern models, in relation with the role of computers in teaching. Digital technology in teaching should be understood as assistant of teacher, for all children no matter how different they may be.

Indicate with X in the box that corresponds to your response.

Nr.	Types of questions	Always	When it seems reasonable	Once a week	Once a month	Never
1.	Do you use the computer?					
2.	Do you like that the digital technology to be included in teaching?					
3.	Do you use Smard-Board (computer table) ?					
4.	Do you think it is necessary to use it in the case of Albanian language?					
5.	Do you think it is necessary to use it in the case of Nature Science?					
6.	Do you think it is necessary to use it in the case of Mathematics?					
7.	Do you think that the use of Smart-Board removes the attention of students to the topic?					
8.	Do you think that the use of Smart-Board reduces the role of teachers in learning?					

ANEKS IV

Questionnaire for parents

Dear parents, please fill out the questionnaire carefully and correctly, that we have designed to make an intervention in teaching, to be close to modern models, in relation with the role of computers in teaching. Digital technology in teaching should be understood as assistant of teacher, for all children no matter how different they may be.

Indicate with X in the box that corresponds to your response.

Nr.	Types of question	Always	When it seems reasonable	Once a week	Once a month	Never
1.	Do you use the computer?					
2.	Do you like that the digital technology to be included in teaching?					
3.	Do you use Smard-Board (computer table)?					
4.	Do you think it is necessary to use it in the case of Albanian language?					
5.	Do you think it is necessary to use it in the case of Nature Science?					
6.	Do you think it is necessary to use it in the case of Mathematics?					
7.	Do you think that the use of Smart-Board removes the attention of students to the topic?					
8.	Do you think that the use of Smart-Board reduces the role of teachers in learning?					