Interactive Frontal Learning Coupled with Project-Based Learning into the School

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Abstract

The paper gives short review of the contemporary state of the learning process into Bulgarian School. The efforts of introducing interactive methods and tools modernizing the process are described. Good teaching practices are presented as a result of wide experimental work realized on national level recently.

Using the traditional class-lesson system is a mass practice in the schools in Bulgaria. Approximately 80% of the teaching material is about new knowledge. Practically, within almost every lesson students are given new facts. There is insufficient time for practicing, summarizing and assimilating of the teaching material. There is no official time into the students' schedule for working on theatrical projects, for self research and creating own products. There is no official documents to regalement this process. All is on the teacher's wish and initiative.

To overcome this situation and to realize a smooth change, authors propose the use of interactive software and hardware products. Some examples of multi-mouse software platforms and interactive whiteboards are presented here. Including students in interesting activities makes them active participants into the learning process, which in its part, leads to high quality learning.

The interactive forms of work involves development in direction of Project-based learning, where students work as researchers and creators. One of the main accents of PBL is the team working inside and outside the school. Working in teams helps in forming personal skills like tolerant behavior, friendship, critical thinking, self assessment, i.e.

After approbation, some models of work, take place in real learning process. There are good examples of teaching practices, and some of them are presented here.

The nowadays society is in need of dynamic and flexible young people. The place where the ground for this generation is laid is the school. The traditional lesson-based system can't offer the effective way of teaching and learning into the contemporary situation. The theory and the practice look for new approaches, strategies and tools to realize effective process of knowledge building. Interactive methods enter into practice widely. Our observations on education in primary and secondary schools in Bulgaria confirm the wide use of the traditional lesson. This fact gives grounds to consider a change that does not conflict and contrast different philosophies for training but to use complementary approaches used for different purposes and in various stages of training. The transition has to be smooth, and the use of the particular methods – reasonable.

1. Lesson and interactivity

Training at school can be seen as:

- Guided learning;
- Organized way to interact with the world [1];
- Active process of knowledge building [2];
- Assisting students in the process of absorption of the world [5];
- Purposeful interaction of teacher and students, which in some fixed and predetermined way increases the knowledge and skills of students [10].

Educational process is specifically organized, systematic process of activ and conscious pedagogical impact and interaction between teacher and students. The effectiveness of training depends largely on the commitment of students in activities that have direct link to knowledge acquisition.

The main features of the interactive educational model are:

- Recognized need for information;
- Identification and resolving problems in uncertain and dynamic environment;
- Adaptation to the information resources. Transforming the available information into a resource in problem solving process;
- Establishment of the interaction "student-student" and teamwork.

Theoretical basis for interactive learning is considered the constructivist theory (Bruner, 1966). According to Robert Glaser [4] training can increase the ability of students to absorb and store the information if it is experimental and contextually relevant. The methodology of interactive training is to teach the child to think within the context of the object. The theory of Multiple Intelligences of Howard Gardner [3] gives a basis for developing a theory of interactive training, whereby training should examine real materials in a context rich with opportunities to stimulate learning.

The lesson is the "place" where the teaching and learning process is realized [11]. That is why we don't need new terminology, but efforts should focus on reforming the existing practice for effective and quality learning process. The educational process is focused on the three types of cognitive processes: visual, auditory and kinesthetically. This leads to the realization of various types of activity – communication, research, knowledge, practical application. According research, the absorption of different amounts of information for the same time is as follows: Listening – 10%; watching – 20% listening and watching – 40-50%; in active participation – 80-90%. Using these one can make conclusions about the development of modern lessons on this basis to create learning models.

2. Theory and Practice

In the transition from traditional through interactive lesson to the realization of project-based learning, the following types of organizational forms can be used:

Directive lessons

The term is used to describe lessons where the teacher transmits information directly to students, structuring time so as to achieve as much as possible in a more efficient set of clearly defined objectives [11].

Lessons with multimedia tools used by the teacher

Realizing the well-known directive lessons the teachers use multimedia presentations. Multimedia lessons affect different senses of the students, creates mood, support the inclusion of students into discussions about new concepts.

Lessons with multimedia tools used by the students

For students to use multimedia tools during lesson, preparation is needed on the structure of lessons, and on special educational equipment.

Learning by teaching or LdL ("Lernen durch Lehren")

Students prepare and teach lessons or parts of lessons to the appropriate audience – fellow students or younger students. Children love to learn from other children. This is not just a presentation or lecture. Students-teachers have the opportunity not only to create specific content but also choose their own methods and didactic approaches to teaching.

Cooperative and collaborative learning

Students work in teams and have a common task, i.e. have a common goal. Basic requirement is that all members to cooperate. To pursue individual and group responsibility – every member is responsible for its participation and the outcome of the team. Basic skills that are intended to form are teamwork, tolerance and mutual assistance, keeping the dialogue, critical thinking and ability to protect her/his own position by bringing arguments.

Project-based learning (PBL)

PBL could integrate all forms mentioned above. Qualities that form pupils during the implementation of research projects are related to intellectual and moral autonomy. Students learn how to seek answers to their own questions, how to plan their activities, how to use various sources of information and to orient the selection of the necessary data. The most common implementation of academic research project goes through several phases or stages: start phase; real work phase, presentation of project discussion and corrections.

3. Implementation

Some accents on different implementation in practice will be mentioned here. Authors work actively in the area of technologies integrated learning. In 2008 we established NGO – Education and Technologies Assoc. in order to manage some pedagogical experimental and research work and to support the work of teachers who work actively to achieve more effective learning process into their practice.

Teachers' E-book

This project corresponds with leading multimedia lessons at class. The Teachers' E-Book is designed for training and education of children and students from kindergarten till 12th grade. The book consists of 14 basic modules. The first two include multimedia content intended for use in kindergarten and Preschool. The other 12 modules contain multimedia lessons and learning projects, arranged by grades – from first to twelfth.

The Teachers' E-book is an open project. Every Bulgarian teacher working in kindergarten, school or other institution that deals with teaching children, can take part in this project. The materials submitted are processed by the organizing team and afterwards are directed to the review procedure. After successful completion of the referee process the work is published and is available for free use. Every reader of the book may download the materials provided by the authors – the description of the unit, the multimedia presentation, additional resources in electronic form, i.e. Each teacher provided learning content, reserves the authorship for his/her work. There is Included information about the teachers, containing data on education, experience, expertise and contact details. The E-book for teachers is available on-line at www.itlearning-bg.com . At this moment the data base consists more than 500 units. The project is planned to be supported till 2015 with two calls per year for new content.

Use of interactive software and hardware technologies into working process

The use of interactive software and hardware technologies gives rich opportunities for children to participate actively into the learning process. One of the most popular lately are multipoint software technologies and the use of interactive whiteboards. Multipoint solutions offer one big resource and connected to it many smaller (mainly in price) units. In the case with multipoint server we have one computer and connected to it working points equipped only with monitors, keyboards and mice. Good example of multipoint solution is Microsoft Mischief [6] – multi-mouse platform for interactive frontal work with students. In this case we have one computer equipped with many mice, working independently. Microsoft Mischief is an free Add-Ins for Power Point program. This makes it easy to work with – all one is needed is to be familiar with Power Point.

The key word under multipoint solutions was "the budget". But after the approbation of the Mischief technology one could see the clear benefits not just in budget, but benefits from pedagogical point of view – forming skills of team-working, higher motivation for learning, fun at the class and so on. This product can be used to help the transition between classical class-lesson system to flexible modern classroom.

In Bulgaria we have very classical situation of teaching and learning. The teacher is in front. The students are strictly ordered on desks, required discipline. What is important now is to transform the classroom from static to dynamic place. To make easy and not frightening to teachers to use new interactive technologies. To make students to participate actively. To break the silence into the class. The interaction with the class is a step to problem-based learning and learning beyond the classrooms.

Mouse Mischief allows a number of methodological problems to be solved. It can be used to update the knowledge at the beginning of the lesson, to activate the attention of students before introducing the topic, to clarify and specify certain terms, for inspection of the students attention, to check the viability of students' knowledge. In the various presentations of the teachers each of these applications can be studied in practice. One recommendation, based on the experimental work is that it is better if two students use one mouse. In this way the pears are more engaged, more competitive, more motivated to participate.

Based on our experimental work we could state that the most interesting, challenging and effective use of Mischief is its combination with team working. Let's see as an example: Math lesson for 3rd grade in the Primary school. Students are divided in four teams. Every team has two or three computers and different problems to solve. Math problems are selected and arrange in such a way that teacher realize rich interdisciplinary connections with history subject. In this way every team has to solve the mathematical problems and to find out some facts and explanations about kings and ancient Bulgarian cities. After finishing the team-work the teacher checks-up teams' work using Mischief-based test. Some of the most complicated geometry problems the team's speaker has to explain on the interactive whiteboard. Additional advantage of such way of working is the limited number of mice. It is enough if the teacher connect 5-6 mice instead of using 12 or more of them.

E-kids Teachers

During the current academic year an experimental training on this module takes place. Students from high school work with students from primary school in the role of their teachers. Small groups (up to 10 students) have been formed with the approval of parents and the school management. Weekly sessions are held where children-teachers teach young students the skills to work with IT. Teaching English is the other accent of the project. Students - teachers are directed and supervised by a teacher-consultant. Training takes place in out of lesson time convenient to both parties. The active developing of this module and its application in practice is forthcoming. At this experimental stage two groups in two different Bulgarian cities are formed. About 20 students and two consultants are involved.

As a result the following benefits are clear: students-teachers become more responsible and engaged in learning activities, there is a deeper understanding of certain terms and concepts related to specific learning material; parents highly approve the initiative and desire to continue in the next academic year;

younger students feel comfortable and eager to absorb the proposed knowledge, the situation is informal – like game, the teacher is close to them, as a friend. Pupils feel relaxed. Such an atmosphere leads to creativity, new ideas, discussions.

Project-based learning

During the last five years we work in direction of project-oriented learning, especially into Primary school. Two national projects were Implemented. A global theme was set, and teachers who wish to participate and promote their work, chose the specific direction in which to carry out projects with their students. The first project was "Journey through Bulgaria". The second one was "Tolerance, friendship, beauty". On implementation of all projects have individual and team work, interaction and collaboration between teachers and students from different cities and classes, interdisciplinary work, using information and Internet technologies by teachers and students [7,8,9].

Conclusions

As a result of the theoretical study and practical references we could conclude that interactive forms could be an effective tool to realize smooth transition between traditional education and modern forms and methods of training. The variety of interactive forms gives rich opportunities to teacher for high positive results within the classroom.

References

[1] Biggs J. (1999): Teaching for Quality Learning at University, (SRHE and Open University Press, Buckingham).

[2] Duffy, T. M., & Cunningham, D. J. (1996). Constructivism: Implications for the design and delivery of instruction. In D. H. Jonassen (Ed.), Educational communications and technology (pp. 170-199). New York: Simon & Schuster Macmillan.

[3] Gardner, H. (2006) Changing Minds. The art and science of changing our own and other people's minds. Boston MA.: Harvard Business School Press.

[4] Glaser, R. (Ed.), (2000). Advances in Instructional Psychology: Educational Design and Cognitive Science, Volume 5. Mahwah, NJ Lawrence Erlbaum and Associates.

[5] Laurillard, D. (2002). Rethinking University Teaching. A conversational framework for the effective use of learning technologies. London: Routledge ISBN 0415256798 .

[6] Microsoft Mischief. http://www.microsoft.com/multipoint/mouse-mischief/en-us/default.aspx

[7] Papancheva R., K. Dimitrova, (2010).Technologies Integrated Project-oriented learning in the Primary School, ATEE Winter Conference 2010: Early Years, Primary Education and ICT, Prague, Czech Republic.

[8] Papancheva, R. Y., K. A. Dimitrova, (2009).Technologies Integrated Learning in the Primary School. Some aspects of forming reflection and self-reflection skills to young pupils, Proceedings of 1st International Conference on Computer Supported Education (CSEDU 2009), INSTICC Press, Portugal.

[9] Papancheva R., K. Dimitrova (2007). Using team-working into the process of integration of ICT into the learning process. Sofia University Publishing House, (in Bulgarian)

[10] Ritchie, D. C., & Hoffman, B. (1997). Incorporating instructional design principles with the world wide web. In B. H. Kahn (Ed.), Web-Based instruction (pp. 135-148). Englewood-Cliffs, NJ: Educational Technology Publications, Inc.

[11] Slavin, R.(2000), Educational Psychology: Theory and Practice, Boston: Pearson Education.