IS IT TOO LATE TO BE CHILD? IS IT TOO EARLY TO BE ADULT?

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Abstract:
The purpose of this article is to present authors' experience related to methods applicable to adults' education that could be transferred to children education and vice-versa. It describes a number of cases in which methods like Game-Based Learning (GBL) and Storytelling, derived from children everyday life and education, are applied to adults' education; and methods like Problem/Project-Based Learning (PBL) and Inquiry-Based Learning (IBL), derived from adults' experience, are applied to children education. The main research methods used are observations done during presented independent trainings, both of children and adults, as well as interviews with participants in these training. The conclusions are drawn based on similarities and differences.
KEYWORDS: *Game-based learning, Storytelling, Project-Based Learning, Inquiry-Based Learning.*

Introduction

Since the term *Andragogy* was originally formulated by the German teacher Alexander Kapp in 1833 (Nottingham Andragogy Group, 1983), andragogy (*andr-* meaning 'man') is contrasted with pedagogy (*paid-* meaning 'child' and *agogos* meaning 'leading') (Davenport 1993). Rosenstock in a report in 1921 argued that 'adult education required special teachers, methods and philosophy, and he used the term andragogy to refer collectively to these special requirements' (Nottingham Andragogy Group, 1983). In addition, according to Malcolm Knowles' 1973 book, *The Adult Learner: A Neglected Species*, Andragogy is premised on at least four crucial assumptions about the characteristics of adult learners that are different from the assumptions about child learners on which traditional pedagogy is premised. First, he argues that adult learners prefer self-direction when learning. Next, he asserts that as a person matures he accumulates a growing reservoir of experience that becomes an increasing resource for learning. Knowles also finds that adults have specific learning needs generated by their social roles and life events (moving, getting a new job, marriage, etc.). Finally, Knowles states that adults are *problem-based learners*. In other words, adults want to immediately apply what they learn, whether it be a new skill or knowledge. A fifth assumption was added later: motivation to learn – *as a person matures the motivation to learn is internal*.

The authors' beliefs are in line with Holmes and Cooper, 2000 and Davenport and Davenport, 1985. In order to support them, the paper presents in Section 1 research of transferring methods like Game-Based Learning (GBL) and Storytelling form children to adult education, and in Section 2 - authors' experience of applying in children education methods like Problem/Project-Based Learning (PBL) and Inquiry-Based Learning (IBL), inherited from adults' education (Figure 1).
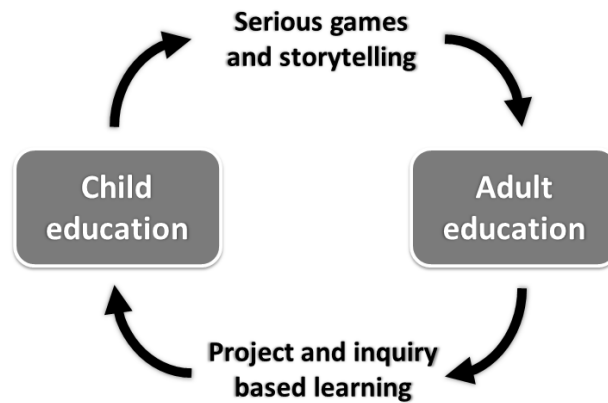
Figure 1. **Transfer of methods from child to adult education and visa-versa**

The subsections describe GBL, Storytelling, PBL and IBL through research methods as the observations, done during presented independent trainings, and interviews with participants in these training.

1. Transfer from children's to adults' education

1.1 Game-Based Learning (GBL)

1.1.1 Games and GBL

Games are perceived primarily as a means of entertainment. But a deeper look brings out their hidden educational potential. Whether games are traditional or computer they contain implicitly or explicitly educational element. If we go back in time we will find many examples of this – playing ball is funny and at the same time makes children more skilful, checkers and chess games develop math and logical thinking. Unlike formal learning in school and training courses, people are likely to put much more enthusiasm and effort in playing games. Besides the entertainment as an obligatory component in the games this is due to a large extent to their strong motivating effect and challenges set out in them. Trough games learning become fun and easy and they find their naturally place in the educational process.

The main idea behind the GBL and other similar educational concepts like Serious Games, Educational games and Entertainment education (Edutainment) are based on the concept of Clark C. Abt (Serious Games, 1975) for the use of games not only for entertainment but also for specific educational purposes. More formally, J. Breuer and G. Bente (2010) define GBL as a...*use of any type of games (e.g. board games, card games, sports or digital games) for learning/educational purposes*. However, more often GBL is associated particular with the use of video and computer games in education. In this sense, in

the analysis of National Foundation for Educational Research, "Game-based Learning: Latest Evidence and Future Directions" authors define GBL as *...the use of video games to support teaching and learning*.

GBL has numerous benefits except entertainment, motivation and curiosity, ... *games are often closer to simulating real life experiences than more traditional educational media. This allows the students to immerse themselves in a realistic simulated setting without the fear of real life consequences...* (Ebner & Holzinger, 2007). This advantage makes games very suitable for adults' professional training to provide the use complex or dangerous devices or materials or to simulate expensive environments.

1.1.2   GBL in children education

A number of studies show that GBL can be an effective educational tool for students in different educational stages (Sung, Chang & Lee, 2008; Papastergiou, 2009; Ebner & Holzinger, 2007), with different needs and abilities (Zafirova-Malcheva, 2011) and at different subject areas and fields (Fong, 2004; Blunt, 2009).

Childhood is the period in which games are the most natural way to acquire new knowledge and skills, so the primary school is one of the most natural places to implement GBL. In their research Sung, Chang and Lee present the process of design and evaluation of multimedia games based on the theories of children's development of taxonomic concepts – Software for Rebuilding Taxonomy (SoRT). Sixty pre-school children, ages from three and a half to five and a half are involved in the study. They have to evaluate game software SoRT, designed by the researchers, compared with two other similar software games. Survey results show that the additional tools provided by specially developed software SoRT significantly facilitate children in the tasks of understanding and performance (Sung, Chang & Lee, 2008).

Papastergiou (Papastergiou, 2009) study is focused on high school students in Computer Science. She compares computer game for learning computer memory concepts with a similar application without the gaming aspect in order to assess the learning effectiveness and motivational appeal of a computer games. The analysis of the results showed that there was no statistically significant difference in the performance between two groups of students. Students that had used the gaming application performed significantly higher than those that had used the non-gaming one. The students using game software found the application significantly more appealing and educationally fruitful than did the students

from other group. The study demonstrated that the GBL approach was both more effective in promoting students' knowledge and more motivational for students than the non-gaming approach. The results suggest that within high school Computer Science, educational computer games can be exploited as effective and motivational learning environments, regardless of students' gender (Papastergiou, 2009).

The experience of our team in the GBL is in a more specific area – special educational needs (SNE). The study is related to learning to work with computer for children with cerebral palsy. The study was conducted in "Special hospital for prolonged treatment and rehabilitation of children with cerebral palsy – St. Sofia", Sofia, Bulgaria, for a period of 5 years. In the first year training included 24 children separated into two age groups – from 6 to 10 years old and from 11 to 16 years. The main objective in the first year of education was to answer two basic questions related to the use of computers in education of children with cerebral palsy – is there a positive effect on child development and what are the main problems occurred during training, and to determinate the further training direction. After the end of first year of education results showed positive effects of computer training on child development in the observed aspects, but they were many problems which required special software applications to meet specific individual needs of children. This led to the design and development of software package – "Games House" which was used in the next years of study. Observation results show that computer games play a very important role in the first stage of computer training for children with cerebral palsy. They have a main role in achieving abilities to control computer system, which plays a crucial role for children success in the next stages of education – working with text and Internet. The high degree of motivation generated by the variety of activities is a main advantage of games as a type of educational software in work with children with SEN. Moreover various game situations allow learning a variety of knowledge and skills, giving the experience needed to solve problems in a real situation. This is very important for children with special educational needs that lack sensory motor experience. This combined with brain damage leads to problems with the development of cognitive function and intellect. For these children it is very important to ensure proper educational environment designed to give them the means for greater interaction with their surroundings and to provide experience in real situations they need. This is one reason why computer educational games represented one of the most appropriate means of presenting and acquire of new knowledge and skills for these children. (Zafirova-Malcheva, 2011)

1.1.3 GBL in education of adults

In his study „Does Game-Based Learning Work? Results from Three Recent Studies" Richard Blunt presents the results of his three researches in East Coast University to examine the difference in academic achievement among students who did and did not use video games in learning. He uses three different video games to 1st year business students, 3rd year economics students, and 3rd year management students. Identical testing situations were used in all courses while data collected included game use, test scores, gender, ethnicity, and age. In the first study Blunt examine the effectiveness of adding a simulation game as a supplement to an Introduction to Business and Technology course. In the second study he tested whether adding a simulation game to a college level economics course improved student understanding and application of concepts, as measured by standardized tests. The third study was conducted to examine the effectiveness of the addition of the video game as a supplement to the Principles of Management class. The results of the study shows that the students using the game scored significantly higher means than students that did not. There were no significant differences between genders, yet both genders scored significantly higher with game play. There were no significant differences between ethnicities, yet all ethnic groups scored significantly higher with game play. Students 40 years and under scored significantly higher with game play, while students 41 and older did not (Blunt, 2009). This study clearly shows that games can be a very effective tool in adult education. In analysing the results should be taken into account and computer literacy of students aged over 41 whose results of the use of games are lower.

Briefly presented studies suggest that GBL is appropriate in the education of students of different ages even if it seems to be most suitable for children. In different situations and for different purposes games can be used as an educational tool in educating both children and adults.

1.2 Learning through Storytelling

1.2.1 Story and storytelling

Traditionally, the story is the way to pass the important, meaningful information between the generations. A lot of centuries from very early pupil age fairytales are used to build children's values and to provoke their imagination. That is why it is not unexpected that the stories are used from many years in children education and storytelling is one of the well known methods, applied in pedagogy.

Nowadays, according Pink (2005) the story has a special place on the way in which businesses can become successful in the Conceptual age: fourth of major *ages*, outlined in the book *A Whole New Mind*: Agricultural Age (farmers), Industrial Age (factory workers), Information Age (knowledge workers), Conceptual Age (creators and empathizers). In this book the story is described *as context enriched by emotion.* Story, next to design, symphony, empathy, play and meaning, is the best of six defined by author essential senses, which *can help develop the whole new mind new Conceptual era demands*. That is why abilities to tell a story (storytelling) as well as being used as education tool and object become crucial – both for pupils and for adults.

What does a storytelling mean? In „The world of storytelling" by Anne Pellowski traditional storytelling is described as *...the entire context of a moment when oral narration of stories in verse and/or prose, is performed or led by one person before a live audience; the narration may be spoken, chanted, or sung, with or without musical, pictorial and/or other accompaniment, and may be learned from oral, printed or mechanically recorded sources; one of its purposes must be that of entertainment or delight and it must have at least a small element of spontaneity in the performance.*

In addition, the storytelling is an effective tool for teaching, because it is a powerful form of communication. In the same time, as Gargiulo (2007) pays special attention, the story-based activities could be used to develop breakthrough communication skills. In such activities, *when people share their experience, a rich playground for learning is created.*

1.2.2 Story and Storytelling in Education

According Peg C. Neuhauser the stories are effective as educational tools because they are *believable, rememberable, and entertaining*. Using storytelling as a pedagogical tool helps learners to conceptualize life experiences, empowers the adult learner, facilitates communication, inspires personal growth, and engages the adult learner. Storytelling helps learners to recognize the value of their own experiences and knowledge, encourage thinking *outside the box*. In addition, as Burk remarks, storytelling gives learners and trainers *the opportunity to cultivate a learning environment open to multicultural dialogues that may provide an understanding of different customs, beliefs, and viewpoints.*

Most of these benefits of the storytelling are already discovered and successfully applied by some professional in their daily practice. E.g. some of the good practices collected

in frame of the Grundtvig European project Sheherazade (www.sheherazade.eu) show that the storytelling itself is used by psychologist, therapists, social workers and others in their practices. But the research done in the frame of project Sheherazade found that in most of the European countries *Storytelling* method is not presented in the curriculum of pre-service and in-service adult trainers. In Bulgaria it is very often applied in kindergarten and partially in primary school, but at the later ages in school and adult education storytelling is used only by some university professors and trainers in last years.

In order to fill the gap, the Sheherazade project aims to develop working methodology and based on it curriculum and course for adult trainers. To achieve mentioned project objectives, each project partner country has the goal to pilot storytelling method in real adult training. In Bulgaria, the pilot was run by Sofia University "St. Kl. Ohridski", by joint team from the Faculty of Education and the Faculty of Mathematics and Informatics. The application of the storytelling in adult training in that pilot and the results of it are presented below.

1.2.3   *A story with a happy end: Case of application of storytelling in adult education*

The Bulgarian pilot focus was on inclusion of unemployed adults. The Sofia University team explored how personal stories, narratives and autobiographical material can be used for arising personal self-confidence and ability for inclusion in social and professional community.

In order to organize the training, Sofia University Sheherazade team cooperated with several bureaus of labour. These bureaus are divisions of the National Employment Agency. They register unemployed adults and organize courses aiming their inclusion. Through the bureaus of labour, team of trainers from the Sofia University have reached a wide range of target group. Four main bureaus have selected participants and directed them to the pilot. These bureaus paid special attention to long-term unemployed people, who really had faced the problems of exclusion. The main goals of the proposed to the unemployed adults training were: to increase self-confidence of the unemployed adult; to improve their oral presentation skills and their communication skills. Final aims were participants to be able to present in the best way their strong sides, so as well as to be able to find a job more easily. That is why the training was announced in the bureau of labour under the title "Story with a happy end".

The training was run in beginning of April 2013 and it was conducted into 2 full days. Thirteen participants took part in it. The first day started with a story, told by one of the trainers. Then, the participants involved in different storytelling activities, focused mainly on oral storytelling. From the very first activity, they were encouraged to think about stories from their own life and present them. The aim of the activity was to increase their self-confidence. In addition, the exercises seek also to reach better self-esteem of the participants. That is why the personal stories were used as ice-breakers. The trainers asked each of the participants to present themselves telling a short story in 3 up to 5 minutes. Teachers triggered them, asking several questions like: In what am I an expert? Why do I think I am an expert in that? How do I became an expert? Trainees were surprised a bit from these questions. To overcome that moment of uncertainty and to motivate them to start, as well as to give them more time to think about their own stories, two leaders of the training, started presenting their own stories. These stories were not related to their professional life, but to their competences in order to show trainees that even small achievements are of great importance. After two trainers had presented themselves in such a way, telling their stories, participants already had the courage to present themselves. To prove their expertise, they started telling personal stories (Figure 2).

Figure 2. **Participant presenting himself through a story**

Story by story, step by step the participants realised that they have strong sides, which could give them competitive advantage. All this worked in direction of increasing participants' self-confidence, self-estimation and in the same time had the aim to train their skills for oral presentation.

Further, participants were encouraged to think about 3 positive and 3 negative sides of their character and to think how to stress on positive or bypass negative, if they present themselves. From that point till the end of the first phase, all participants were divided into

groups. Each participant in the group presented their positives and negatives in front of the others through stories (Figure 3).

Figure 3. **Presenting through story 3 positive and 3 negative in a group**

During the second phase of training different storytelling skills like: expressing with appropriate words, taking into account body language, enlarging communication skills, and so on, were practiced. In order to stress on these skills, it was improvised a real job interview with different participants. In the beginning each unemployed was asked to choose the job to which apply. Next, the trainers in the role of interviewers leaded the interviews so in each case interviewee had to tell a narrative or personal story in order to prove the thesis that he was appropriate person for the desired position (Figure 4).

Figure 4. **Telling a story to prove your beliefs at interview**

After each interview all the participants discussed how the story presents the person, how it helps, how words could be used in appropriate way, what is said through the body language, and so on. All the participants were so engaged in the storytelling and started to live with others' stories.

When the training came closer to its end, they felt so close to each other, they felt like people, knowing each other for many years. For them, expressing themselves through stories became already a natural way. That is why, when the final phase of evaluation started, it was

not a surprise that for self-evaluation and group evaluation storytelling had already been used by participants. Nobody asked them to do exactly this, but it just became reality. Most of our participants shared "This training started for each of us *a story with a happy end*, but for all of us together it is a never ending story".

Finally, the Sheherazade pilot in Bulgaria proved that the storytelling method works successfully not only in early age, but also in the elderly ages. The representative of bureau of Labour expressed their interest to repeat the training with other groups of unemployed persons. Here is the place to draw attention to the role of trainer's experience, who played very successfully role of storyteller. In order to train more people to be able to apply storytelling in adult education two further steps are planned: (1) to organize national training day (in the frame of the project), and (2) to introduce methodology in the university courses curriculum.

2. Transfer from adults to children education.

According to Knowles (1973) the characteristics of adult learner are orientation to learning and motivation to learn. But the next cases from our experience show that the motivation to learn is internal factor not only for adults.

Nowadays children, like adults, also want to see application of their knowledge immediately. That is why it is not unexpected that orientation toward learning shifts from subject-centred to problem-centred even in school teaching. In addition, students are not motivated to be in passive role during the process of education – they would like to participate *just now*; firstly to do, later to think. That means the old teacher-centred approaches are not the most appropriate. Shifting to student-centred methods provides environment for students to be active learners, to take responsibility, and to increase their internal motivation.

The two cases presented in sub-sections below related to the application of *Problem/Project-Based Learning* and *Inquiry-Based Learning (IBL)* give us arguments to prove the statement above.

2.1. Problem/Project-Based Learning (PBL)

2.1.1. Project

The word *project* origins from the Latin *projectum* which means to *throw forth*. Early senses of the verb were 'plan' and 'cause to move forward' (Oxford English Dictionary).

The Cambridge dictionary provides the next definitions (Cambridge Dictionaries online):

1) (noun) A piece of planned work or an activity that is finished over a period of time and intended to achieve a particular aim.
2) (verb) To throw or direct something forwards, with force.

Usually projects are related to long term activities directed to solving a complex problem. Never mind if they are business projects, scientific projects, research or just personal (like own wedding) projects, they share some common characteristics: Defining a final goal; Planning; Defining milestones and critical points; Project and time management.

Such features identify projects as typical for matured people. In contrast, children live *day to day* – they do not have stable long term goals, have no habits to do long term plans, much less adhere to them. It is usually their parents and teachers that take care ot all these details.

2.1.2. *Specifics of Problem/Project Based Learning*

The *problem-based learning* is a student-centred approach. According Gallagher (Gallagher 1997) the main requirements for successful implementation of the approach are: use problems at the beginning, not the end; use *ill-structured* problems; relate all learning to the problem; make students apprentices; give students responsibility for problem definition and plan of action; have students defend their resolution using criteria which are meaningful to the discipline.

The benefit of the approach is that it *makes learning look like real word*. Working in such style students not only collect core discipline knowledge but in addition they develop a lot of important for real life skills related to problem solving, conceptual reasoning, thinking, ethics, etc.

The *project-based learning* is a student-centred approach too, based on *learning by doing* and adds value by following typical project management in searching and presenting a solution of a complex problem. It is a long term activity, usually interdisciplinary. The educational project should be carefully planned; the *milestones* and critical points should be marked. Project and time management (from the teacher's and from student's side) is an essential part of successful implementation. According to Bell *the outcome of PBL is greater*

understanding of a topic, deeper learning, higher-level reading, and increased motivation to learn. It also aims developing of meta-skills as ability for planning, choosing a strategy for solving problems, time and task management, etc.

The *I*Teach methodology* enriches the PBL by emphasizing on *soft skills* for working with information, team work, and ability to present outcomes, acquired by the use of ICTs. Providing opportunity for students to look for and choose their own way for solving problems, the methodology has a huge potential for creativity development.

2.1.3. *Op Art or the Art of Object-oriented Programing – an example of PBL*

In Bulgaria secondary school there are approximately 30 schools with *specialized classes* in informatics. The specialized classes deal with advanced object-oriented programming. The curriculum is similar to the curriculum applied during the first two years at the university. This means the learning process is quite heavy in terms of content.

During the given experiment the teacher replied to the challenge with a challenge: *It's a kind of magic!*

She organized a PBL with her 11-th grade students (17-18 years old) around the Op Art – a modern art based on optical illusions. Students' final goal was to develop a Java program representing Op Art products (images/animation).

For three weeks teams of students had to find their own way to the goal. The *route* passed through study of Op Art artists and artworks, planning, drawing sketches, study on important concepts or object-oriented programing – data encapsulation, composition, and inheritance, testing and collecting feedback.

All the time the teacher act as a partner and a coach – she was in the *shadow* and just reaching out only when needed.
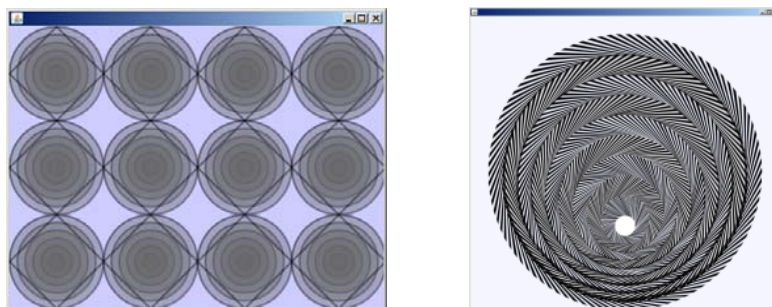

Figure 5. **Visible results from the students' work on the project**

The high motivation of students, their enthusiasm for work, exiting results (Figure 5.) and the ease of absorption of complex concepts inspired us to analyse the process and instructional design and to prepare reusable learning scenario which can be adapted for new classes.

2.2.Inquiry-Based Learning (IBL)

2.2.1. Scientific research

Scientific research is another *adult methodology.* It is applicable in all sciences – mathematical, natural, and social sciences. Commonly it starts by asking a general question in the field of research, focusing on specific aspects, designing research methodology (incl. methods as experiment, observation, etc.), collecting and analysing data, getting conclusions and making generalization.

The formal scientific experiment follows common phases (Figure 6) as: Ask a Question; Do Background Research; Construct a Hypothesis; Test the Hypothesis by Doing an Experiment; Analyze Data and Draw a Conclusion; Communicate the Results.
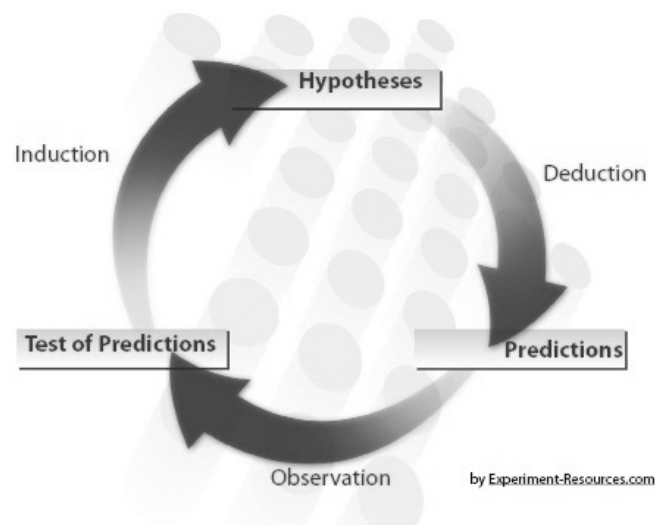

Figure 6. **Research cycle (Explorable.com, 2013)**

One of the widely used methods in scientific research is the experiment – an empirical approach to prove or disprove a hypothesis or to test given theory.

2.2.2. Specifics of Inquiry-Based Learning

Children also use experiments as a way to learn about the nature and its laws but usually their experiments happen spontaneously without special design and evidence of conclusions.

The Inquiry-based learning is an educational technology on grounds of Problem-based learning which follows the stages of real research cycle. The idea behind it is to motivate students to formulate hypothesis and to reason them, as well as to develop meta-skills in doing scientific research in parallel with development of knowledge base and skills in the specific scientific field.

2.2.3. My classroom – the most energy efficient: a case of IBL application

The pilot experiment in the frame of *weSPOT* FP7 EU project is related to the Energy Efficency in Buildings testbed. It was implemented as an integrated training on the subject *Man and Nature* and *Information Technology* (IT) in 6th grade (students aged 12-13 years) at First Private Mathematical Gymnasium (FPMG).

In parallel with covering the disciplines objectives of the subject *Human and Nature* as understanding the current energy flow, calculating the cost of electricity by household electrical appliances and finding ways to save it, providing argumentation about the special role of man to protect and preserve energy, extracting information from graphs, tables and charts, and with IT, and forming attitude to the energy consumption, students acquire *inquiry meta-skills* as

- Selecting among given questions and posing new scientific questions with guided support;
- Collecting certain data with guided support for what constitutes evidence;
- Formulating explanations from evidence with guided support;
- Linking areas and sources of scientific knowledge to clarify explanations;
- Communicating explanations based on scientific reasoning with guided support.

Scientific question of the experiment was: *What are the external factors influencing energy consumption and how the man can act to preserve it*?

Inquiry was organized as a completion between three 6 grade classes under the subtopic *My classroom – the most energy efficient!*

During the implementation the process followed the Mulholland et al octagonal model (Figure 7):
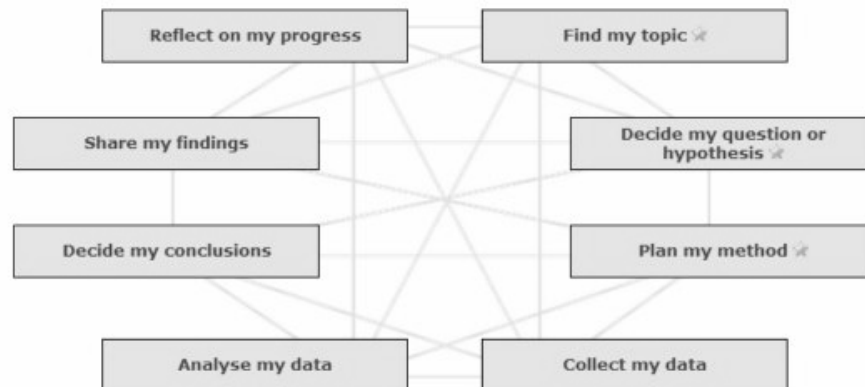

Figure 7. **Inquiry cycle**

Each class played as a single team which searched how many energy its classroom consumes and how it can save some of energy without health risk. The main teams were divided into sub-teams according generated hypothesis and indicators chosen to measure. Each class collected and analysed data (Figure 8). At the end of the project each class presented its experiments, observations and conclusions in front of the other classes, parents and school managers. Each team shared ideas about increasing the energy efficiency of the building and provided argumentation based on its research.

Figure 8. **Data collecting**

The winner was the class which provided the most reasonable ideas and succeed to communicate in the best way (Figure 9).

Figure 9. **Communicating and reasoning the results**

Conclusion

The described examples show that activities, popular in children's everyday life, can be successfully transformed not only in educational technology but in educational technology for adults. Games and storytelling provide a natural pleasant environment for communication and training of adults. The psychological comfort in combination with the educational power of the games and stories allow matured people to become *children again*, to learn in fun and to achieve higher results

On the other hand, using typical for adults strategies for solving problems, doing research and project management has a huge additional value in student's education. The process of learning is no longer just knowledge transfer but it cultivates skills, habits and personal characteristics which are a stable foundation for future realization of the youth.

Our research gives us arguments to conclude that it is never too late to be child and never too early to be an adult. Methods like Game-Based Learning and Storytelling could by applied successfully in adult education and could be part of adult education curriculum; the methods coming from adult's education and life like Project-Based Learning and Inquiry-Based Learning are very successful in school education.

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