

Investigative games and internet on-line activities

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In this paper I would like to present the audience the project “Investigative games on internet”, which lasts from May 2006 to December 2006. Internet is a new phenomenon in our society and already become one of the mostly used media around the world. In human history this is the first media, which is broadly used in so little time. Obviously, it plays an important role also in the life of our children. They use it for communication with each other (chat, email), they use it for finding new information to school, and they search the web or even create their own websites. The “Investigative games on internet” are competitions, through which the pupils can develop variety of skills in information literacy and problem solving competencies. Participants have to work in small groups (4-6 members) aged from 12 to 18. The tasks are in every investigation different. An example: on the day of the activity, which is announced long enough ago to register, they will get a brief description of a fictive crime. The information is communicated to them by e-mail, but there is also a project website with all information about the investigation. After the first e-mail they will get further information every 5-10 minutes again by e-mail. Between two e-mails they have to search the web, look up information in databases, work together and communicate with each other.

Keywords internet; collaborative learning; on-line activities;

1. New competencies of society

Many recent research articles are dealing with the growing challenges for teachers. These are the challenges of the new millennium, before all teaching and learning by the information and communication technologies. In 1998 the World Educational Report (see UNESCO [1]) is describing the radical changes, which have to arise in the traditional learning and educating:

“New possibilities are emerging which already show a powerful impact on meeting basic learning needs, and it is clear that the educational potential of these new possibilities has barely been tapped. These new possibilities exist largely as a result of two converging forces, both recent by-products of the general development process. First, **the quantity of information available in the world** – much of it relevant to survival and basic well-being – is exponentially greater than that available only a few years ago, and the rate of its growth is accelerating. A synergistic effect occurs when important information is coupled with a second modern advance – the new **capacity to communicate among the people of the world**. The opportunity exists to harness this force and use it positively, consciously, and with design, in order to contribute to meeting defined learning needs.” (Source: World Conference on Education for All. Meeting Basic Learning Needs, Jomtien, Thailand)

There may be difficult debates about what education is. Is it just the transfer of certain knowledge? Is it more linked to the development of human beings? It is obvious, that in the modern society the transmitting of the knowledge from teachers to pupils calls for new methods. The teachers have to keep up with the times, they have to be able to work with ICT and they have to be prepared for the changes in the society. We can compare the education in the modern society to an economic activity. We can describe the knowledge as the raw material and the Education as the activity itself.

We are convinced, at the department of informatics education at Comenius University, that using internet is at present neglected in our educational system. We are convinced that internet can be used in

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highly productive and constructive way in the cognitive process. We also think that on the internet there could be developed environments which (in a large measure) develop students' information literacy. We think that these environments have really positive influence on pupils and elaborate important skill like problem solving competencies and internet competencies. We claim that such an activity we are able to create and prove our beliefs.

2. Internet – a tool for achieving new goals

2.1 Internet in general

Internet is a new phenomenon in our society and already become one of the mostly used media around the world. In human history this is the first media, which is broadly used in so little time. If we consider the birth of internet to be in the middle 70's last century, nearly after 30 years it is widely used all over the world. Obviously, it plays an important role also in the life of our children. They use it for communication with each other (chat, email), they use it for finding new information to school, and they search the web or even create their own websites. But, many researchers in the field of didactics (see [3],[4]) think, that potential of the internet for developing and refining the cognitive process and the mentioned competencies is much higher than we can imagine nowadays.

In an optimal situation the pupils are commonly using internet during the lessons and also at their homework. Searching and processing the findings; sending emails; involving in various online activities; creating web documents. All these should be done on daily basis in our schools. But, before this will happen, we have to think about the way, how to teach internet and how to develop the new competencies on the internet. One of the crucial questions is how to teach students to differentiate between the important and less important information. On the internet they can find various data, but not all of them they really need or they will really use. To differentiate between these two things is a really hard task and it is even harder for teacher to find any attractive ways to teach these new competencies. Luckily on the net there are variety of online activities, which could help in achieving these new goals and competencies.

2.2 Investigating games, internet activities

One of the teaching aids in these competencies could be the investigating online activities. These activities are basically competitions, through which the pupils can develop a variety of skill. We mean especially those ones which are not really being developed in the school. Some years ago a new kind activities were regularly organized by David Cassey from E-engage Development (not-for-profit company working internationally with schools). The activities were called "Net-detectives". Based on these activities we decided to create our own activities in Slovak language for students from the whole country. We designed the investigations as a group competition; participating children have to work in teams. The pupils' age is from 12 to 18. The task is the following: on a special day, let's say on 6th December 2006 there will be a new activity. The organizers create the activity's website and publish all the necessary information for the pupils in advance. Small groups of students (4-6 in each group) register for the activity. The registered teams on the day of the activity will get the first e-mail about the fictional crime somewhere in Slovakia (or somewhere else in the world). This crime will be the object of investigation through internet. After the first e-mail they will get further information every 5-10 minutes by e-mail. These messages will contain various additional information and they will have to deal with them. Not all of this information will be relevant and important; the participants will have to decide which are necessary and which not.

The sent messages are not only simple text messages. The e-mails contain new information in various formats, like pictures, sound records, maps, databases etc. Not everything is important to find the criminal; they have to differentiate among all the received messages. This is the point, where they will learn how to decide what is important and what is not. Beside this, many information they will have to trans-

form to appropriate shape and form. For example, they will receive a pictures' negative from party, where the crime happened. For some teams, it will be only an irrelevant negative with no information on it, because they will not be able to read it. But for some other teams, it will be much more. They will create the picture from its negative using graphic editor and finally finding the suspicious person on it how he is leaving the party. From this moment, their investigation will have a completely different dimension and they will be one step before all the other teams. Similar situations could happen, when they receive a sound record e.g. telephone call between two suspicious persons. There will be nothing special on the conversation, but after deep analyzing of the record they will notice some sound in the background (like bells etc.). From this sound a clever detective will be able to decide, where the suspicious person was at the moment of the call. This could be crucial for the investigation. There are many examples like these two where the participants need to analyze data not only superficially but deeply and thank to this deep analyzing they will be able to solve the problems.

There is also one important dimension which is not very common in schools. This is the group work. During the whole investigation participants have to work in small teams, cope with other views and perspectives from the rest of the team. Team work is mainly prohibited in our schools and the teachers try to develop individual skills. But after leaving the school, pupils will probably work in teams and it is very important to experience the team work also during the school years. If the team will cooperate and collaborate they will have better chance to solve the problem and the crime. Nobody alone will be able to do it. But together they will a chance to divide the problems into smaller parts and solve partial problems first. In the team they will have different roles like team leader, internet surfer, e-mail writer, database analyzer etc.

2.3 Advantages of investigative games.

Let me mention some of them:

- **Cooperation and collaboration** – as it was mentioned before, this is the dimension which is not very commonly used in our schools. By all tests, written exams or by answering questions in front of the class, the teacher will never allow students to communicate together or to collaborate during the tests. We try to educate the students as individuals, never to work in team. This is obviously very good in some ways, but we don't have to forget, that after school students will be employed in various companies. They surely will belong to a team or some of them will even be team leaders. Unfortunately our school does not prepare them for this task. This is the point where the investigative activities appear on the scene. During the investigation they have to work together, they have a team leader and they have no choice, they have to collaborate. The team consist of 4-6 members where all of them have their own task. If one of them will not work properly, the overall outcome of the whole team will be worst.
- **Analyzing information and responsibility for own decision** – working with information is very common in every school on every learning subject. During history lessons they learn about various historical events, they analyze information. During physics or chemistry they are engaged in various experiments and tests. Again, they analyze information. But, in all these cases, every time there is somebody, who can they ask when they are in trouble. There is always a wizard or magician, who knows nearly everything and has the answer to all questions. We usually call this magician simply teacher. During the investigations at online activities, there is no wizard, no magician who can they ask. Obviously there is a teacher, but he does not know the result and has no answers. They can only count on themselves. Only they alone will decide which information is important and which not. They take the whole responsibility for their own decisions.
- **Internet, ICT and information literacy** – during the whole activity the participants will use the internet as the main communication tool. They have to write e-mails, answer questions, search the web for relevant information. Beside this, they will have to use programs they never used before. For example, for the analyzing the sound records they will have to download a program by which

they will be able to read more information than others. Or other example: they will get code breaking program and will have to use this program during investigation. So, we are testing them how can they cope with new situation, on which level is their information literacy and whether they can use ICT programs they never used before. And obviously, whether they can use the internet for communication and for finding new information.

- **Attractive ways of learning** – usually children do not like to learn in traditional way. They like to play; they like to construct their own knowledge of things; they like compete with each other, even better if the competition is between children from the whole country. This is the situation at investigative online activities. The activity is prepared for every school in Slovakia. The pupils know it and they try to have as good results as possible to be the best. At the same time, they learn about new things, they have big motivation to find new information about Slovakia and about other places.
- **Problem solving in real context** – the result of pupils from Slovakia in PISA 2003 in problem solving (see [5]) was below the European average. In the test they had to prove, that they are able to solve problems from real life, not only mathematical equations. They were tested, whether they could understand the problem by determining relevant conditions. This requires analytical, quantitative, analogical and combinative justifications, which are the core principles of problem solving competencies. This is exactly what happens during investigative activities. They have a real problem, they have to analyze it at first, try to find partial solutions and then prove their assumptions.

3. Pre-evaluation

In 2006 there were 4 activities up to this time. The table 1 shows the number of participants.

Table 1 Number of participants in the investigative on-line activities during the year 2006.

Date	Number of teams	Number of participants
22 nd June 2006	25	125
28 th September 2006	26	130
10 th October 2006	26	130
26 th October 2006	39	195



Fig. 1 Investigation website. Every activity has its own website, which contains all the information about registering, taking part and the results of the competition.

Up to the end of 2006 there will be 4 more investigation activities. At the Department of informatics education we are making a deep qualitative research about the effectiveness of the activities. During every investigation we are collecting data from groups taking part in the activity. We are recording videos; giving out forms to the participants to fill them in. We hope we will be able to present the results at the presentation during the conference. At the time of registering to the conference they are still being evaluated.

We hope we convinced you (even without evaluation of our research) that the internet can be used in highly effective and productive way by using the investigative online activities. I hope you agree with

me, that this communication tool is appropriate for achieving new goals in education process and to develop the pupil's problem solving abilities.

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