

EDUCATIONAL GAMES SUPPORTING LEARNING ABOUT METEOROLOGY

V. Haverlíková, vhaverlikova@fmph.uniba.sk, J. Horváthová, horvathova.jana@gmail.com, Comenius University, Faculty of Mathematics, Physics and Informatics, Mlynská dolina, 842 48 Bratislava, Slovakia

INTRODUCTION

Physics summer camp SCHOLA LUDUS: Experimentáreň was held in the year 2011 for the ninth time. This year it was focused on meteorology [1].

The program of the camp can be divided into two parts – scientific and entertaining. The links between these two parts are educational games.

EDUCATIONAL GAMES – COMMON CHARACTERISTICS

Learning by playing is broadly accepted as typical for early childhood. In fact the importance of playing did not decrease even in adolescence and adulthood.

Playing a game is physical or mental activity that is characterised by positive emotions. Common signs of playing games are spontaneity, severance in time and space, uncertainty of running the game and its result, unproductivity, following of agreed rules, and awareness of another reality [2]. Playing game is associated with positive emotions that open minds for new inputs, with getting wonder, enjoyment of the success and elimination of the fear from the failure.

Educational game is defined as a game with premeditated didactic goals – development of competencies, factual knowledge and / or learning skills. These goals may be for students apparent or hidden. Using games in teaching and learning process allow effective realization of several goals at the same time. It combines motivation, active learning, construction of knowledge and its evaluation, building of attitudes, development of communicational and social skills. Educational games provide experience with learning process, include reformulation of the problem, utilise primary knowledge, allow embedding of learned to real relevant context and support using of various representations [3].

EDUCATIONAL GAMES IN SUMMER CAMPS EXPERIMENTÁREŇ

Participants of physics summer camps Experimentáreň are children 9 – 15 years. They have school holidays. Some of them are primary interested in physics and science, but most of them are normal curious children with wide range of interest and various experiences. Playing a game is the way how to address all of them and provide them introduction to the topic, a relevant starting point for further investigation.

Besides relaxing and sport games we use different type of games with various didactic goals:

1. Games focused on familiarization of participants and development of their interpersonal competencies, especially cooperation skills.

Specific version issues from the story of the camp. In Experimentáreň 2011 Meteorology it was a story about extraterrestrials that land on the Earth and

have to discover weather conditions to schedule their flight away. The spaceship was modelled by small pieces of carpet, that children stand on. The first task was to transfer the spaceship to the “Earth”, without standing out of the “spaceship”.

2. Games focused on getting information necessary for further activities.

These games are usually associated with physical activity or with memory training. In Experimentáreň 2011 Meteorology children searched information about clouds to complete their clouds atlas.

3. Educational games focused on knowledge construction and development of learning competencies.

We apply three basic “strategies of authentic learning by playing” developed within the frame of SCHOLA LUDUS pro-scientific teaching and learning theory [4]:

- authentic learning by spontaneous playing,
- authentic learning by directed playing, and
- authentic learning by playing with great creation.

EDUCATIONAL GAME “SYNOPTIC”

Goals of the game from teachers’ perspective:

Students should:

- understand the importance of the weather station network and simultaneous measurements,
- develop their ability to record data and to keep conditions of measurements (in this case the time and the location),
- understand the reasons for data coding, create simple code system,
- build deeper understanding of concepts: synoptic, forecasting, accuracy, probability, density

Incorporation into the teaching process:

The game “Synoptic” can be used in lower secondary school in teaching meteorology in physics or in geography.

Goal of the game from the students’ perspective:

- to record presence of particular objects in their stand periodically (in agreed time). Students don’t know the didactic goal of the activity. They only know that their recordings will help them to win next competition.

Time demand – 60 – 90 minutes

Equipment:

- worksheets – recording table, pencil and a map of stands (if the game is played outdoor or in large area) for each group,
- three objects (we used a ball, a paper fan and a plastic bottle with water),
- booklet of maps for each group.

Game rules, description of the game procedure:

1. Recording - Students divide into 6 – 10 groups. The task of each group is to record presence of defined objects in their stand any second minute (or minutely if the game is played in a room), totally ten times. It is necessary to start recording at the same time. Teacher

wander from one stand to another and move defined objects following predisposed path. In the middle of the wander he hides one object away between two stands (to flowerpot or to the box).

TAB. 1. Example of data collection in game Synoptic

	Objects in the stand at given time			
	start 0:00	2:00	4:00	...
stand A	ball	fan	-	
stand B	bottle	ball, bottle	bottle	
stand C	-	-	ball	
stand D	fan	-	-	
...				

2. Looking the path - Students collect their data (fulfil the table – Tab. 1). Simple paths can be seen directly in the table, complicated path need another type of representation. Students may plot collected data into the booklet of maps - separate map for each time. If the booklet is made from translucent paper, or if somebody leaf quickly through the booklet, the paths of objects' movement can be seen.

In this step student spontaneously create vicarious signs for each object.

3. Finding the hidden object - following the path of object, students can forecast where it is hidden - the preannounced competition.

4. Discussion on collecting and representation of meteorological data – the network of weather stations, density of the net, frequency of obtaining data, coding of meteorological data suitable for digital transfer and for visualisation in a synoptic map.

EDUCATIONAL GAME “CLIMATE CHANGES REPORTER”

Goals of the game from teachers' perspective:

Students should:

- understand the concept “climate change”,
- know basic facts about climate change,
- understand the impact of climate change on nature and our lives,
- develop cooperation and communication skills, the ability to create common conclusion and accept it.

Incorporation into the teaching process:

The game “Climate changes reporter” can be used in lower secondary school in teaching meteorology in physics, in geography, as well as in teaching environment.

Goals of the game from the students' perspective:

Students write report (respectively create a poster) on impact of climate changes from different points of view.

Time demand – 60 - 90 minutes

Equipment:

Information and problem cards placed in larger area (outdoor), writing pads, pencils.

Game rules, description of the game procedure:

The game “Climate changes reporter“ is based on a PlayDecide discussion game “Climate change” [5]. Testing the discussion game with Slovak students of various ages showed that this format is rather not

suitable for lower secondary students. Information and problem cards from the discussion game are used in “Climate changes reporter”. Students divide into groups of 3 – 5. Each group has to find appropriate information and problems and prepare newspaper article (or poster) reporting climate changes regarding different points of view – the impact on flora, on fauna, on humankind, on waters and hydrologic cycle, etc.

Completeness of information, distinction between facts (information) and subjective opinions (problem), and understanding complex relations can be rated in evaluation of reports.



Fig. 1. Climate changes reporter

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