

Serious Games in Environmental Education. Potentials and Limitations.

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Abstract

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1 Introduction

One main goal of environmental education is to keep the environment for the next generations with all kind of different climes, seasons, animals, plants, etc. This is the so called sustained thinking (vgl. Herkommer 2004, p. 2). There are many possibilities to convey and anchor sustained thinking; one of those is the use of media devices. The questions which need to be answered are: Nature and media – a contradiction? How important is the medium computer technology as a factor of teaching and learning regarding environmental education? How can environmental education benefit from this new medium? The assumption is that through the use of the new medium computer environmental education is possible.

2 Nature and multimedia – a contradiction in terms?

How important is the new media computer technology as a matter of learning and teaching concerning environmental education? How can environmental education be positive impacted by using computer technology? The hypothesis of this paper is: through the use of the new media computer is environmental education possible.

One of the most important aspects is the intervention of processes of sensual outlook about nature, which are not accessible for human beings; e.g. global warming, glacier melting, etc. It can be assumed that the attitude and willingness as an acting in favor of environmentally consciousness will increase after using specific learning programs and learning situations. Immediate efficiency can not be assumed because education comes about of the education of its own volition. The occurring question is to what extent environmental education is possible by computer technology.

3 Game Based Learning

In this context the concept of “Game Based Learning” (GBL) after Diener et al (2005, p. 2) and Prensky (2001, p. 149) of the four dimensions will be analyzed. The first dimension is the concept of gaming in general, which tries to explain the nature of gaming. The second dimension constitutes the concept of learning. The understanding of learning is codetermined by the social environment. The dimension of learning is an essential part of Game Based Learning. The use of games as knowledge transfer is the important point of this dimension. This assumption is based on the implied premise of games being a prime engine of learning. This statement is very important for the discussion on the relevance of Game Based Learning, because the assumption of the impact of games on learning legitimates GBL as a didactical method.

The third dimension is the level of simulations. These are not games, but a visualization of complex processes, which give the learners possibilities of understanding these through an impact on certain parameters. For GBL is the level of simulations constitutive (comp. Diener 2005, p. 2), because of the use of GBL people are able to transfer gained knowledge into real life. This is an attempt to teach knowledge in a specific area. The aim is the transfer of knowledge from the computer game into reality (Allesi/Trollip 2001, p. 233; Galarneau 2005, p. 4).

The fourth dimension is motivation, which takes a sizable part of a successful learning process (comp. Prensky 2001, p. 149). For Malone (1980), Alessi/Trollip (2001), Galarneau (2005) and also Prensky (2001) plays the conception of learning games a very important role for the motivation of the gamer. Without the factor motivation there is no gaming possible and further on no learning. Curiosity, graphical design but also the generation of tension are creative elements of computer games.

4 Serious Games

And also the definition of “Serious Games” is important to get the right focus on this study. Because these are computer games which claim to be entertaining and informative but also to provide new ways of learning, ways which are not possible in reality (Gunter et al 2006, p. 9). The main difference between Serious Games and Game Based Learning is the target group, because Serious Games are only for adults in comparison to GBL, which is used by people of all kind of ages. A further difference is the explicit intention of training. This means that the concept of Serious Games is to learn determined skills, to train them or to gain knowledge of a certain topic like for example flight simulations, training programs for saving forces, mediation of energy-saving possibilities through a game or in-house training (Masuch 2004, p. 1).

Concrete possibilities of implementation of environmental education in the

gaming industry. The permeation of everyday life through computer technology has an impact on learning processes. Both media education and environmental education are key competencies and can be related to each other in didactics. All these possibilities of combining key competencies can be generated in educational games such as that one which will be developed in the project "Game assisted eco-learning". Base of this concept are GBL and gaming theory. The other part is the contention of computer technology in environmental education. The assumption of this project is that with special themed computer games sustainable environmental education is possible. The obtainable objective of using GBL in environmental education is modified action, educate to an environmentally compatible and environmentally friendly acting (comp. Horz 2004, p. 12 and Apel 1998, p. 313). But is this possible? This project will show the potentials and limitations of the use of computer technology in environmental education; it will show if it is possible to establish not only understanding but also comprehension that all actions, which human beings set, have consequences.

The example is the project „Mission: Energy Self-sufficient Community“, which was created for the Austrian city of Güssing. In the setting of a computer game, the player has to acquire knowledge on renewable energy sources and apply this knowledge in a game. The role of the game is to help the community become energy independent. The adaptation of this game was provided by the Austria based company SPC – Gschwandtner SPC GmbH ("Seminars, Projects, Consulting"), the University of Vienna as well as the EEE – Europäisches Zentrum für erneuerbare Energie Güssing ("European center for renewable energy Güssing"). Further support was granted by Zentrum für Innovation ("Center of innovation"), the European Union, the Bund ("Federation") and the federal state of Burgenland, the Federal Ministry of Transport, Innovation and Technology as well as the company Energie – Systeme der Zukunft ("Energy – systems of future").

In total, there are four levels running one after another. Each level describes the option of a renewable source of energy such as water, wind, sun and

wood as well as their tangible use in daily life. There is an avatar, which performs the tasks for the players. In order to perform the tasks successfully, the player must answer questions correctly. As a reward, the player receives tools in a toolbox which, if needed, can be used in the next level. Should problems arise in the course of answering the questions, an information button can be used which provides the player with the information required. This game shall transmit knowledge to adults on renewable energy forms. The awareness that every single person can contribute to energy saving and therefore does not play a negligible role in the community is being emphasized here. Furthermore, this game shall offer the possibility to acquire knowledge about this topic in a playful way. The target groups are adults who are interested in this field but who have no background knowledge like mayors, small-time home builders, educators, etc.

5 Future aspect of environmental education through computer games

The goal to be reached through the use of computer games in environmental education is a modified acting. Hence „environmental education [...] can not just be applied on people with lack knowledge and awareness in terms of environment problems, and teach them know-how, like with any other “normal” education, but environmental education shall set up the individual ecologically, and educate him/her to act environmentally sound.“ (Apel 1998, p. 313). The disarming of the reproach, that only through the creation of learning programs the learner will be motivated, is crucial. For the didactical sense design consists of a stimulating learning environment, a learning culture, an exposed learning situation and finally a constructive learning ecology (comp. Siebert 2000, p. 27), which allow a deeper discussion and understanding of the topic. In the presence modern information technologies such as multimedia and computer based training programs are being increasingly applied as education and communication tools. Therefore, it is

important not just to thematize computer technology in environmental education but also to offer a thorough and systematic discussion. Nevertheless, “the computer must not be regarded as a universal remedy, but its demonstrated educational potential has to be integrated in the most appropriate and wise manner in the educational institutions”. (Aufenanger 2005, p. 61) To see computer games as teaching and learning instruments and to use them as such, to adapt them to the educational goals, and not vice versa (comp. ibid., p. 61), thus the actual goal – environmental education – must not be forfeited due to the technology.

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