TASK-BASED APPROACH IN 3D EDUCATION FOR SECURITY AND SAFETY

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Abstract: The article discusses the implementation of task-based approach in education for security and safety taught in virtual environment. The research conducted among a group of 124 Polish students revealed that the application of this approach brings numerous advantages. Students become naturally engaged in the learning process, memorize procedures better and perceive this form of learning as attractive. Regarding competences, not all saving-life behaviours can be performed and trained in effective way.

Key words: 3 task-based approach, virtual reality, safety and security education, 3D environment.

1. INTRODUCTION

A crucial element of security and safety training are simulations of actions and behaviours aiming at saving human health and life [10]. These simulations can be conducted in two types of learning environments: real life or 3D virtual reality. Regarding this second type of the environment, treated in literature as virtual environments for learning, or VELs [17], its reported main asset is the possibility of painless learning on mistakes [7]. In 3D environment this can be realised with the application of the Task-Based Approach (TBA). Instructions based on tasks trigger more practice in learning. An appropriate instruction should minimize problems, and maximize the chance to achieve didactic goals [19].

Although this approach has been initiated and popularized in the area of second language learning and teaching [6], its assumptions (especially involvement in practice) can be adopted in education for safety and security.

The purpose of the paper is to present the idea of using TBA in this kind of education. The presented research results proved that tasked activities performed in virtual worlds help students to increase their competences, engage them more in the learning process, and are perceived as more attractive than traditional trainings.

2. EDUCATING FOR SECURITY AND SAFETY – CONCEPTUAL FRAMEWORK

2.1. Education for Security and Safety

In Poland this kind of education is the result of an agreement between the Ministry of National Education and the Ministry of National Defense of the Republic of Poland. It was introduced in Polish educational system in 2009. Its scope covers broadly defined civil defense, methods of protection against various hazards and preparation for dealing with disasters, first aid. It also involves typically military subjects, such as weapons types and military service rules, selected issues on international law of armed conflict and topography.

Education for security and safety, closely linked to politics, the education system, the state, the power and the whole system of exercise, has the overriding goal of spreading awareness and knowledge about the sources, nature and effects of threats both on a daily basis and in emergency situations. It aims to recognize, prevent and counteract these threats. Its target includes all age groups: children, adolescents and adults. In psychology, however, security and safety are perceived as basic human needs; lack of these needs is hindering for human development and life satisfaction [12].

2.2. Virtual Environment for Educational Activities

Emerging technologies bring promises to didactics of security [5] and safety education [23, 20], so they become more and more popular in teachers' practice. Teachers perform their didactic innovations on open source three-dimensional platforms [15, 2, 3], such as Second Life (http://secondlife.com/), Metropolis Metaversum (https://hypergrid.org/metropolis/). Each user of the platform can create avatar that represent them in the virtual world, perform activities, interact with other avatars and objects. As Smart, Cascio & Paffendof state, virtual worlds possess numerous specific features [21], such as:
  • persistence of the in-world environment,
  • a shared space allowing multiple users to participate simultaneously,

- virtual embodiment in the form of an avatar (a personisable 3-D representation of the self),
- interactions that occur between users and objects in a 3-D environment,
- an immediacy of action such that interactions occur in real time,
- similarities to the real world such as topography, movement and physics that provide the illusion of being there [21, 22].

In literature using virtual worlds in education for safety or security in not a quite new concept. The examples can be safety education based on virtual mine (2011) [9], designing construction safety education model based on Second Life (2012) [11], or using virtual environments simulation to improve construction safety (2012) [24]. Recent research reveal that as a result of training in virtual reality, students know how use safety procedures, preventive measures, what to do in crisis situations or how to perform while online safety risks [16]. The examples of projects and research activities indicate that learning military and civic issues is effective and beneficial for learners and teachers.

2.3. Task-Based Approach

Although this approach has been initiated and popularized in the area of second language learning and teaching [6], it can be adopted in education for safety and security. Tasks trigger learning on mistakes, which is related to experiential learning (Dewey, Lewin, Piaget, Kolb), the process of learning through experience, defined as "learning through reflection on doing".

Similarly to experiential learning, in the task-based approach a learner is placed in the centre of a didactic process. This approach, when compared to stereotypical classroom processes, significantly differs in numerous didactic aspects. Those differenced, adapted from R. Ellis concept [8], are presented in Table 1.

It can be noted that there are advantages of the Task-Based Approach; for instance, students able to control topic development, use of referential questions, they have opportunities to negotiate meaning when communication problems arise, receive content-focussed feedback [8]. The presented characteristics of the TBA indicate that this approach corresponds also with other forms of active learning such as action learning, adventure learning, free-choice learning, cooperative learning, or situated learning.

Table 1. Stereotypical classroom processes in traditional form-focused pedagogy and task-based pedagogy (adapted from Ellis, 2006:81) [8]

Traditional form-focused pedagogy	Task-based pedagogy
Rigid discourse structure consisting of IRF initiate-respond-feedback exchanges.	Loose discourse structure consisting of adjacency pairs.
Teacher controls topic development.	Students able to control topic development.
Turn-taking is regulated by the teacher.	Turn-taking depends on students' activity.
Display questions (questions that the questioner already knows the answer).	Use of referential questions (questions that the questioner does not know the answer).
Students are placed in a responding role.	Students function in both initiating and responding roles.
Little need or opportunity to negotiate meaning.	Opportunities to negotiate meaning when communication problems arise.
Form-focused feedback.	Content-focused feedback.

3. FIRST AID LESSON CASE STUDY

One of the topics from the area of education for security and safety, is first aid. An exemplary lesson based on the TBA consists of three lesson phases; each one is provided with examples concerning teacher's steps (Table 2).

Table 2. A framework for designing task-based lessons on the basis of R. Ellis (2006: 80) [8]

Lesson's Phase	Examples of steps
Pre-task	Framing of activity (giving scenarios) Planning procedures
During a task	Time pressure (saving lives in first aid actions)
Post-task	Learner's report Repeat the task

It can be stressed that one of the steps, procedures, can be based on strategic planning or they can be planned ad hoc. It depends on a situation, teacher's or students' preferences. This framework can serve as universal pattern in lesson planning. More elaborated description of teacher's actions including type of basic

interactions are presented in the lesson plan (designed for 2 didactic hours) (Table 3).

Table 3. Example: first aid lesson plan

Procedure	Roles&Tasks	Type of basic interactions*
Materials distribution (content: medical procedures), information exchange.	Teacher distributes/shares materials, students get familiar with the topic.	T-SS
First aid scenario planning	Students work in groups and they create a hypothetic situation to perform in Second Life (SL).	S-SS
Realization	Students get into SL, choose location, can create virtual elements, choose avatars and act.	S-SS
	The situation is being recorded.	S-SS
Summary & Analysis	Situational analysis presented in the video material in the classroom.	S-S-T

*T- teacher, S- student, SS-students.

The following lesson plan has been used in didactic process in which took part Polish and international adult students (124) in the academic years 2014/2015 and 2016/2017.

Students aimed to simulate first aid procedures in Second Life platform. The simulations were recorded and presented in a form of machinima, video created in virtual environment [14, 4].

After the virtual training students were asked to answer the questions about their perception on competences possible increase, attractiveness, and engagement in the training in virtual environment. They were asked to compare their traditional lessons on first aid with TBA in VLE training. The survey was supported with open questions which allowed to understand students' views on the topic. Moreover, students were asked about possible advantages and barriers in this form of training.

4. RESEARCH RESULTS AND DISCUSSION

Research on the use of TBA for the needs of virtual security and safety education was conducted in a group of 124 adult students (between 19 and 49) in

the academic years 2014/2015 and 2016/2017. It indicated that such an approach significantly increases satisfaction of learners and improve their competences in the scope of procedures. More detailed data are presented in chart 1.
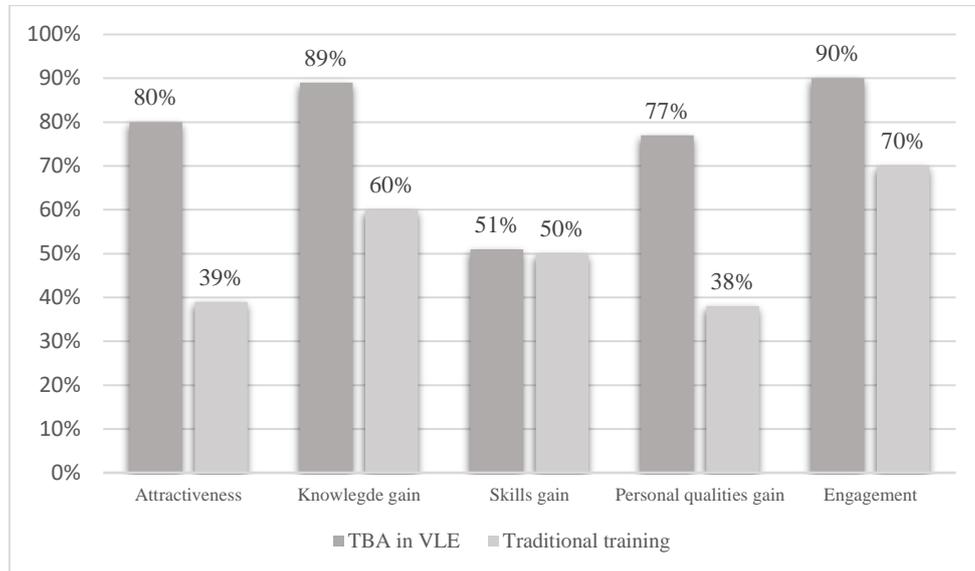
Fig. 1. Students' responses on two forms of training

The first question concerned attractiveness of the lesson and undoubtedly the use of virtual worlds and task-based instruction was perceived as more attractive (80% for TBA in VLE and 39% for traditional lesson). It means that students' learning satisfaction from innovative approach is higher than from a traditional one (lectures and practical activities). This is the highest difference and it can be explained with the fact that many students claim to use social media and virtual worlds in their everyday activities, so this kind of learning environment seems to be interesting and engrossing. The second difference concerns personal qualities gain. In Second Life platform students have various means of communication (chat, voice chat) so it could be a reason for evaluating this item so high (77% for TBA in VLE and 38% for traditional training). Various means of communication help in collaboration, negotiation, or mediation, which are crucial while teamwork.

The least difference concerned skills gain (51% for TBA in VLE and 50% for traditional training). Almost the same level score can be related to the fact that in virtual reality, students need to perform with the use of tools (such as mouse or joystick), which may hindrance performing emergency procedures, such as

cardiopulmonary resuscitation, use first aid kit (e.g. pocket mask, adhesive bandages, face shield). In spite of those virtual world limitations, in open answer they explained that they got skills of using procedures in emergency (probably therefore, skills gain was slightly higher in TBA in VLE). Students also assessed that their engagement is greater when they work in VLE. This can be related to the fact that they spend their time in virtual reality, so their engagement in the environment they know seems to be natural [18].

It must be noted that education for security and safety, when properly planned, has a great chance for success for its realizations in virtual worlds. The additional asset is the possibility to record all emergency actions in a form of machinima. The videos can serve as teaching materials for other groups [13]. Apart from pragmatic value, creating videos by students helps them to make meaning [1] and memorize the situations better, what gives a synergy effect for the whole didactic process.

As it was mentioned above, the questionnaire also contained open questions on possible advantages and barriers related to the TBA in VLE. The interviewed chances indicated by students concerned the possibility of making simulations based on scenarios (students gain knowledge on how to perform practically), improvement of social and IT skills. Perceived barriers concerned technical limitations such as poor IT infrastructure, weak internet connection, and human limitations, for instance, students may not be able to perform in 3D platform, they may not like the activity.

5. CONCLUSION

Creating tasks for learners in virtual environment brings numerous assets for education for security and safety. The presentation of case study on first aid training and survey conducted in a group of learners, proved that the implementation of TBA in VLE increases students' competences (specifically procedures for saving human life, but not really performing the emergency actions such as resuscitation or wound dressing). Moreover, students perceive such training as attractive and engaging. The learners are aware of possible advantages and barriers related to the use of virtual reality.

The case study on first aid and students responses can encourage teachers for application VLE in other topics related to education for security and safety. However, teachers must be aware of possibilities and barriers that may be encountered while planning and realizing the didactic process in virtual world. Not all activities can be fully performed. Those which can be realized, are possible to

be recorded and used as a teaching video material. If this work is done by students, they find this activities as meaningful and, as a result, memorize things better. Possible application of the TBA in virtual education for security and safety should be still researched, especially in the area of new solutions which enable psychomotor actions. The use of oculus rift or intelligent accessories can enhance learning environment and help to perform more types of saving-life behaviours.

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