

Lost in Antarctica: Designing an Information Literacy Game to Support Motivation and Learning Success

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Abstract. The acquirement of information literacy skills is associated with a number of challenges (e.g. less motivation because often no grades are given). This paper presents a new method for developing information literacy – the gameducation application “Lost in Antarctica”. Gameducation describes the integration of game design elements into education and, within that concept, learners have to act as realistic characters in a realistic environment. It uses the beneficial effects of games to positively influence the student’s motivation and learning success.

Keywords: GamEducation · Gamification · Education · Information literacy game · Learning success · Motivation

1 Introduction

Information Literacy (IL) describes the ability of a person “to recognize when information is needed and [...] to locate, evaluate, and use effectively the needed information” [1]. This skill is increasingly recognized as a key competence in order to be successful at school or work in today’s information and knowledge society [2].

Teaching IL to students is associated with a number of challenges. Disagreements about how to learn IL (e.g. self-study, in-class lecture) or the lack of positive assessment for learning these skills are such examples [3–5]. Consequently, maintaining motivation is difficult and learning success is frequently not achieved.

This paper demonstrates a new approach for IL instruction – the GamEducation application “Lost in Antarctica”. The research follows the design science process proposed by Peffers et al. [6].

GamEducation is a combination of the words gamification and education. It describes the integration of game design elements within the context of education. Students act as realistic characters in a realistic story [7]. A strong connection between game story and activities during the game play promotes the context for learning [8]. Firstly, the integration of game design elements can encourage the participation and interaction of students, so that an effective and active acquirement of IL skills takes place [9]. Furthermore, motivation, fun and engagement of students can be increased, and thus the learning success can be positively influenced [9].

2 Design of the Information Literacy Game

2.1 Differences to Other Information Literacy Games

Game design elements are already being used in different ways to learn IL [9]. Previous applications focus on several aspects of IL (e.g. plagiarism, search strategies) but the instruction of an extensive knowledge is non-existent [10–12]. While most applications encourage competition, collaboration is rarely considered. Indeed, collaboration is integrated among students but mainly outside of the accompanying websites during in-class lectures [13]. Solving tasks together during the process of game play is rare. The applications are too often characterized by repetitive task types (e.g. multiple choice tasks) [12, 14]. Therefore, there is little variety in activities for the students.

This is why “Lost in Antarctica” instructs a fundamentally extensive knowledge about IL. In addition, the background story is strongly connected with the tasks completed during game play, and both collaboration and competition among the students should be supported in the same dimensions.

2.2 Game Design of “Lost in Antarctica”

According to Zichermann and Cunningham, most educational games fail because the learners do not enjoy themselves while playing and learning [15]. During the design of corresponding applications, the focus is on the learning outcome instead of a combination of learning outcome and a gaming experience that is fun [15]. Fullerton emphasizes the importance of the process of testing and an iterative design process. Moreover, the need for an interdisciplinary team with different skills for a game design that is completely thought through is recommended [16]. Therefore, the development of the “Lost in Antarctica” game concept was carried out in several iterative steps in a project course with the target group, students of mechanical engineering. In addition, a graphic designer, a programmer and librarians worked on the project.

“Lost in Antarctica” is a browser game designed as a ‘point and click’ adventure. In the game, the students act as scientists traveling in teams to a research expedition to the South Pole, but due to a snow storm they have crash-landed. Consequently, in addition to their research they must repair the defective aircraft.

Figure 1 shows six screenshots of the gameducation application. In the beginning of the game students can create their own avatar (screen 1 and 2). The selected career further influences the course of the game and serves as basis to randomly put together the teams. The career choice is based on the area of concentration in the mechanical engineering degree program.

The students are able to move freely within a research station and choose between twelve different levels. The levels are hidden behind doors and represent topics of IL (screen 3). Each level has an identical structure. The students have to follow a checklist (screen 4) and appropriate new knowledge or solve tasks alternately. The knowledge transfer is done based on videos, presentations or stories to scroll down. The associated task types vary. Drag and drop (screen 5), cloze texts, multiple choice questions, tasks where students have to connect lines (screen 6), crossword puzzles, memory games, free

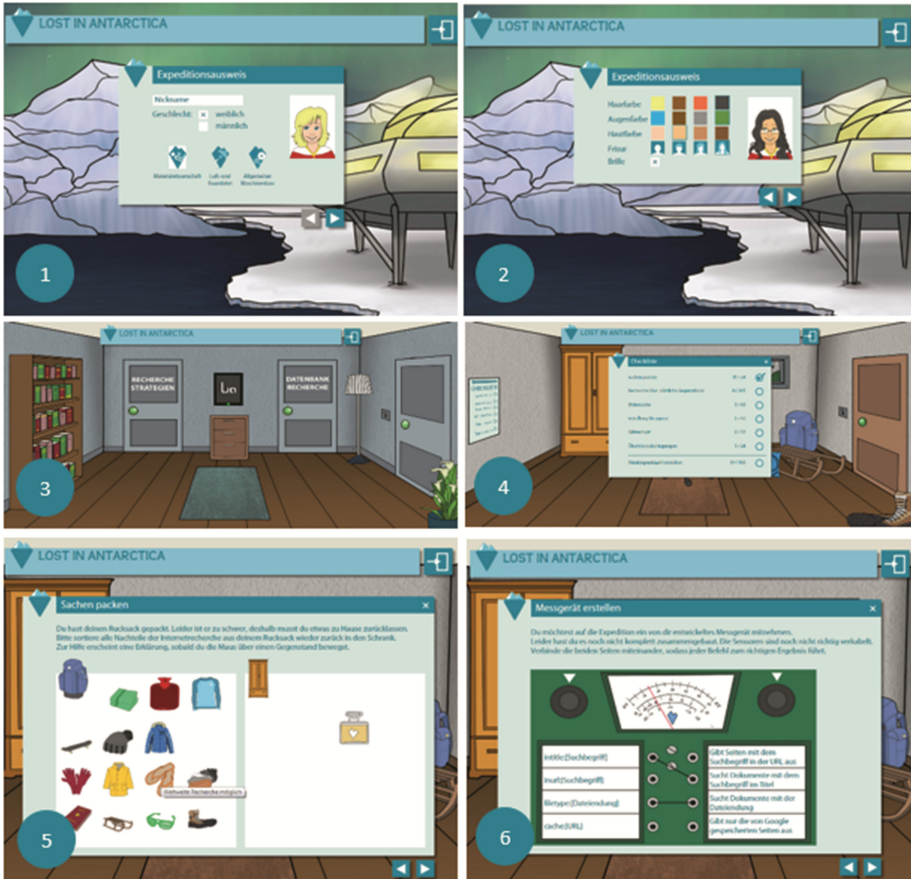


Fig. 1. Screenshots of the information literacy game “Lost in Antarctica”

text tasks and tasks that students have to solve as team, are examples of such tasks. In every level students can gain up to 300 points, but they need only 100 points to progress within the game context. Additional points can be exchanged in mini games (e.g. penguin shooter). The students receive an airplane component for a successful level completion. These components represent the game progress.

3 Significance of “Lost in Antarctica” for Research and Practice

3.1 Significance for Research

The integration of game design elements for gaining IL skills is not totally new but the game design of “Lost in Antarctica” offers new insights into the effects of gameducation through this compilation of game design elements. Answers to the following questions should be found, among others:

- Is the learner's motivation positively influenced by identification with the game story and the avatar?
- Does a balance between collaboration and competition promote the motivation and the student's learning success?
- Does the strong connection between task types and game story influence the motivation?
- Does gameducation positively influence the learning success?

3.2 Significance to Practice

The game "Lost in Antarctica" offers a new method to students for learning IL skills. Librarians can use the game in order to expand their portfolio for IL instruction, and faculty staff can use it in the field of education in order to better prepare students for scientific writing.

4 Evaluation of "Lost in Antarctica" and Future Research

In order to enhance the gaming experience and ensure that the students have fun while learning with the "Lost in Antarctica" IL game, playtests are initially planned. The playtests are based on Fullerton's ideas and may be followed up with some improvements [16].

The IL game is then introduced within a course. An evaluation is carried out in order to indicate whether motivation and learning success are positively influenced by using the game. Learning success is not an easy aspect to measure and consists of different components (e.g. motivation) [17]. For this reason, different methods for gathering information are used. One possibility for collecting information about motivation and learning success is through game play-based interaction [18]. For example, this objective assessment can record how often a student repeats a task and how many points were received. Another possibility is to use a subjective method for assessment. Obtaining information through dialog-based interaction is an example of such a method [18]. Students have to answer questions that are usually presented as questionnaires or interviews, thereby enabling the collection of information about learner beliefs and thoughts.

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