

Story Game as a Stimulus for Experimental Activity

Tatiana SUKELOVÁ, Klára VELMOVSKÁ

*Faculty of Mathematics, Physics and Informatics, Comenius University Bratislava, Mlynská dolina F1,
842 48 Bratislava, Slovakia*

Abstract. In this contribution, we focus on the Story game as a stimulus for experimental activity. Storytelling is prevalent in education, hence our decision to incorporate storytelling into the game. We conducted a survey in which we observed sessions involving our created Story game alongside a Standard assigned experiment, aiming to assess whether the Story game is a suitable stimulus for experimental activity. Based on the questionnaire survey, we can conclude that the Story game serves as a suitable stimulus for experimental activity.

Introduction

Through storytelling, we share information or build social interactions. Storytelling takes various forms and is utilized in education to make learning more meaningful for students (Naul, Liu, 2019). The effectiveness of storytelling depends on both the audience and the storyteller (McDrury, Alterio, 2016). A storyteller's introduction can greatly influence listeners, with some stories provoking strong reactions and others receiving weaker responses. Stories that resonate with students are often those they can relate to base on their own experiences (McDrury, Alterio, 2016). We endeavoured to create a narrative-driven game to encourage students to experiment. The initial inspiration came from the popular game Dungeons and Dragons, which combines storytelling, role-playing, and board games. An adaptation of this popular game was used to foster student self-reflection (Clarke, Arnab, Morini, Heywood, 2019).

Theoretical framework

The main objective of the research was to determine whether narrative gaming as a teaching method could stimulate students to engage in experimental activities. We compared a teaching session where students played the Story game with a session where students conducted an experiment involving a list of materials, procedures, and supplementary questions. During the Story game session, students were provided with the experiment procedure through a story, and the materials were located at stations along with the narrative. The Story game focused on the topics of Phase Changes and Heat. Groups had access to both correct and incorrect answers, which directed them to subsequent stations. These stations featured experiments or supplementary questions. As we aimed to encourage students to engage in experimental activities using different stimuli, we chose the Story game as a stimulus. Thus, we formulated the research question: *Can the Story game stimulate students to experiment more than a Standard assigned experiment?*

Methods and findings

As a research method, we chose classroom observation, where the observer simultaneously acts as the teacher. We supplemented the observation with a questionnaire using a Likert scale (5 - most positive, 1 - least positive response). We utilized the questionnaire for other stimuli we were testing as well. The questionnaire comprises 9 questions:

1. How satisfied were you with your performance during the experiment?
2. How would you rate your involvement in group work?
3. Are you satisfied with the outcome of your experiment?

4. How motivated did you feel during this activity?
5. Do you feel you learned something new?
6. Did you find the execution of the experiment according to the procedure interesting?
7. How did you enjoy working on this activity?
8. Was working with the physics lab tools easy for you?
9. Were you able to follow the given procedure?

After completing both activities, we asked the students to fill out a comparative questionnaire in which they had to choose either the Standard assigned experiment or the Story game. In the survey, 26 students participated. Students attend the second year of an eight-year grammar school (ages 12-13). In Table 1, we present the average values with standard deviations of the students' responses from the questionnaires for the Standard assigned experiment and the Story game.

Table 1. The results of the survey for the lesson with a Standard assigned experiment and the Story game.

The standard assigned experiment									
Questions	1.	2.	3.	4.	5.	6.	7.	8.	9.
Total	3,95	3,87	3,10	3,31	3,39	3,53	3,95	3,77	3,76
	±	±	±	±	±	±	±	±	±
	0,84	0,97	1,22	1,36	1,11	1,19	1,15	1,01	0,97
The story game									
Total	4,54	4,22	4,32	4,40	3,53	4,49	4,41	4,33	4,29
	±	±	±	±	±	±	±	±	±
	0,76	0,97	0,93	0,81	0,82	0,65	0,99	0,75	0,69

Conclusion

The survey results indicate that students responded more positively to each question during the Story game activity, as evidenced by the outcomes. The smallest increase occurred in responses to the 5th question. Students expressed that they learned roughly the same amount of new information in both activities. They felt more motivated during the Story game than during the Standard assigned experiment, and they also found the execution of the experiment more engaging in the Story game. Based on the observations, we concluded that while students did experiment, they did not perceive the physical essence of the experiment. In response to the research question, the answer is affirmative: the Story game stimulates students to engage in experimental activities more than the Standard assigned experiment, as evidenced by the increase in positive responses in the questionnaire during the Story game and the fact that in the comparative questionnaire, students predominantly chose the Story game for each question.

Acknowledgements

This paper was elaborated with the support of projects KEGA 059UK-4/2022 Preparation of physics teachers for the use of non-formal and informal education.

References

- [1] S. Clarke, S. Arnab, L. Morini and L. Heywood, *Dungeons and Dragons as a Tool for Developing Student Self-reflection Skills*, Games and Learning Alliance, Italy, 2018.
- [2] J. McDrury and M. Alterio, Learning Through storytelling in Higher Education: Using Reflection and Experience to Improve Learning, *Routledge* 1 (2016) 200.
- [3] E. Naul and M. Liu, Why Story Matters: A Review of Narrative in Serious Games. *Journal of Educational Computing Research* 58 (2019) 21.