DIGITAL SIMULATION GAMES FOR MEDIA EDUCATION. A DIDACTIC SCENARIO

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ABSTRACT

The authors developed, implemented, and evaluated a digital simulation game for media education in teacher training. The aim of the simulation game is to simulate decision-making processes in schools for the implementation of hybrid teaching in the context of the pandemic. The question is whether the participation in a digital simulation games initiates reflection processes that change or deepen students' attitude towards hybrid learning concepts. For this purpose, N=300 students who participated in 12 simulation games were surveyed by means of a questionnaire as part of a pre-post design.

KEYWORDS

Media Education, Simulation Game, Digital Inequality, Hybrid Teaching, Higher Education Teaching

1. INTRODUCTION

In German-speaking countries, simulation games are increasingly used in the context of university teaching (Meßner, Schedelik and Engartner 2018). Due to the COVID19 pandemic, face-to-face formats had to be dropped or converted into digital formats at universities. The authors therefore developed, implemented, and evaluated a digital simulation game format for media educational teacher training. The main purpose of a simulation game is to initiate experiential and action-oriented learning in a constructed situation that is modeled after real processes (Meßner, Schedelik and Engartner 2018). The objective of the developed simulation game is to replicate decision-making processes in schools for implementing hybrid teaching in the context of the pandemic. The pedagogical learning objectives were formulated as: (1) an associative introduction to the design of hybrid teaching and learning formats in schools, as in many cases no own experiences with this format have been made in the school context, (2) the training of professional competencies (planning of hybrid teaching concepts considering digital inequality) as well as (3) the testing of the methodological arrangement digital simulation game. The question arises whether the use of the digital simulation game caused reflection processes among the students that changed or deepened their attitude towards hybrid teaching concepts.

The findings on learning effects through (digital) simulation games are still limited. However, concerning the phases of a simulation game, which are divided into (1) preparation (2) implementation and (3) reflection (Capaul and Ulrich 2010), it is evident that the reflection phase is of great importance with regard to learning success (Kriz and Nöbauer 2015). Therefore, quantitative questioning was used to find out to what extent the perception of multiple perspectives and digital inequality as well as the planning of hybrid teaching caused reflection processes among the students. Methodologically, the conducted simulation games were evaluated by means of questionnaires in a pre-post design. N=300 students who participated in 12 simulation games were surveyed. The aim of this paper is to reflect on the potential of digital simulation games for (hybrid) university teaching.

2. SPECIFICS OF THE SIMULATION GAME

Digital simulation games offer the possibility of action-oriented learning in constructed situations. These situations are modelled on everyday situations in a virtual world (Pappa and Papadima-Sophocleous 2018). In the case of the present media-educational simulation game, for example, a situation from everyday school life is simulated. Of course, the simulation cannot be compared 1:1 with the everyday situation. Rather, it is reduced to certain decision-making situations that the players have to deal with. Nevertheless, the constructed situations still contain the characteristic structures and possibilities for action of the everyday situation (Meßner, Schedelik and Engartner 2018; Von der Weth et al. 2018). Simulation games are characterised by the following dimensions, which are also omnipresent in everyday situations (Imhof and Starker 2020):

(1) Uncertainty and the pressure to act or make decisions.
(2) Openness to the future, in the sense that the players can decide and act in different ways and thus encounter and change situations.
(3) Development options, in the sense that the decisions made have a perceptible effect.
(4) Interconnectedness, in the sense that the actions can also have an effect on the other roles.
(5) Dynamics, in the sense that a spiral of emotions can be set in motion.

The process of simulation games can be described using a certain phase structure (Reinhardt 2016). As part of the introduction, the learners receive materials for preparation, from which a situation description, tasks, rules and role descriptions emerge. In the following phase of information, the focus is on the examination of the materials, the learners prepare for their roles and finally take them. The phase of deciding and planning offers the players space to organise themselves within group structures by analysing needs, wishes and conflicts arising from the role description. In the course of the interaction, the different group structures meet and come together with different, sometimes opposing positions; the exchange and negotiation begins. The final phase of evaluation - also called reflection phase in the following - is connected to the game and allows the learners to reflect on what they have experienced by taking up and discussing procedures, conflicts that have arisen and possible solutions that the learners have experienced within their roles. Likewise, a reference to reality is established and a transfer of what has been learned to this very reality is aimed at (Fischer and Reinhardt 2018). If we condense this fine-grained structure, the phase structure basically always comprises introduction, game and reflection.

The form of simulation games can vary and differs above all in the role-based interaction phase of the game. This can take place, for example, in an analogue learning environment, within the framework of a board game or also in a digital learning environment. There can be methodological overlaps and parallels between the simulation game method and other teaching-learning arrangements. In principle, simulation games are characterised by their reference to institutional mechanisms of function and effect and complex issues, thus distinguishing them from role-playing games. In the context of role-playing games, the focus is much more on dealing with and processing the immediate living environment (Fischer and Reinhardt 2018). Accordingly, differentiations can also be found in the role descriptions: In simulation games, roles of functionaries often appear, whereas in role plays, life-world roles are central (Petrik 2017). Both in a case study and in a simulation game, learners have to deal with a case or a scenario in which abstract and complex contexts are shown on a concrete person-related level, and to understand this case or scenario. However, the scenario of the simulation game provides role-based, partly institutional, guidelines for action and rules that require attention from the players and provide a framework (Fischer and Reinhardt 2018). Thus, the learners experience the interrelationships as well as the complexity from the dynamic model-based game events (Schwägele 2015). Learning in case studies, on the other hand, takes place primarily through the development of questions that should lead to making the complex interrelations visible and understanding them. Only then are action and solution strategies formulated and discussed (Fischer and Reinhardt 2018).

Didactically, the implementation of a simulation game always makes sense if the learning objective is to deal with complexity (Riberio 2019). Digital simulation games make it possible to encounter the complexity of a specific everyday situation in a virtual, protected space and to deal with one's own actions and the available options for action within the framework of playful action and later joint reflection in the group (Adipat et al. 2021; Vasmatzoglou and Ní Chiaráin 2020).

3. SCENARIO OF THE SIMULATION GAME

In the developed simulation game "Hybrid Teaching in Times of Pandemic. Challenges and Possible Solutions", the complexity is reduced to the aspect of planning or designing hybrid teaching during the pandemic, with different levels of digital inequality becoming perceptible during the game (such as unequal equipment, access, user experience or media literacy). Each simulation needs its specific scenario and specific roles. In the present scenario, typical roles were developed for teachers, student representatives, parent representatives and school management and were given to the players digitally in the form of an individual role description for each. Roles can be, for example, the "innovative principal" or the "media-critical teacher". How the media-critical teacher behaves, whether he voices his criticism aloud, tries to boycott digital instructional design or simply does not support media innovations, is a matter of interpretation for the players.

The spatial scenario was chosen so that the simulation begins at a fictive school. School management, teachers, parent and student representatives initially meet in an assembly hall. The vacations are over and the school management informs about new ministerial requirements. Due to the pandemic, purely face-to-face teaching is currently not possible on site and classes must be held hybrid for the time being. First, the homogeneous status groups start planning or exchanging ideas in virtual rooms: the teachers develop concepts under pressure on how they can design their subject lessons hybridly from now on; parent representatives and student representatives exchange ideas on dimensions of digital inequality that make hybrid teaching more difficult. Afterwards, the status groups mix and go into the discussion of the developed concepts in a new composition. In the virtual rooms, for example, discussions take place between teachers and student representatives, different levels of digital inequality are pointed out and their consideration in the concepts is insisted on.

4. EVALUATION

The implementation of the simulation game "Hybrid Teaching in Times of Pandemic. Challenges and possible solutions" was additionally evaluated and the results will be presented in the following. Participation in the pre- and post-survey was completely anonymous and voluntary. The allocation of data from the pre- and post-survey was carried out using personalised complex codes that did not allow any conclusions to be drawn about the individuals. First, the students took part in the pre-survey, then in the simulation game and after the simulation game in the post-survey in the sense of a pre-post design. Of the total of 300 participating students, N = 221 students took part in both the pre- and post-surveys. 23 (10.4%) of the 221 participants had already taken part in a simulation game before. Of these 23, 20 (87%) had participated in a face-to-face simulation, 2 (8.7%) in a digital simulation and 1 (4.3%) in a hybrid simulation. In the simulation, 107 (48.4%) took on the role of teachers, 45 (20.4%) the role of parent representatives, 16 (7.2%) the role of headmasters or vice-principals and 53 (24%) the role of student representatives.

The students went into the simulation in a positive frame of mind, even though most of them were not sure what to expect (see Table 1). They also stated that they were more sceptical about digital simulation games than face-to-face simulation games. In addition, they believed that the simulation game would provide them with both an increase in competence and opportunities for reflection. It was striking that 181 (82.7%) of the 221 students stated that they knew different arguments for and against hybrid teaching, but only 85 (38.5%) had a firm opinion on hybrid teaching. Of these 85 students, 40 (47%) are sceptical about the digitisation of face-to-face teaching. Finally, the pre-survey revealed that the students largely perceived themselves as competent, both critically-reflexively and in the conception and implementation of digital or hybrid teaching lessons.

Table 1. Mean values of items in relation to expectations and attitudes towards digital simulation games

Item	M	SD
I prefer a digital simulation game over the offline version. (N=221)	2,71	1,31
I am uncertain about what to expect from a digital simulation game. (N=220)	3,71	1,13
I'm looking forward to the digital simulation game. (N=218)	3,67	,98
I expect to learn something by participating in the digital simulation game. (N=220)	3,90	,89
I expect the digital simulation game to encourage reflection about the topic. (N=221)	4,02	,92

Notes: M = mean (with 1 = fully disagee, 5 = fully agree); SD = standard deviation.

The simulation game as a whole was predominantly evaluated positively (see table 2), it seems to have been fun for most students. The cooperation with other students was viewed positively for the most part. The reflection phase that followed the simulation was also considered useful for the most part. Although some students stated that their own attitude did not match the attitude of the role they had to play, most stated that they found it easy to play their role. This indicates that the role descriptions and the tasks set were clear and not overwhelming, but at least that the handouts on the simulation and the support can be rated as helpful.

Table 2. Mean values of items describing the effects and evaluation of the digital simulation game

Item (N=221 for all items)	M	SD
The simulation helped me to better understand arguments for and against hybrid learning.	4,15	,82
I enjoyed the digital simulation game.	4,31	,75
The digital simulation game got me thinking about hybrid learning.	4,19	,76
I learned something through the digital simulation game.	4,00	,86
My expectations of the digital simulation game were met.	4,04	,83
My opinion of hybrid learning has become more positive as a result of the digital simulation game.	2,84	,95
I felt comfortable in my role in the digital simulation game.	4,11	,95
The attitude of my role also corresponded to my own attitude.	3,17	1,34
It was easy for me to "play" the attitude of my role.	4,06	1,01
I made an effort to slip into my role as authentically as possible.	4,05	,90
I can imagine using a digital simulation game in my classes someday.	4,14	,953
I would like to play the digital simulation game again.	3,50	1,11
The reflection period was useful.	4,03	,95
The cooperation with other players worked well.	4,52	,62
Things also got a little emotional in the digital simulation game.	2,03	1,07
I felt activated by the simulation.	3,90	,89

Notes: M = mean (with 1 = fully disagee, 5 = fully agree); SD = standard deviation.

It is worth mentioning that the simulation obviously stimulated reflection processes about hybrid teaching in the students and they also noticed an increase in learning, but this did not automatically translate into a more positive opinion towards hybrid teaching.

Overall, the feedback was predominantly positive (see table 3). Both gather.town as a platform for the digital simulation and the support provided by the game leaders were predominantly rated positively. Although the students had a certain basic scepticism towards digital simulation games, they stated that their expectations were largely fulfilled and that they perceived an increase in knowledge.

Table 3. Mean values of items describing the students' feedback

Item (N=221 for all items)	M	SD
How do you rate the user interface design in gather.town?	4,34	,65
How do you rate the support before and after the simulation by the game management?	4,48	,64
How would you rate the role description/manual for the simulation?	4,42	,66
How well were your expectations of the simulation met?	4,12	,71
How has the simulation impacted your growth in knowledge about hybrid teaching and learning?	3,87	,71
How well is the knowledge acquired through the digital simulation game suited for transfer to reality?	3,97	,67

Notes: M = mean (with 1 = very bad, 5 = very good); SD = standard deviation.

5. CONCLUSION

There are still few didactic concepts for the implementation of simulation games in the field of media education - although the concept is particularly suitable for this field because it enables to deal with digitality at different levels.

An evaluation of whether the learning objectives of a simulation game have been achieved presents itself as a challenge (Spaude, Starker and Imhof 2016), because there is the difficulty of measuring how the acquired knowledge or competences from the digital simulation game are transferred into practice or how the reflection is to be evaluated. Due to the quantitative data collection carried out in the context of this simulation game, no statement can be made about the quality of any knowledge and competence growth. The results of this evaluation therefore point to the need for further analyses and the addition of qualitative data in order to be able to present and measure the effects of the digital simulation game in a more differentiated way. Based on the quantitative evaluation, it can only be stated that reflections took place and were perceived as enriching. A more in-depth methodological and didactic examination of the simulation game method in the area of teacher training as well as media education appears to offer added value.

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