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Situation Simulation as a Pedagogical Method in Teacher Education

Dace Medne Dr. paed.
Jāzeps Vītols Latvian Academy of Music, Latvia
dace.medne@jvlma.lv

Abstract: The idea of sustainable development has been identified as the overarching goal of the 21st century in various sectors of the Latvian economy, including education. This idea of sustainability encourages teacher education programs to look for new approaches and pedagogical ways to achieve learning outcomes, i.e., to ensure that graduates are effective implementers of sustainability ideas in their professional careers. Simulation-based education has been found to be an effective way to address these challenges in many countries. It offers students the opportunity to learn in a safe environment, as well as promotes self-efficacy in their professional activities. This article highlights ways in which simulations can strengthen teachers' professional skills in everyday and critical professional situations. The aim of this publication is to analyse the effectiveness of the situation simulation method in the context of teacher education. The methodology of the research consists of a set of qualitative data obtained by interviewing 37 graduates of the teacher education program, for whom situation simulation was used as one of the methods during their studies. The professional benefits identified in the interviews were mapped in relation to the planned learning outcomes and it was concluded that this method can be used both as a teaching method and as a tool for assessing professional skills. The study data were analysed using the qualitative data processing program NVivo 12.0. Within the framework of the research, the benefits for students both in the study process and in starting an independent professional activity were analysed and described.

Keywords: situation simulation, small teaching approach, reflexive approach, teacher education, NVIVO

Introduction

In order to implement the vision for education set out in the Guidelines for the Development of Education of the Ministry of Education and Science of the Republic of Latvia for 2021-2027 “Future Skills for the Future Society” and to address the challenges related to the current situation, four interrelated goals for the development of education have been identified: (1) highly qualified, competent and excellence-oriented teachers and academic staff, (2) a modern, high-quality education offer focused on the development of highly valued skills in the labour market, (3) support for everyone's growth, (4) sustainable and efficient management of the education system and resources (Education Development…, 2021). Namely, they focus on each person's skill "Learning to Transform", thus through the individual level to the sustainability of education and society. These interrelated goals set out in the guidelines for the development of education include the idea that teachers need professional and transversal competencies, especially in situations of uncertainty. The process of educating a professional teacher is complex and multidimensional. The education sector is gradually moving towards assessing the performance of teachers' skills and focusing on improving quality. An equally important aspect is that the complex educational issues of the 21st century often require the cooperation of interdisciplinary specialists. The administration of education increasingly often means that students' specific information is transferred from one specialist to another, where communication is one of the most important skills. The strategic management of this approach is based on an understanding of the form and content of communication that underpins healthy development. Thus, defining a pedagogical communication strategy centered on trust-based relationships as the leading one. In order to form trust-based relationships in practice, and not just as the compilation of knowledge, the issue of the relationship between the dimensions of individual development and social factors is raised, where quality is determined by the experience of subjective acquisition of both things and social situations (Medne, 2019). Higher education is not only the acquisition of specific competencies and qualifications, but also the process of human talent, emotional intelligence and personality development (Medne et al., 2019), so it can be considered that learning outcomes in any educational program are holistic and synergistic. In practice, part of the

professional (field-specific) competencies is acquired in close connection with the transversal competencies. By gradually acquiring transversal competencies, they promote the acquisition of professional or disciplinary skills and form the basis for masterful professional pedagogical activity. Transversal competencies are developed in formal and informal situations, are related to general skills and apply to all types of activities (Langa, 2015). The search for effective pedagogical solutions in teacher education has become a serious field of pedagogical research and simulation is one of the teaching methods that can be integrated into teacher education programs. Simulation is considered to be an effective method as it best links theory and practice and promotes the acquisition of specific professional skills.

Simulation is used as a teaching method in many industries. Although their use in teacher education is still less common in practice, research and experience in other sectors, it also points to their potential in the implementation of teacher education programs (Kaufman et al., 2016). The use of this method in teacher education is becoming increasingly important as the need for practice in authentic situations is emphasized. In teacher education, it is based on the professional needs of the teacher, as the results can be immediately applied in everyday professional activities. The simulation-based educational process allows for the repetition of skills up to a certain level, in a risk-free environment and without the direct presence of students (or others involved in the pedagogical process). The simulation provides an immediate reflection, giving the student the opportunity to complete the task, using the comprehension of errors or possible consequences already gained in the first attempt. Thus, a learner-centered educational process is provided in which the student tries to acquire complex professional skills without harming the learner (or other person involved in the pedagogical process) (Elspets et al., 2015). However, in the current pandemic situation, the format of remote work has challenged to improve and modify situation simulations according to the remote format. Simulations in a remote format are considered to be a fully feasible practice also during post-pandemic period (Torres et al., 2020).

Thus, the existing societal challenges for teacher education, as well as the binding regulatory situation in the organization of education, make it necessary to analyse: (1) the shifting of the focus of the implementation of the learning process from the acquisition of knowledge to the acquisition of professional and transversal skills in real time and space; (2) the improvement of professional and transversal skills of future teachers in the simulation experience and to identify students' professional benefits using it.

Simulation for the acquisition of professional skills of teacher

Simulation is a simplified but accurate model of reality (Sauvé et al., 2007) that allows users to face problem situations, try decisions and actions, experience results and model their behaviour without risking harm to the learner (or any other person involved in the pedagogical process). Simulations have many advantages, including the ability to (1) replicate scenarios with specific learning objectives, (2) provide practice longer than in real life through trial and error, experience rare or risky situations, and (3) clearly measure outcomes using defined assessment criteria.

Pedagogy is used to practice and evaluate situation simulations in scenarios such as interviews or conversations; responding to critical situations (such as challenging student behaviour in the classroom), making quick decisions. There are three types of situation simulations that are considered to be particularly effective in teacher education:

In *Scenario / Role Play simulation*, a student takes on the role of a teacher and performs tasks such as leading a lesson or coordinating a response to a complex pedagogical situation. In this case, the student is presented with a scenario and has to research the best possible solution strategies to complete the scenario.

Team scenario / role play simulations in which students perform multiple roles. This method is also often used as a way to promote collaborative skills (Eppich et al., 2011). This type of situation simulation, which simulates actual pedagogical situations, is used to teach to identify a problem and solve it within a team, thus requiring the ability to effectively set priorities and productive cooperation in a limited time (Schroffel, 2012).

Simulations with standardized patients and students. A standardized client is a person (a professional or amateur actor, or the students themselves) who accurately reproduces a script (McMaster University, 2015). This type of simulation is used to provide students with the skills to manage a variety of situations, to respond to a standardized student's individual behaviour, learning traits, and possibly special needs.

Methodology

A qualitative approach has been chosen to achieve the goal of the research. The study consisted of two stages. In the first stage, in order to achieve the aim of the study, the interview was chosen as the data collection method, as it reduces the possibility for the respondent to give imaginary "correct" answers and allows to gain an understanding frame in the context of the research topic (Cohen et al., 2007). The interviews have been analysed using quantitative context analysis, which allows for an analytical and descriptive comparison of the thematic diversity updated in the narratives with the learning outcomes identified in the study course. The linguistic context analysis of the interviews was performed in the qualitative data processing program QSR NVivo 12. The choice of the Nvivo data processing program in the study was determined by the fact that it increases the validity of the qualitative study (Siccama et al., 2008). The processing and analysis of interview data was carried out in the following order: (1) preparation of interview transcripts in Microsoft Word; (2) importing transcripts into an NVivo file; (3) open coding in the NVivo file (identification of topics, contexts, problems) by assigning a code to the relevant snippet of the interview transcript; (4) implementation of the interpretation of content, based on the context structure developed in the context analysis.

In the next stage of the study, a mapping matrix was developed based on Microsoft Excel to structure, visualize and analyse the interrelationships between the identified code (identified student's professional gain) and the planned learning outcomes. The purpose of mapping is to create a hierarchical map of skills acquisition steps for planning learning outcomes, as well as for assessing students' skills in accordance with the results planned for the study course. Mapping has been chosen as a method at this stage of the research, because one of the goals of the mapping method is to identify whether the learning activities are appropriate as a result of the study.

Sample type for this study: purposive sample. The sample consisted of teachers working in educational institutions who had completed the study course within 2 - 5 years (n=37). Age of respondents: 25 - 29 years. The study was conducted in accordance with the ethical aspects of the research, and consent was obtained from the study participants. No information was requested in the interviews that could identify the respondents. Participants in the study were informed that they had the right to terminate their participation in the study at any time. Interviews were conducted remotely using the Zoom platform.

Procedure: according to the results of theory analysis on the benefits of teacher education (practice of the Psychology study course as one of the pedagogical methods), situation simulation was introduced in 2015. The aim of this research is to evaluate the obtained results for the inclusion of situation simulations in the pedagogical process, namely, to analyse the effectiveness of the use of situation simulations in teacher education, identifying graduates' professional benefits and mapping them with the planned learning outcomes. The structure of the Psychology study course within the framework of pedagogy programs is formed logically and sequentially. The study course is developed within the framework of reflexive and small teaching approaches. The reflexive approach is chosen because the teacher's ability to reflect on his emotions and understand how they drive his teaching style and professional development (professional mastery) determines the teacher's self-efficacy (Medne et al., 2019). The small teaching approach, on the other hand, has been chosen because it is an evidence-based promotion of student learning centered on respect for the specificity of cognitive processes, thus promoting self-directed learning and enhanced meta-cognition (Lange, 2016).

Psychology study course includes the following thematic ranges: general psychology, pedagogical communication, special knowledge in the field of protection of children's rights, developmental psychology. The aim of including situation simulations as a teaching method in the acquisition of the study course was to achieve the learning outcomes specified in the study course, and thus to promote the ability of graduates to implement the ideas of educational sustainability in practice.

At the beginning of each thematic range (general psychology, pedagogical communication, special knowledge in the field of protection of children's rights, developmental psychology) students received a description (scenario) of the situation, the solution of which, in the process of acquiring a particular thematic range, they solved / modelled individually. Students were encouraged to ask questions about the information they needed and about the people involved in the situation. The lecturer provided the necessary information, which the students had identified as necessary. In the first stage of the simulation, the Open book approach is used; students are encouraged to use the available study literature to develop their own strategy for solving the situation. The second stage is a scenario simulation, which is implemented by concluding a thematic range. The simulation takes place during contact hours (both face-to-face and remote). The third stage is a reflection on the simulation. In group simulations, groups and roles in the scenario were selected at random. In the creation of groups, the principle of randomness has been chosen in order to diversify the nature of cooperation and experience of cooperation to the maximum. In turn, scenario roles were chosen at random to enrich the experience of understanding social roles.

Results and Discussion

In order to understand the professional benefits of the respondents in the process of studying the Psychology study course, interview transcripts were imported into the NVIVO program. The next step was open coding (identifying topics and contexts by assigning a code to the relevant snippet of the interview text). During open coding, eight open codes were identified according to the purpose of the study: Cognitive Benefits, Cooperation and Cooperative Learning, Problem Solving, Communication, Self-Efficacy, Motivation, Application. The identified codes are summarized in Table 1.

Table 1

Frequency matrix of codes identified in the interviews

Open code	Total Number of interviews where the open code was identified	Total open code usage frequency
Self-Efficacy	37	126
Problem Solving	35	121
Motivation	29	97
Communication	37	112
Application	35	123
Cognitive benefits	36	99
Cooperation and Cooperative Learning	28	84

Code usage frequency indicates how widely and extensively respondents talk about each question, including, indirectly, what is important or topical for the interviewee. The obtained results show that the respondents describe the cognitive benefits, problems, solutions, self-efficacy, communication, application and motivation in a sufficiently detailed and extensive way, with relatively less focus on collaboration.

Respondents associate *cognitive benefits* with the acquisition of knowledge, understanding of the content and conceptualization of concepts, the ability to interpret, in-depth learning, action-oriented thinking, the promotion of analytical thinking, scientific judgment making process and the acquisition of basic concepts in everyday pedagogical work. Respondents emphasize that when starting an independent professional activity and currently working at school, they understand and evaluate the importance of theory in the implementation of practice. The interviews emphasize that comparing different points of view has promoted analytical skills and critical thinking, as well as that argumentation skills have raised their self-confidence throughout the study process. The interpretation

of this code also illustrates the importance of self-reflection in the professional activity of a teacher. Self-reflection is a metacognitive skill that is considered to be an essential component of in-depth learning. Respondents emphasized that their assessments of learning achievements had also improved significantly, not only in the specific study course, but also in other study courses. Thus, it can be assumed that the use of simulations in one study course affects the overall performance of students, as it is likely to promote conceptual understanding. The interdisciplinary benefits of simulations should be examined in further studies of different forms. Within this code, respondents also reflect on the fact that knowledge, the ability to reflect, and critical thinking have contributed to their sense of security when starting to pursue a professional activity on a daily basis. However, the benefits of this code are more likely to be attributed directly to the learning process.

Thus, it can be concluded that the interpretation and benefits of this code are related to both the learning process and professional benefits for practice, as well as the acquisition of the content of the study course, the benefits of healthy personal development and the benefits of professional skills.

Respondents in *Problem Solving* interviews interpret their behavioural algorithms to address different pedagogical situations. The content of this code included two dimensions of content. The first dimension was related to the fact that the respondents emphasized the idea that they had learned to solve specific pedagogical problem situations directly, but the second dimension included the idea that they had acquired the ability to resolve mutual disagreements and conflicts during the simulation of situations. Respondents admit that it was the simulations that contributed to their ability to identify steps to solve the problem, namely to identify the problem, discuss alternative solutions, decide to take action and take responsibility. The benefits of this code are more likely to be attributed to the benefits of practice as part of professional mastery.

Communication. This code describes the dimension of the lecturer's involvement in the implementation of the simulation: what the respondents expect from the teacher (clarification of instructions, ideas, answers to questions, emotional understanding, professionalism, intelligence) and emotional background (support, positive attitude, encouragement, sense of humour). Namely, the content of this code in the context of the implementation of simulations emphasizes trust-based relationships between the teacher and the student. The interpretation of the content of this code marks the relevance of the ideas of a people-centered approach in education. Respondents emphasize that the lecturer's support and understanding has facilitated their learning, especially in selecting and discussing new information, as well as in complex situations. Thus, the social role of the lecturer as a cooperation partner is emphasized. Respondents within this code emphasize that the example of emotional support demonstrated by the lecturer is also implemented in their professional activities. Thus, the importance of the example as a pedagogical method in higher education was outlined.

The analysis of this code leads to the conclusion that during the implementation of simulations it is important that the communication process includes a relationship based on trust and cooperation with the teacher. It would be important to study the benefits of lecturers during simulations, which could be one of the dimensions of further research in this study. The interpretation of this code is related to both the benefits of the study process and the benefits of professional mastery, however, mainly the position and personality of the teacher in the learning process is established in this code.

Self-Efficacy. Within this code, respondents emphasize that the simulation method has boosted their courage, confidence in their pedagogical competencies and decisions, and promoted an optimistic approach to managing pedagogical situations, including balance in difficult situations. Respondents emphasized that when reflecting (over a longer period of time) on their pedagogical activity, they realized that simulations had made the more confident that they could teach students. Respondents indicated that simulations have contributed to their understanding of the need to learn for themselves. The interpretation of this code is mainly related to the benefits of professional skills for practice.

Motivation. Within this code, motivation was related to the performance of tasks, interest in learning, cognitive interest in completing the simulation provided by the emotional background. It is accented that the respondents enjoyed participating in the simulations: they felt interest, joy, inspiration. Respondents within this code also pointed out that a sense of belonging to the group promoted motivation. Respondents also indicated that the incompleteness of the situation had stimulated their desire to explore. This code outlines the relationship between achievement and self-confidence, with

respondents affirming that situational awareness has boosted their self-confidence. The interpretation of this code is related to both the learning process - to complete the task, and the interest in how the solutions work together in practice.

Application. Within the framework of this code, the respondents emphasize that when starting an independent professional activity both in everyday pedagogical situations and in difficult pedagogical situations, they have felt safe, they knew how to act in situations that had to be dealt with in everyday practice. They have also been able to flexibly change their methods of dealing with situations. The simulation process has provided a form of practical learning in which they have been able to take an active part in situations. Thanks to this active participation, the respondents were able to use the taught theoretical concepts in practice. The interpretation of this code is mainly related to the benefits of professional skills.

Respondents interpret *cooperation* as an interaction between the people involved. Within the framework of this code, it is emphasized that when endeavouring into their independent professional activity, there has been an understanding of the specifics of cooperation and algorithms for solving various pedagogical situations and opportunities for active participation, support and cohesion. They have developed the ability to argue their point of view, which has made them feel safe in their professional life. In the interpretation of this code, opinions about the nature and involvement of the team were dichotomous even in one interview. On the one hand, respondents emphasized that teamwork is a tool that facilitates decision-making in the simulation, on the other hand, discussed the importance of each participant's involvement in the simulation, the fact that there were colleagues who did not want to take responsibility or had poor communication skills that made it difficult to work in a team. Despite some negative connotations, all respondents acknowledged that this experience helped in their professional activities overall. The interpretation of this code is related to both the benefits of the study process and the benefits of professional mastery.

Results of the second stage of the research

In order to analyse the connection of the identified students' professional benefits with the study achievements planned in the study course, a mapping matrix was created, which provided an opportunity to link each code identified in the interviews with a specific study achievement planned for the study course. The data structure of the mapping results consists of the identified professional benefits (collaboration and collaborative learning; cognitive benefits; problem solving; communication; self-efficacy, motivation; application) and learning outcomes defined in the course description (seven in total): to promote students' professional autonomy teaching methods and techniques; provide feedback; to solve pedagogical situations and personalize teaching according to learning needs; is able to create a safe, inclusive and supportive learning environment); understands the issues of teacher ethics, safety and children's rights, as well as the pedagogue's role in the learning and socialization process, is able to cooperate with colleagues, parents and society; is able to use the acquired theoretical knowledge in practice: to solve psychologically complex situations, conflict situations, to work with the diversity of learners; understands one's personality (is able to identify in different social roles); understands the importance of self-education in professional development and further education; is able to communicate respectfully with learners, colleagues, learners' parents and society; by analysing the dynamics of students' achievements, is able to systematically evaluate and improve their performance; is motivated for lifelong learning and professional development in accordance with the latest findings in pedagogy and psychology.

It was possible to map all the codes identified in the interviews against the study results determined in the study course. Such results indicate a good succession between the planned learning outcomes and the competencies acquired by the students during the learning process, in which situation simulations are used. By mapping all the codes against the study results specified in the study course description, it has been established that these codes correspond to all seven study results specified in the Psychology study course. Analysing the results obtained in the mapping, it can be concluded that the situation simulation as a study method corresponds to the planned study result of the Psychology study course. Furthermore, this study confirms the benefits of simulation as a method, as well as gain of planned study results and the real skills of graduates in practice.

Discussion and Conclusions

Research interest in the inclusion of situation simulations in teacher education is growing as the pedagogical focus shifts from a lecture-oriented environment to an organized one involving students. Thus, active learning methods, including situation simulation, are being practiced more and more. It is important that the changes introduced by the pandemic, which required that higher education adjusts accordingly, allow us to predict that simulations will play an important role in the pedagogical process in teacher education as well. The aim of this study was to determine the benefits of teachers' acquisition of professional and transversal competencies when situation simulation is used in the pedagogical process.

It was concluded that the respondents have identified the benefits of situation simulations both during the studies and starting an independent professional activity. During the studies, this method has promoted performance not only in the specific study course, but also in other study courses, which allows us to assume that situation simulation promotes students' conceptual understanding. In addition, simulations are interpreted as an emotionally enjoyable learning method that requires active and shared engagement and thus also helps to improve learning skills. An equally important place is given to the lecturer, who implements situation simulations both because of his personality and the way of communication with students. That allows us to assume that the importance of trust-based professional relationships is also emerging in the context of higher education. Respondents emphasize that the skills acquired in simulations when starting a professional career have promoted their independence, self-directed decision-making, sense of security, and flexibility, which are components of professional autonomy. Respondents also emphasized equanimity when dealing with situations of different levels of complexity, perseverance, which respondents attribute to readiness to deal with situations even when they are discouraged, self-reliance - faith in oneself and one's potential, and meaningfulness - evaluation of one's own contribution to solving situations. All of these criteria are part of resilience (Caplan, 1990), so the use of simulations can be considered to enhance students' resilience.

The results indicated a good succession between the planned learning outcomes and the competencies acquired by the students during the acquisition of the study course. Therefore, it can be concluded that situation simulation as a teaching method is appropriate for the implementation of the Psychology study course in order to achieve the planned results. Also, the results of this study confirm the efficacy of simulation as a method, as well as the gain of the planned learning outcomes and the acquisition of graduates' competencies in practice and thus can be both a teaching method and a type of examination.

Although this study determines the sustainability of the situation simulation framework in the context of teacher education, it has limitations. The benefits of using situation simulations in this study were considered from the student's point of view, however, in order to objectify the results of the study, it is important to find out the position of lecturers, because the inclusion of situation simulations also marks complex aspects. For example, costs (computer simulation), time resources (both in the preparation and implementation of simulation scenarios), and possibly a change in lecturers' understanding of learning approaches. Situation simulations are a type of simulation that most educators implement individually. In order to develop scenarios relevant to the pedagogical reality and to integrate them into the implementation of the study course, it requires lecturer's time and understanding. The theoretical basis, a clear understanding of the behaviour to be practiced or evaluated, a professional simulation model, sufficient realism, and a feedback mechanism are essential in the situation simulation method. It would therefore be useful to continue research in this direction as well.

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