

USING SIMULATIONS AS A TOOL TO ENHANCE CLASSROOM MANAGEMENT PRACTICE

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Abstract

This research investigates the effect of simSchool, a web-based classroom simulation, on undergraduate students' classroom management skills. Sixty-three undergraduate students of the School of Pedagogical and Technological Education (ASPETE) of Athens participated in the research. Questionnaires with closed-ended and open-ended questions were used as a data collection instrument for the survey. The results indicate that the use of simSchool improved participants' pedagogical and teaching skills. The simulation enhanced participants' classroom and behavior management skills, while it helped them learn to analyze the characteristics and the different needs of their students and adjust their instruction in order to motivate and improve their students' performance.

Keywords: Simulations, simSchool, teacher training, classroom management.

Introduction

The introduction of technology in education gave new perspectives to teaching and learning posing new challenges to teachers, who must redefine their role and enrich their knowledge and skills in order to improve the quality of education (Makri-Botsari, 2007). The biggest challenge for teachers lies in the fact that they must teach a generation of students who are growing up with technology from an early age and have open access to unlimited resources globally. Teachers must adjust to a constantly changing classroom and find new ways to communicate with their students. Moreover, they must use new innovative ways to maintain their students' interest and guide them to conquer knowledge but also support them socially and emotionally. At the same time, another challenge in today's classrooms is the diversity of a student population that is characterized by different cultural backgrounds and language, different levels of knowledge and different learning needs (Koutsothanasi, 2010).

Teacher's professional development in the context of today's digital environment became one of the priority areas in the European agenda (European Commission, 2012). However, the Joint Report by the Council of the European Union (2010) noted the lack of opportunities for teachers to improve their teaching and ICT skills. Additionally, researchers reveal that teacher education programs do not adequately prepare candidate teachers with the necessary skills and knowledge for effective teaching (Katsarou & Dedouli, 2008; Kirby, McCombs, Barney, & Naftel, 2006; Mavrou &

Meletiyou-Mavrotheris, 2013; Woolfolk, 2005). The last few years many efforts have been made to enrich teacher education programs with technology-based approaches to better prepare candidate teachers to deal with classroom complexities. One innovative tool that seems promising for the preparation of tomorrow's teachers is classroom simulations that offer a realistic experience that can enhance their cognitive, social and emotional development.

Investigating the Needs of Greek Teachers

The effectiveness of university teacher training programs depends on whether they meet the real needs of teachers based on the difficulties that they face in their everyday school practice (Katsanda, 2005; Katsarou & Dedouli, 2008). A review of the literature revealed that Greek teachers need more training on issues related to learning disabilities, behavioral disorders, classroom management problems, cultivating social skills, emotional management and multicultural differences (Anastasiadis et al., 2010; Karagianni, 2008; OEPEK, 2011). Equally important is the fact that teacher education programs offer theoretical education and only a few hours of practice in schools that in most cases has the form of observation and not of actual practice (Anastasiadis et al., 2010; Katsarou & Dedouli, 2008; Patouna, 2005).

Greek teachers need to reflect on their changing role and update their teaching methods with new innovative teaching approaches (Katsarou & Dedouli, 2008). Moreover, teachers need to deepen their knowledge in their own domain, improve their skills in order to effectively manage their classroom and emphasize areas such as: organization of the learning environment, motives for learning, individual differences of the students, learning difficulties, behavioral problems, student discipline, multicultural education, the psychological dimension of the educational process and the psycho-emotional needs of the students, classroom climate, development of metacognitive skills, etc. (Makri-Botsari, 2007; Katsarou & Dedouli, 2008).

The Pedagogical Institute (PI) of Greece (2009) suggests the use of active methods for teachers' training such as simulations and role-playing games where teachers can act both as the student and as the teacher. Nowadays, advanced digital technologies can give a new dimension to the educational approaches proposed by the PI. Computer simulations can serve as a tool for candidate teachers' professional development by creating an authentic learning experience that enhances learning within a constructivist approach where the learner plays an active role by participating in the construction of knowledge.

Using Simulations in Teacher Training

Simulation games are an integral part of training programs in fields such as medicine, military and management. Simulations place the player "in a realistic setting where he or she is confronted by a problematic situation that requires active participation... through a sequence of inquiries, decisions and actions" (Baek, 2009, p.29). They offer a "unique...authentic learning experience when it is impossible or impractical to foster such an experience in the physical world" (Baek, 2009, p.27). Simulations can be used in teacher preparation providing a rich learning experience in a virtual classroom environment that is identical or similar to that of the real world where candidate teachers can develop their teaching skills and practice. Simulations

offer teachers the opportunity to practice their skills within a safe and realistic environment and acquire knowledge on how to organize their classroom, understand the needs of their students and use the learning strategies and activities that will meet those needs and will maximize students' academic performance.

Simulations can address the need for practice in teacher education and can provide new teachers the feedback, mentoring (Zibit & Gibson, 2005) and "the realistic view" (Kirby et al., 2006, p. 44) that they need. Another significant advantage of using simulations is that they offer a safe environment allowing teacher-trainees room for error but without the risk of harming real life students (Brown, 1999; IITTL, 2013). Moreover, simulated classroom environments offer candidate teachers the ability to experiment on multiple teaching methods and techniques and experience problems (e.g., behavioral problems and learning disabilities) that will arise in their real classroom, explore the possible solutions, and experiment on how to solve them. Furthermore, simulations allow teacher-trainees to reflect and evaluate their teaching, promoting their professional development, personal efficacy and decision-making (Brown, 1999; Foley & McAllister, 2005). This paper presents a research that took place at the School of Pedagogical and Technological Education (ASPETE) of Athens, in Greece, with the use of a simulated classroom environment that is called simSchool.

The SimSchool Classroom Simulation

SimSchool is a first person online classroom simulation where the player has the role of the teacher and is responsible for students' learning (for more information on simSchool visit www.simschool.org). SimSchool offers teachers the opportunity to experience a variety of virtual students with different personalities; characteristics and learning styles that will help them understand in the future their real students. Although the students are simulated, their behaviors are real and based on psychological and behavioral theories including the Five Factor Model of Personality, the Big Five and the OCEAN model (Gibson, 2011). The artificial intelligence behind simSchool allows the simulated students to respond to the tasks assigned or to the teacher's comments and questions (Gibson, 2011).

SimSchool provides players-teachers with information relative the behavior and the learning preferences of the virtual students. The players must analyze students' needs and differences and adjust their teaching in order to meet the needs of every student. The players' decisions during the game affect students' academic and behavioral responses. The change of their body position indicates a change in their state; the students might change body positions, sit up straight and appear to be listening, get bored, or go to sleep, or talk to a neighbor student (see Figure 1 below). The simulation provides information relative to whether the students are learning or not, if they are engaged to the tasks and their emotional status, so that the user can make the appropriate adjustments in order to maximize student learning. Through the different scenarios teachers can be trained, experiment on the different teaching methods and approaches, evaluate themselves and reflect on developing their teaching expertise.



Figure 1. The reactions of the classroom after the assignment of a task.
(Source: www.simschool.org)

Although research relative to the use of simSchool in teacher training is still in its infancy, research results so far reveal that simSchool could be used successfully for the preparation and professional development of candidate teachers. Research conducted by the Institute for the Integration of Technology into Teaching and Learning (IITTL) (2013) revealed that the use of simSchool had a positive impact on participants' self-efficacy. Another study by Mavrou and Meletiou-Mavrotheris (2013) reported that teachers found simSchool a safe environment to practice and develop their teaching skills before entering a real classroom for the first time and without the fear of harming real students. Moreover, according to the results, the variety of the virtual students that simSchool offers provides useful information to teachers relative to the types of learners that they will meet in their real classroom. The research by Christensen, Knezek, Tyler-Wood, and Gibson (2011) also revealed a positive impact of simSchool on participants' self-esteem and self-efficacy. Similar to Christensen et al. (2011), Foley and McAllister (2005) also reported that simSchool enhanced participants' self-efficacy and had a positive impact on the development of teachers' identity, since the participants found the simulation realistic and this helped them feel like teachers in a classroom.

Overall, simSchool seems to be a beneficial teaching tool that can address the need of practice in teacher education by providing a realistic school context where pre-service teachers can experience real-life situations. Within this safe virtual classroom environment, teachers can experiment, act, make mistakes, reflect on their teaching practice and learn from their mistakes but without the risk of harming their real students.

Methodology

This research addresses the gap in the research on educational simulations and focuses on the investigation of the use of simSchool in teacher preparation. This paper presents the empirical data of research that took place within the context of the undergraduate course *Educational Technology and Multimedia* at the School of Pedagogical and Technological Education (ASPETE), in Greece. The aim was to train candidate teachers in classroom management through the realistic environment that simSchool offers. Participants had to deal with the different problematic behaviors of the simulated students, analyze the profiles of the students and their needs and adjust their teaching in order to meet students' needs and motivate them to actively participate in the

learning process. Moreover, simSchool was used as a tool for reflection and teachers' self-evaluation with the aim to learn from their mistakes and improve their practice and skills.

Participants

A total of sixty-three participants from the School of Pedagogical and Technological Education (N=63; 53 men and 10 women), age ranging from 18 to 50 years responded to the first questionnaire before the use of simSchool. They consisted of third-year students (90,5%), second-year students (4,8%), fourth-year students and students over their fourth year of study (4,8%). Relative to computer knowledge 7,9% of the respondents had excellent knowledge, 23,8% had very good knowledge, 38,1% had good knowledge, 20,6% had fair knowledge and 9,5% claimed to be beginners. From the sixty-three participants, fifty seven (N=57) responded to the second questionnaire after the presentation and experimentation with simSchool because one of the lessons was cancelled the day the research took place. In this research informed consent was obtained from all participants.

Research Tools and Procedure

A combination of quantitative and qualitative approaches was used for the current research. Three questionnaires were used for the data collection that consisted of open-ended and closed-ended questions. Initially, participants had to complete the first questionnaire that had to do with personal data. Then simSchool was presented in the computer lab and explained in details to the participants. Since simSchool is in English, tutorials were created and translated in Greek in order to provide participants all the necessary information on how to use the platform and work with the simulation. After the presentation and description of simSchool and of the activities that would take place during the semester, twenty-four students worked on a simulation that was created by the instructor with three simulated students that were created with the help of active teachers. According to those teachers the virtual students that were created had characteristics similar to those of the real students that they described. From the three students one had good grade level, one had dyslexia and one had attention deficit hyperactivity disorder. The twenty-four students had to work with the simulation, analyze the profiles and the needs of the simulated students in order to motivate them and involve them actively in the learning process maximizing their cognitive, social and communicative skills.

In the second stage, all participants were registered to simSchool and ran quick simulations with one simulated student in order to be familiarized. After a quick reflective discussion in order to discuss participants' problems or questions, each participant worked with a simulation with three simulated students, randomly selected from the database of simSchool with a mixed grade level. After the end of the simulations, participants were asked to complete the second questionnaire. The twenty-four participants that had played both simulations -- those randomly generated by simSchool and the one that was designed by the instructor -- were asked to answer an open-ended questionnaire in order to investigate which simulation offered more opportunities for learning.

Results

The analysis of the data is still under development with the use of SPSS. So far, the first results of the survey reveal that that nearly half of the sample -- 47,6% -- were familiar with the term educational simulation, while an overwhelming percentage of the respondents -- 93,7% --believe that simulations can be an effective tool in the learning process. Participants were asked to evaluate their pedagogical and teaching skills before the presentation and implementation of simSchool. The results reveal that 29 of the participants assessed their skills as good, 18 believed that their skills are fair, 8 rated themselves as having very good skills, 6 believed that their skills are poor and 2 assessed their skills as excellent (see Table 1).

Table 1

Participants' Evaluation of Their Pedagogical and Teaching Skills Before the Implementation of SimSchool

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	2	3,2	3,2	3,2
	Fair	18	28,6	28,6	31,7
	Good	29	46,0	46,0	77,8
	Poor	6	9,5	9,5	87,3
	Very good	8	12,7	12,7	100,0
	Total	63	100,0	100,0	

The results of the second questionnaire that was completed by the 24 participants who worked on the simulation that was created by the instructor (based on the characteristics of real students) identified that a large proportion of them were satisfied with their overall experience with simSchool (see Table 2). According to the majority of the respondents, the use of simSchool improved their pedagogical and teaching skills as only 2 participants reported that the use of simSchool did not improve their skills at all (see Table 3).

Table 2

Participants' Experience with SimSchool

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unsatisfactory	2	8,3	8,3	8,3
	Quite satisfactory	13	54,2	54,2	62,5
	Very satisfactory	5	20,8	20,8	83,3
	Extremely satisfactory	4	16,7	16,7	100,0
	Total	24	100,0	100,0	

Table 3

Participants' Beliefs Related to the Improvement of Their Pedagogical and Teaching Skills After the Use of SimSchool

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Not at all	2	8,3	8,3	8,3
A little	14	58,3	58,3	66,7
Very	7	29,2	29,2	95,8
Extremely	1	4,2	4,2	100,0
Total	24	100,0	100,0	

According to the results, only 9 participants found simSchool easy in use, indicating that the majority of participants found it difficult to play with the simulation. It seems that due to the fact that simSchool is using a language other than the mother tongue of the participants, it was apparently difficult for them to use the simulation. Moreover, a large number of respondents, 58.3%, did not find simSchool a very realistic classroom simulation, although none of them evaluated simSchool as “not at all realistic.” Nevertheless, the majority of the participants -75%- believed that simSchool could be used in order to practice their teaching and classroom management skill. Furthermore, the survey showed that participants feel that simSchool promotes reflection of beginning teachers improving their professional development through the evaluation of their mistakes. None of the participants answered that simSchool does not promote reflection at all. Another significant insight is that the majority of the respondents -83,3%- would like simSchool to be implemented in their undergraduate studies.

The results of the second questionnaire that was completed by the 33 participants, who worked on random simulations created by the simSchool platform, revealed that the majority of the participants -90,9%- were satisfied with their overall experience with simSchool. Moreover, most of the respondents -87,9- reported that the use of simSchool improved their pedagogical and teaching skills, while some participants -12,1%- stated that their skills have not been improved at all (see Table 4).

Table 4

Participants' Beliefs Related to the Improvement of Their Pedagogical and Teaching Skills After the Use of SimSchool

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Not at all	4	12,1	12,1	12,1
A little	14	42,4	42,4	54,5
Very	15	45,5	45,5	100,0
Total	33	100,0	100,0	

According to the results, the majority of the participants -75,7%- found it difficult to play with the simulation, mostly because simSchool is using a language other than their mother tongue. Moreover, over half -51.5%- viewed simSchool as a realistic classroom simulation, while only a few -6,1%- did not find the simulation realistic at all. Additionally, it seems that of participants 72,7% believed that simSchool can be used as a tool that will help them practice their teaching and classroom management skills. Furthermore, the results indicated that simSchool promotes reflection of beginning teachers improving their professional development through the evaluation of their mistakes. None of the participants answered that simSchool does not promote reflection at all. Furthermore, a large number of respondents -72,7%- would like simSchool to be implemented in their undergraduate studies.

The sixty three participants were asked to rate emotional feelings experienced during playing with the simulation using a 5-point Likert scale ranging from 1=Not at all, 2=A little, 3=Moderate, 4=Quite a bit, 5=A great deal. Table 5 presents the mean, mode, minimum, maximum values of the variables and the standard deviation that gives an indication of the dispersion from the mean value. No missing values appeared during the analysis. Results indicated that during the use of simSchool participants experienced positive emotions of interest, challenge, enthusiasm and satisfaction. Participants also experienced negative emotions including fear and embarrassment. They reported that they experienced at a lower level inability to deal with the simulation, nervousness, disappointment, anxiety, pressure, insecurity, and feeling of defeat, inadequacy, and confusion. Moreover, some of the participants experienced emotions of embarrassment and fear during the use of the simulation.

Table 5

Emotions Participants Experienced During the Simulation

	N		Mean	Mode	Std. Deviation	Minimum	Maximum
	Valid	Missing					
Anxiety	57	0	2,23	1	1,102	1	4
Nervousness	57	0	2,28	2	1,098	1	5
Disappointment	57	0	2,25	1 ^a	1,214	1	5
Insecurity	57	0	2,18	1	1,241	1	5
Inability to deal with the situation	57	0	2,40	2	1,178	1	5
Feeling of defeat	57	0	2,18	1	1,182	1	5
Enthusiasm	57	0	3,46	4	1,019	1	5
Embarrassment	57	0	1,88	1	1,053	1	5
Inadequacy	57	0	2,16	1	1,146	1	5
Fear	57	0	1,70	1	,963	1	5
Challenge	57	0	3,58	4	1,133	1	5
Satisfaction	57	0	3,39	3	,996	1	5
Confusion	57	0	2,11	1	1,205	1	5
Interest	57	0	3,86	4	,972	1	5
Pressure	57	0	2,19	1	1,231	1	5

Participants were asked to rate the contribution of simSchool on their personal development on a 5-point Likert scale ranging from 1=Not at all, 2=A little, 3=Moderate, 4=Quite a bit, 5=A great deal. As shown in Table 6, simSchool enhanced participants' ability to analyze student's emotions (M=3,51), emphasize emotional aspects of learning (M=3,53) and enhance students' emotional development (M=3,39). Moreover, the use of the simulation helped participants identify the cognitive and learning characteristics of their students (M=3,46), adapt their instruction in order to meet the needs of their individual students (M=3,40), manage their diverse classroom (M=3,40) and students with learning disabilities (M=3,30). Additionally, the use of simSchool enhanced participants' skills in motivating students to learn and participate in classroom activities (M=3,30). The results also revealed that the simulation improved participants' classroom management skills (M=3,32) and behavior management skills (M=3,25). Furthermore, the use of simSchool increased participants' self-efficacy (M=3,19) and self-esteem (M=3,14) and improved their teaching skills (M=3,05).

Table 6

Contribution of SimSchool on Participants' Personal Development

	N		Mean	Median	Std. Deviation	Minimum	Maximum
	Valid	Missing					
Improvement of teaching skills	57	0	3,05	3,00	,990	1	5
Increase of self esteem	57	0	3,14	3,00	,854	1	5
Increase of self-efficacy	57	0	3,19	3,00	,854	1	5
Classroom management problems	57	0	3,32	3,00	1,088	1	5
Behavior management problems	57	0	3,25	3,00	,969	1	5
Managing diverse	57	0	3,40	4,00	,904	1	5
Managing students with learning disabilities	57	0	3,30	3,00	,906	1	5
Motivating students	57	0	3,30	3,00	,925	1	5
Knowledge of cognitive and learning characteristics of students	57	0	3,46	4,00	1,019	1	5
Adapting instruction to meet the needs of individual	57	0	3,40	4,00	1,033	1	5
Analysis of emotions of students	57	0	3,51	4,00	,909	1	5
Emphasize on emotional aspects of learning	57	0	3,53	4,00	,868	1	5
Enhancing emotional development of students	57	0	3,39	3,00	,921	1	5

Equally important, is the fact that the first qualitative results from the participants who played both simulations, the one that was randomly generated by simSchool and the one that the instructor designed, indicated that participants believed that random simulations offer them more opportunities for learning. They reported that random simulations gave them an opportunity to experience a variety of virtual students providing them useful information about the types of learners that they will meet in their real future classroom.

Discussion

The results of the current research demonstrate the possibility of using classroom simulations, such as simSchool, as training tools to enhance classroom management skills in teacher preparation programs. The majority of the participants were satisfied with their overall experience with simSchool. However, they reported that the fact that the simulation is using a language other than their mother tongue did not facilitate the game. Participants found it difficult to use the application. They could not understand the students' reports and profiles during play and found it difficult to use the buttons from where they could communicate with their virtual students and assign the tasks. Similar to this research, research by Mavrou and Meletiou-Mavrotheris (2013) also reported that participants characterized simSchool as a not user-friendly simulation, something that affected their participation and engagement.

Despite the problems that participants faced, they reported that simSchool improved their pedagogical and teaching skills. This finding supports previous research by Mavrou and Meletiou-Mavrotheris (2013) and Christensen et al. (2011), according to which simSchool can provide new and inexperienced teachers a safe environment where they can practice and develop their teaching skills before entering a real classroom for the first time and without the fear of making mistakes that can harm their real students.

Although some of the participants did not find simSchool a very realistic classroom simulation, the majority of them believed that simSchool could be used in order to practice their teaching and classroom management skills. Moreover, based on the results, the majority of the participants would like simSchool to be implemented in their undergraduate studies. Similar to this study, research by Mavrou and Meletiou-Mavrotheris (2013) reported that participants did not like the reactions of their virtual students and stated that a virtual classroom simulation cannot replace the real classroom experience. Additionally, the survey shows that simSchool promotes the reflection of beginning teachers improving their professional development through the evaluation of their mistakes.

Another significant result of the research is that participants experienced many positive (interest, challenge, enthusiasm and satisfaction) and negative emotions (inability to deal with the simulation, nervousness, disappointment, anxiety, pressure, insecurity, feeling of defeat, inadequacy, confusion, embarrassment and fear).

Research results also reveal that the use of simSchool enhanced participants' ability to analyze students' emotions, emphasize on emotional aspects of

learning and enhance students' emotional development. Moreover, participants learned to adapt their instruction in order to meet the needs of their individual students and enhanced their skills in motivating their students to learn and participate in classroom activities. The use of the simulation enhanced participants' classroom and behavior management skills, while it increased their self-efficacy and self-esteem. Those findings support previous research by Christensen et al. (2011) and Foley and McAllister (2005) according to which participants who used simSchool developed high levels of self-efficacy and enhanced their teaching skills.

SimSchool provides a safe training environment where users learn by doing and learn from their mistakes through metacognition. For this reason the majority of participants would like simSchool to be implemented in their university studies. Equally important is the fact through the simulations participants improved their classroom and behavior management skills and understood the importance of knowing the characteristics and the different needs of the students in order to adjust their instruction and meet the needs of every student.

Conclusion

SimSchool can introduce new teachers to the profession and support their development by offering them the opportunity to practice and develop their classroom and behavior management skills and teaching techniques in a safe virtual environment. Simulations such as simSchool do not aim to replace real classroom experience but to complement it, by allowing inexperienced teachers to spend more time in a safe environment that represents real classroom circumstances and without the risk of harming real students. Although research on the use of classroom simulations in teacher training is still in its infancy the results so far seem promising. Undoubtedly, classroom simulations such as simSchool can give a new dimension in teacher training supporting the development of the necessary skills that today's teachers need for a sustainable future in tomorrow's classroom.

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