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Simulated apprenticeship for pre-service Filipino teachers

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Abstract

The delivery of teacher education courses often for the most part deal with the visible parts of knowledge, the "know-what", which is often disconnected from the tacit knowledge, the "know-how", required in authentic teaching environments. It could be argued that would-be teachers do undergo practice teaching as part of their preparations and before becoming licensed professionals but said experience could be very brief. Said transitory period of practice-teaching may not be enough to internalize the range of skills and strategies that the new teachers need in facing the rigors of the real classroom setting. The purpose of this empirical study is to explore the impact of simSchool, a computer-based classroom simulator to the pedagogical style and expertise of pre-service Filipino teachers. The study utilized a quasi-experimental design. Purposefully, the study involved thirty (30) randomly selected practicum teacher education senior students. Two Likert-type survey instruments were used in the study and qualitative data were as well collected through teaching reflections and focus group discussions to supplement the quantitative data. For the statistical analyses, descriptive statistics were determined, Paired-Samples t Tests was used to determine pre-post differences within groups and Cohen's d was used to determine effect sizes across measurement indices. Findings of the study revealed that simschool enhanced the pedagogical style and proficiency of the pre-service teachers and interestingly could complement effectually the in-placed practicum course. These suggest the promising progressive impact of simSchool, if adapted, to the existing teacher education program.

Keywords**:** simSchool, simulated learning, pedagogical style, pedagogical expertise, pre-service teacher education

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1. Introduction

Existing teacher education programs do their best to prepare its students to the realms of actual classroom teaching through well-designed curriculum embedded with content and methods courses which typically include a mixture of lectures, hands-on activities, lesson plan development assignments among others. However, the delivery of these courses often for the most part deal with the visible parts of knowledge, the "know-what", which is often disconnected from the tacit knowledge, the "know-how", required in authentic teaching environments. Know-how, even more than know-what, is essential to becoming a professional (Orlikowski, 2002). It could be argued that would-be teachers do undergo practice teaching as part of their preparations and before becoming licensed professionals but said experience could be very brief. A transitory period of practice-teaching may not be enough to internalize the range of skills and strategies a new teacher needs to feel confident, master the cognitive decision-making process a teacher uses when questioning students, making suggestions, or noticing signs of understanding among others.

Repeatedly, one of the most troubling issues concerning teacher education is that teacher preparation programs are relatively disconnected from classroom practice. Consistently, Gnezek, Christensen, Tyler-Wood, Fisser, & Gibson (2011) stated that a major challenge facing beginning teachers is how to juggle teaching and learning parameters in an often-overwhelming context of a new classroom. Consequently, this has put out a call for innovative ways to prepare teachers for the tasks they will face in their work (NSF, 2003).

There is wide contention that technology use can improve student learning in schools. Both educational researchers (Chandra & Lloyd, 2008; Davis, Preston, & Sahln, 2008; Lawless & Pellegrino, 2007) and educational organizations(International Society for Technology in Education, 2007; United Kingdom Department for Children, Schools, and Families,2009) have committed to supporting student learning through the effective use of technologies in schools. In education, simulations both for children and adults, become popular with the development of computer technology, because they are fun and engaging and allow learners to internalize knowledge by applying new skills in a risk-free environment (Gibson, 2009). And one considerable simulation-related innovation for teacher education is simSchool – a classroom simulation program funded by the Preparing Tomorrow's Teachers to Teach with Technology (PT3) program of the U.S. Department of Education. The use of digital games and simulations to help prepare teachers is inspired by the dramatic rise and growing appreciation of the potential for games and simulation-based learning to help prepare future teachers (Aldrich, 2004; Foreman, Gee, Herz, Hinrichs, Prensky & Sawyer, 2004; Prensky, 2001).

1.1. About simSchool

Just as a flight-simulator immerses a player in the complexities of flying a plane, simSchool, a classroom simulation program funded by the Preparing Tomorrow's Teachers to Teach with Technology (PT3) program of the U.S. Department of Education, engages novice teachers in some of the complexities of teaching students who possess a variety of different learning characteristics and personalities. It is an "epistemic first player game" (Shaffer, 2005) with computer- and network-based expert feedback which can be seen as providing a form of "simulated apprenticeship. "The tacit processes, mental models, and professional skills of an expert that are needed to succeed in teaching are embedded in the structure, rules, choices, and environment of the game; through such a design, the simulation "coaches" a player through feedback, hints, and scaffolding during game play – accordingly fostering what researchers have described as a "cognitive apprenticeship" approach to instruction (Lave and Wenger 1991; Collins, Hawkins, and Carver 1991). Immersed in a simulated classroom, simSchool players must analyze student needs, make instructional decisions, and evaluate the impact of their actions on student learning in order to succeed at the game. And, as players advance in their ability, the complexity increases, pushing them to new levels of challenge just as in

apprenticeship-based learning. Through repeated cycles of decision-making, experimentation, and refinement, the player builds expertise by developing new strategies and thinking like a teacher. Considerably, it introduces future teachers to some of the teaching community's "ways of doing, being, caring, and knowing" and through repeated cycles.

Currently, users may register for simSchool accounts at any time for free by visiting http://simschool.org/register. However, said registration only gives access to a lite if not a demonstration or trial version of the software which has restricted features compared to the full access version which entails a certain amount of registration.

2. Objective of the Study

SimSchool was designed to provide novice teachers with a safe environment for experimenting and practicing techniques, especially methods of addressing different learning styles, and wide variations in academic and behavioral performance of students. The study gave focus on the exploration on the impact of the use of simSchool to pre-service teachers predominantly in terms of their pedagogical style and expertise.

3. Method

3.1. Research Design

This study was empirical in nature and utilized quasi-experimental design.

3.2. Participants

Purposefully, the study involved 30 randomly selected General Elementary Education major teacher education senior students from the School of Education who are currently enrolled in their practicum. Subsequently, fifteen (15) of them were randomly selected to comprise the treatment group whilst the remaining half comprised the control group. To clarify, the constrained number of participants was mainly linked to the financial implications to the researchers on the purchase of full-access and research-linked licensed simSchool software to be provided to each of the participants comprising the treatment group.

To lessen if not to eliminate potential contamination of results which could be attributed to the fact that same group attend same school and it is very reasonable that they mix outside of sessions and share ideas, members of the treatment group were asked to maintain confidentiality of the session proceedings especially to those comprising the control group.

3.3. Measure

Two Likert-type survey instruments were used in the study. The first of which is the Teacher Preparation Survey (TPS) (Riedel, 2000) composed of 10 items on perceptions of teaching (i.e. instructional self-efficacy and learning locus of control) and 15 items on preparedness on certain teaching skills. Validation procedures were carried out on the instrument which was found to have both content validity as well as construct validity as determined through factor analysis (Christensen, Knezek, Tyler-Wood, & Gibson, 2011). Cronbach's Alpha values for the aforesaid domains were: Instructional Self-Efficacy = 0.77 (5 items); Learning Locus of Control = 0.68 (5 items); and Teaching Skill = 0.95 (15 items). These internal consistency reliability estimates were all in the range of "acceptable" to "very good" according to the guidelines provided by DeVellis (1991). Secondly, the

25-item Survey of Teaching Skills questionnaire which measures the confidence and experience levels across eight categories viz. knowledge of students, pre-planning instruction, making and using tasks, making and using assessments, re-planning instruction, classroom decision-making, making and using a post-assessment, reflections on teaching. Qualitative data were as well collected to supplement the quantitative data.

3.4. Procedure

In a scheduled preliminary meeting with the participants, the research groupings were formed. As well, preliminary data were collected with the accomplishment of the prepared questionnaires. For the intervention, members of the treatment group underwent sessions to accomplish the prepared simSchool lessons guided by an agreed schedule. The sessions were conducted at the Internet Center of the University where each of the participants was given a work station supported with a computer unit with reliable internet connection.

Finally, post-treatment quantitative data were collected from the research groupings after the culmination of the simSchool sessions.

For the qualitative data, members of the treatment group were asked to submit teaching reflections. Then, a focus group discussion was conducted with selected members of the treatment group.

3.5. Statistical Analyses

Initially, descriptive statistics were determined. Secondly, Paired-Samples *t* Tests was used to determine pre-post differences within groups across measurement domains. Finally, Cohen's d was used to determine effect sizes on the various measurement indices.

4. Results and Discussion

4.1. Participant's Attributes

Mostly, the participants were initially involved as classroom observers (56.7 %), with intermediate skill with using technology (86.7 %) and expend 5 hours or less in using email or instant messenger (66.7 %) *(see Table 1)*.

The aforesaid profile especially on the aspect of technology use, supports the notion that in the early 21st century, pre-service teachers are now more comfortable with the use of computers (Russell, Bebell, O'Dwyer, & O'Connor, 2003) and potentially technology in general.

Table 1. Profile of participant

Variable		f(%)
Teaching Experience	Observed a K-12 classroom two weeks or more	17(56.7)
	Completed at least one term of student teaching	2(6.7)
	Served as a teaching assistant	11(36.7)
Skill with using Technology	Novice	2(6.7)
	Intermediate	26 (86.7)
	Advanced	2(6.7)
Time spent in using email or instant messenger (in hrs)	1-5	20(66.7)
	6-10	6(20.0)
	11-15	3(10.0)
	25 or more	1(3.3)

4.2. *Teacher Preparation Measurement Domains*

Within group comparison showed significant pre-post medium to large gains (ES > 0.20; Cohen, 1988) only within the treatment group along the domains of instructional self-efficacy, $t(28)=-2.53$, $p < 0.05$ and importance of computer games or simulations as learning tool, $t(28)= -2.39$, $p < 0.05$ *(see Table 2)*. With ES values well beyond the 0.30 cutoff, the effect of simSchool can be said to be educationally meaningful (Bialo & Sivin-Kachala, 1996) along these identified pedagogical indices. The findings are very much consistent with the studies conducted by Kruse & Gibson (2011) and in earlier studies as cited by Knezek, Christensen, Wood, Fisser and Gibson (2012).

The notable pre-post gains could be attributed considerably to the reinforcement of the "know what" by the "know-how" of teaching self-efficacy with and better appreciation of computer-related innovations as utilities to learning. The simSchool sessions presented added teaching opportunities that helped supplement the achievement of improved pedagogical style and expertise that may not be realized with constrained period of actual practicum. The simulations presented copious possibilities where the pre-service teachers can initially investigate their instructional plans and learn suggestively from the results for a more developed authentic classroom instruction.

These could be attested by the following reflection entries and interview transcripts.

. . . experiment is also needed to such learners who cannot cope up. There is a need to adopt variety of strategies and see which is effective to the learner. Before entering the classroom, the teacher should be prepared always with his/her lesson plan with different tasks that would improve and develop the learners' ability and skill. It should give focus to all the students and not only to some .

. . . the simSchool helped incoming teachers to develop their teaching skills, how they manage pupil. It also help us to make a lesson plan for the student. This simSchool program helped me to become a real teacher besides our practice teaching. I learned to this simschool to be more patient because just like in the practice teaching, I also encountered pupils who had different personalities and when during when you are giving the task they are doing something like talking to their seatmates, sleeping, putting cosmetics like that. It helped me, give me a realization. As a teacher you know what you are teaching and before you teach you should be prepared in teaching the students and you should also know how to understand and like what I said a while ago I know the background before judge or make a comment to student . . .

Table 2. Research groupings' pretest and posttest within group comparison and Cohen's d across teacher preparation survey measurement indices.

			Control Group			Treatment Group		
Measurement Indices		N	Mean (SD)	*t* (sig)	Cohen's d	Mean (SD)	*t* (sig)	Cohen's d
Instructional Self-efficacy	Pre	15	4.40 (0.58)	-0.47 (0.645)	0.15	4.15 (0.71)	-2.53 (0.024*)	0.91
	Post	15	4.49 (0.64)			4.69 (0.45)		
Learner Locus Control	Pre	15	4.96 (0.60)	0.36 (0.723)	-0.07	5.05 (0.60)	0.65 (0.525)	-0.26
	Post	15	4.92 (0.63)			4.92 (0.39)		
Teaching Skills	Pre	15	4.92 (0.61)	0.47 (0.649)	-0.15	4.97 (0.62)	-0.70 (0.496)	0.20
	Post	15	4.84 (0.47)			5.08 (0.50)		
Importance of computer games or simulations as learning tool	Pre	15	3.40 (1.18)	-1.33 (0.204)	0.44	3.13 (0.92)	-2.39 (0.032*)	1.03
	Post	15	3.87 (0.92)			4.00 (0.76)		

**significant at 0.05 level (2-tailed)*

4.3. Teaching Skills Measurement Domains (Experience Level)

There were more significantly greater medium to large (ES > 0.20; Cohen, 1988) pre-post experience gains observed in the treatment group than in the control group particularly along the areas of making and using tasks, $t(28) = -2.69$, $p < 0.05$, re-planning instruction, $t(28) = -2.74$, $p < 0.05$ and classroom decision making, $t(28) = -2.23$, $p < 0.05$ *(see Table 3).* Repeatedly, the effect of simSchool can be said to be educationally meaningful not only in the aforesaid pedagogical indices but in all indices with ES values beyond 0.30 (Bialo & Sivin-Kachala, 1996).

The observed improvements could be again qualified to the enhanced pedagogical style and expertise by the pre-service teachers because of the added exposure to typical classroom realms as duplicated by the simulated sessions. This could be supported by the following qualitative data.

> *. . . I learned that planning of lesson plan is essential for it serves as the guide in teaching the subject matter to the learners. The teacher must equip himself/herself with variety of strategies in handling more learners. In simSchool program it helps teachers be more creative in giving tasks to the students . . .*

> *. . . simSchool is like a training. It should be given if possible before practice teaching so that practice teachers can train and will know more how to manage and will gain necessary experience . . I should make a good lesson that will help effectively Everly to understand the lesson and to uplift his academic performance. I will make a detailed lesson plan with visual materials suited to the subject matter in the way that it will effectively help Everly comprehensively do the task given to him, and can help him perform better. Knowing Lacey's academic performance and with her weakness in task performance, helps me reflect and think ways on how to help Lacey improve or perform well. Considering her weakness of self-esteem, one way to help Lacey is to give encouraging words and affirmation for motivation . . .*

Table 3. Research groupings' pretest and posttest within group comparison and Cohen's d for experience level across survey of teaching skills measurement indices

		Control Group				Treatment Group		
Measurement Indices		N	Mean (SD)	*t* (sig)	Cohen's d	Mean (SD)	*t* (sig)	Cohen's d
Knowledge of Students	Pre	15	3.64(0.50)	-2.57 (0.022*)	0.95	3.89(0.59)	-1.48 (0.162)	0.47
	Post	15	4.07(0.40)			4.16(0.56)		
Pre-planning Instruction	Pre	15	3.80(0.63)	-0.80 (0.437)	0.27	4.02(0.57)	-1.28 (0.221)	0.47
	Post	15	3.97(0.64)			4.27(0.48)		
Making & Using Tasks	Pre	15	3.60(0.63)	-1.02 (0.324)	0.35	3.67(0.65)	-2.69 (0.017*)	0.94
	Post	15	3.83(0.67)			4.20(0.46)		
Making & Using Assessments	Pre	15	3.80(0.65)	-0.71 (0.487)	0.23	3.85(0.40)	-1.07 (0.302)	0.43
	Post	15	3.93(0.49)			4.04(0.48)		
Re-planning Instruction	Pre	15	3.73(0.75)	-0.26 (0.800)	0.11	3.50(0.76)	-2.74 (0.016*)	0.83
	Post	15	3.80(0.53)			4.00(0.38)		
Classroom Decision Making	Pre	15	3.72(0.46)	-1.17 (0.262)	0.45	3.73(0.73)	-2.23 (0.043*)	0.67
	Post	15	3.97(0.64)			4.14(0.46)		
Making & Using Post-assessment	Pre	15	3.78(0.59)	-0.77 (0.456)	0.24	3.60(0.92)	-1.69 (0.113)	0.55
	Post	15	3.93(0.66)			4.00(0.45)		
Reflections on Teaching	Pre	15	3.63(0.48)	-1.75 (0.103)	0.71	3.53(0.79)	-1.87 (0.082)	0.59
	Post	15	4.07(0.73)			3.93(0.53)		

**significant at 0.05 level (2-tailed)*

Yet, with the observed significant gain in other area within the control group, specifically on knowledge of students, further clarifies how simSchool could complement the in-placed curriculum-supported practicum.

4.4. Teaching Skills Measurement Domains (Confidence Level)

Remarkably, there were more observed significant confidence gains in most measurement indices in the treatment group than in the control group *(see Table 4)*. Sufficiently greater medium to large (ES > 0.2; Cohen, 1988) pre-post confidence gains were observed in the treatment group along the following domains: making and using tasks (pre-post ES = 1.19), making and using assessments (pre-post ES = 0.72), re-planning instruction (pre-post ES = 1.08), making and using post assessment (pre-post ES = 1.01) and reflections on teaching (pre-post ES = 0.93).

As had been initially underscored in the preceding sections, the added confidence could be repeatedly ascribed to the reinforced "know what" of actual teaching. Recurrently, the simulated teaching sessions which bared the numerous possibilities in the actual classroom setting brought invaluable improvement in the pedagogical style and expertise of the pre-service teachers. These could be surmised in the verbatim statement below.

> *. . . as a trainee, I strongly recommend the use of simSchool most especially to the incoming student teachers for them to practice, for them to know how to interact and how to manage and how to make lesson plan before they go to a real setting of teaching . . . like a preliminary training before they go to real setting of teaching . . .*

Once again, the observed significant gains in the other areas within the control group on the domains: knowledge of students (pre-post ES = 1.24), pre-planning instruction (pre-post ES = 1.44)

and classroom decision making (pre-post ES = 1.18) repeatedly underline the complementary nature of simSchool to the conventional practicum for pre-service teachers.

Table 4. Research groupings' pretest and posttest within group comparison and Cohen's d for confidence level across survey of teaching skills measurement indices.

			Control Group			Treatment Group		
Measurement Indices		N	Mean (SD)	*t* (sig)	Cohen's d	Mean (SD)	*t* (sig)	Cohen's d
Knowledge of	Pre	15	3.53(0.48)	-4.54	1.24	3.75(0.67)	-1.69	0.57
Students	Post	15	4.04(0.33)	(0.000**)		4.09(0.51)	(0.114)	
Pre-planning	Pre	15	3.76(0.60)	-3.67	1.45	3.76(0.67)	-2.81	0.85
Instruction	Post	15	4.62(0.59)	(0.003**)		4.25(0.46)	(0.014*)	
Making & Using	Pre	15	3.87(0.67)	-0.37	0.11	3.57(0.65)	-3.30	1.19
Tasks	Post	15	3.83(0.67)	(0.719)		4.20(0.37)	(0.005**)	
Making & Using	Pre	15	3.87(0.71)	0.55	-0.16	3.62(0.72)	-2.07	0.72
Assessments	Post	15	3.78(0.41)	(0.590)		4.05(0.45)	(0.058)	
Re-planning	Pre	15	3.77(0.78)	-0.42	0.14	3.47(0.69)	-4.05	1.08
Instruction	Post	15	3.87(0.67)	(0.683)		4.07(0.37)	(0.001**)	
Classroom	Pre	15	3.75(0.46)	-2.53	1.18	3.65(0.50)	-3.75	1.06
Decision Making	Post	15	4.28(0.44)	(0.024*)		4.10(0.33)	(0.002**)	
Making & Using	Pre	15	3.76(0.57)	-0.92	0.36	3.40(0.74)	-2.46	1.01
Post-assessment	Post	15	3.96(0.55)	(0.372)		3.98(0.34)	(0.028*)	
Reflections on	Pre	15	3.73(0.50)	-1.02	0.42	3.47(0.67)	-2.75	0.93
Teaching	Post	15	3.97(0.64)	(0.324)		4.03(0.52)	(0.016*)	

**significant at 0.05 level (2-tailed)*

*** significant at 0.01 level (2-tailed)*

5. Conclusion and Recommendations

simSchool is a very ensuring technology-related innovation in education that can effectively help improve the pedagogical style and proficiency of pre-service teachers. Undoubtedly, it can serve as a hefty complement to the in-placed typical curriculum-supported practicum courses of existing teacher education programs in order to have decidedly prepared and classroom-ready pre-service teachers. Teacher education institutions (TEIs) could further strengthen their teacher education program with the inclusion of simSchool in its curriculum. Moreover, the observed possibilities of simschool bring about overwhelming curiosity for its likely adoption as an added tool to enhance current in-service development programs.

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