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Prolonged Exposure to Simulated Teaching and the Academic Performance of Education Students

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Author's contribution

The sole author designed, conducted, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

Research on superior performance has shown that important characteristics of students' achievement and the acquisition of cognitive skills are acquired through practice and appropriate use of teaching methods [1].

Aim: This study examined the effect of using simulated teaching in learning a college content course.

Methodology: A total of 88 third year college education students went through a pretest-posttest experimental study with 44 participants in each of the control or reporting group and the simulated teaching or experimental group, respectively. It was assumed that prolonged exposure to simulated teaching would enhance education students 'academic performance in a specified academic subject. The data were analysed using means, standard deviation, T-Test for Paired Samples and T-Test for Independent Samples.

Results: Findings revealed a highly significant difference between the mean gain of the control and experimental groups (p-value=.000) indicating that the level of academic performance of students who had more exposure to simulated teaching was significantly higher than students who stopped using the method. The result suggests that the students who had prolonged exposure to simulated teaching performed better in learning a content subject than those who had less exposure to the

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method.
Conclusion: The study concludes that prolonged exposure to simulated teaching results in a higher academic performance. It further strengthens the notion that 'when we teach, we learn twice'.

Keywords: Prolonged exposure; simulated teaching; academic performance; education students.

1. INTRODUCTION

In all phases of education, teaching exists to create a significant change in the learner [2]. In the process of skills and knowledge acquisition, teachers utilize teaching methods which they think correspond to the specific objectives and level exit outcomes [3]. As commonly observed, the methods that are prevalent in the college classrooms today are teacher-centered, mainly because the subject matter in the tertiary level require higher level abstraction skills that can only be satisfactorily delivered by teachers who have acquired mastery in that area. In this setting, students either listen to their instructor/professor or they could be asked to report a topic to the class as has been the practice of so many tertiary level faculty. For purposes of assuring that the content being imparted is adequate, teacher-directed activities may be beneficial to some degree, but could somehow be considered lacking specifically for teacher education students because it may not help them to prepare for the reality shocks associated with the real pre-service teaching. Walker [4] argues that a strong predictor for students' better outputs is instructional alignment or the linkage between the intended outcome, the instructional processes and the post-instructional assessment. He stresses the idea that the tighter the linkage, the better the alignment; resulting in a higher achievement. One way to achieve this alignment is through simulation. Simulations are generally defined as artificial environments that are carefully created to manage individuals' experiences of reality [5]. Jones [6] defines simulation as an exercise involving "reality of function in a simulated environment."Cannon-Bowers and Bowers [7] note that simulations and other synthetic learning environments (e.g., virtual reality) possess "the ability to augment, replace, create, and/or manage a learner's actual experience with the world by providing realistic content and embedded instructional features." Although convenient modalities of lecture and small-group teaching are essential to the educational process, they cannot replace the value of actual teaching experience brought about by simulations [8]. Although simulation comes in varied forms, the current study specifically centered on a role play model conceptualized by Espada [9] as simulated teaching.

1.1 What is Simulated Teaching?

Simulated Teaching (ST) may well be defined as a non-computer generated type of simulation in the form of a live action role play known as LARP which allows students to assume the role of a teacher. Each student is provided a topic to be studied and shared with the class in the form of a lesson. The student prepares the materials and formulates questions to be asked in the duration of his/her teaching period. The teacher acts as an arbiter who supplies the missing information and mediates between the student and the subject matter being taught. One thing to be noted in this context is the decrease of tension in the interactive process because students may not hesitate to answer questions being thrown by another classmate who is playing the role of a teacher. In other words, the students are actively engaged in the teaching-learning process. Chen and Martin [10] assume that the effectiveness of classroom methodologies are dependent on four postulates: (1) focus on change and not just knowledge attainment;(2) reveal behaviours in a real-world context; (3) highlight internal and external influences on environmental behaviour; and (4) include a problem-solving approach that demands a solution. The proponents observed that role-play simulations address those criteria and can effect change necessary to promote sustainable behaviour. Simulated teaching is an illustration of this methodology since it carries potential merits in fostering transformative learning among education students [11].

If computer-generated simulations are recognized as efficient tools in teaching dynamic complex systems among students engaged in technical training [12], the live action role play (larp) works best for education students who are being trained to develop heuristic and communication skills within a prepared environment similar to a classroom setting [13,14]. Worth noting is the fact that efficiency is

gained by reducing the time it takes to reach a specified level of learning whereas effectiveness is gained by achieving better results in performing the tasks learned.Experiential learning, or ‘‘learning by doing,’’ inspired by Dewey in 1916 has long dominated the culture of apprenticeships which is directly related to student teaching [8].

There are critical components for instructional alignment which include the following: development of assessments congruent with instruction; identification of stimulus, or what you plan to teach; identification of prerequisite cognitive and affective entry behaviours, or what students need to comprehend prior to instruction; identification of the critical attributes of instruction and how they will be taught; and teaching for transfer. Although the above components are indispensable when it comes to excellent teaching, nothing could be more relevant than to “teach for transfer.” Positive transfer occurs when students provide more likelihood of the features of the characters they are portraying. *‘Hugging,’* as Perkins and Salomon [15] call it, pertains to the vehicle that promotes positive transfer. What students do, for instance, in simulated teaching ‘*hug’* the most desired transfer tasks associated with teaching like mastery and delivery of the lesson, construction and use of materials, maintaining eye contact and voice projection. The transfer theory demonstrates that when the learning experience *hugs* the target performance, automatic transfer occurs [16]. What they learn in the simulated classroom leads to the attainment of related goals in the real teaching because learning and achievement levels are dependent on the first stages of learning which enables subsequent transfer [17,18].

1.2 Reality Shocks of Practice Teaching

Apart from its technical and conceptual components, the real teaching practice is a period of considerable personal changes, with students going through several adjustments involving their own perceptions, professional identity, tasks management, interlocutors, as well as their fluctuating emotions [19-22]. Schlossberg [23] described student teaching as a period of complex transitions and crises in human development resulting in, to quote Bridges [24], a “normal process of disorientation and reorientation, which eventually leads to the direction of growth”. Concomitantly, Caires [25] and Huberman [26] propose that practicum is a simultaneous experience of survival and discovery because of the vulnerability experienced from the switch of the role of student to that of a teacher leading to the ‘loss of a comfortable sense of familiarity with oneself and the look for his / her voice as a teacher and as a person [27]. It is a shift from the student’s to the teacher’s perspective leading to a process of challenging and revisiting of personal assumptions and beliefs which may be felt in a stressful way [28-30]. Due to its multidimensional and idiosyncratic process it evokes changes in the different areas of the student teacher’s development [31,32,28]. It further creates a stressful and demanding context involving several cognitive, emotional, and physical utterances related to reality-shock manifestations. In view of this, Caires, Almeida, and Martins [20] expressed that teachers should apply more contextual methods of preparing education students for the practicum stage by giving them avenues to share their expectations and concerns regarding critical episodes of the real teaching practice and the discussion of positive and negative feelings involved in their experiences in order to reckon with their vulnerabilities in teaching. The study of Caires, et al. [20] focused on identifying variables that influenced the way student teachers dealt with the socio-emotional worries of the teaching practice. Findings revealed that the quality of course training prior to student teaching proved to be a significant predictor in student teachers’ reactions to stressors and problem stimuli. The results suggest that if students will be given earlier opportunities to perform prolonged mock practicum in simulated teaching, their levels of anxieties and stress associated with the demands of student teaching would be lessened or even eliminated.

1.3 Deliberate Practice and Simulated Teaching

The foregoing grounds firmly establish the fundamental idea behind simulated teaching which proposes that through instruction and extended practice, even ordinary students can overcome academic challenges and become highly experienced teachers. Simulated teaching is a role play-based pedagogy where education students in the lower years are engaged in a mock practicum in a college setting [9]. In this context, every student is given a topic found in the syllabus, studies it thoroughly, prepares the materials and delivers the lesson in front of the class wearing a teacher’s attire and teaching like a real teacher. To a higher degree, students take

responsibility for mastering the topic because of the assumption that as teachers, they should know more than their students. This personal and deliberate effort builds their energy and enthusiasm and allows them to gain knowledge and expertise in teaching [33]. It fosters more retention because it lowers the interaction from teacher-student to student-student level. The sight of seeing a different classmate teaching them every meeting turns out to be an entertaining spectacle to the whole class because it simply resembles a showcase of talents in teaching. Simulated teaching offers multiple benefits to teacher education students. The diverse ways of teaching which they witness first hand in the simulated classroom gives them opportunities to sort the good and bad practices in teaching and provides insights on classroom management, communication and construction of materials. It develops empathy towards their teachers, enriches students' capacities in handling socio-emotional conflicts and deepens their understanding of the rigidities involved in the process of teaching. Simulated teaching eliminates students' inhibitions and apprehensions in reciting during class discussions as they become aware that it's just their classmate asking them a question; not their teacher.

Recent findings are gradually attempting to disprove the common postulate that superior performance is attributed to special innate talents alone. In fact, when scientists attempted to measure the experts' supposedly superior powers of speed, memory and intelligence with psychometric tests, they found no general superiority. The demonstrated superiority was domain-specific. For instance, the chess experts' memory was confined to regular chess positions only [34,35] and neither other types of materials nor even Intelligence Quotient [36]. Ericsson and Lehmann [37] argue that basic inherent aptitudes do not predict success in a domain. The difference between experts and less proficient individuals lies in the qualities acquired during their prolonged training. The world-class chess players' potential moves were not influenced by the speed of their thoughts or the size of their basic memory capacity but on their extensive experience and knowledge of patterns in chess. Chase and Simon [38] who proposed the theory of expertise suggest that experts with extended experience acquire a larger number of more complex patterns and use these new patterns to store knowledge about which actions should be taken in similar situations.

1.4 Superior Performance and Prolonged Practice

The study is anchored on the proposition that individuals who start early and practice longer at the higher levels will have a higher level of performance throughout their development than those who practice equally hard but start later [39]. Furthermore, experts can acquire cognitive skills enabling them to circumvent the limits of short-term memory capacity and serial reaction time. Empirical evidence on exceptional performance describes both the development leading to exceptional performance as well as the genetic and acquired characteristics that mediate it. Proponents of behavioural genetics claim that behaviour is the result of the interactions between environmental factors and genes during extended periods of development. Thus, it may be conjectured that prolonged exposure to simulated teaching can build skills and characteristics which cause performance and increase maximal amounts of possible practice. The goal of simulated teaching is not to "repeat the same thing" but to engage in the activity with full concentration to improve performance in teaching. Research on skill acquisition shows that performance on a wide range of tasks improves as a function of many hours of practice [39]. Theories echoed by de Bruin, Kok, Leppink, & Camp [34], Anderson [40] and Bonnet [41] confirm that initial performance is mediated by sequential processes, which, with additional practice are transformed into a single direct (automatic) retrieval of the correct response from memory. Other theories of skill acquisition claim that with several hours of practice, cognitive differences are essentially eliminated, giving way to the more basic differences in components associated with perceptual and motor production [42]. This implies that a student doesn't have to be exceptionally intelligent to be able to teach well but that his / her performance becomes exceptional because he develops cognitive skills in the process of prolonged practice. A good example would be a recent finding that the amount of time individuals spend in reading as assessed by diaries is related to memory for prose even when education and vocabulary are partially ruled out [43]. The estimated amount of reading is also related to reading ability [44]. Because the perceptual and motor systems show great flexibility in response to extended practice, research on skill acquisition indicates that performance during the early phases of practice is determined by characteristics quite different

from those that determine performance during the later phases. Ericsson and others [39] added that untrained adults can overcome limits of speed and processing capacity by acquiring new cognitive skills that thwart these limits (innate abilities) by means of qualitatively different processes. In relating this concept to the study it is assumed that with prolonged exposure to simulated teaching, even students who do not possess high levels of intellect can gain knowledge and develop competence in teaching.

1.5 The Problem

It is in the foregoing context that the current study was conducted. This study examined the effect of using simulated teaching in teaching a college content subject on the academic performance of education students. Specifically, the study attempted to determine whether there was a significant difference in the academic performance of students exposed to simulated teaching and those who were exposed to reporting or lecture method. The study further probed into students' perceptions on the potentials and limits of simulated teaching and reporting as a method in college teaching.

2. METHODS

2.1 Design

A pretest-posttest experimental design was used in the study. The design allowed the researcher to compare the results obtained from the experimental group against the control group with the use of simulated teaching as the independent variable whose effect was being tested. This method involved the use of a pretest and a posttest.

2.2 Subjects

Using random sampling, a total of 88 third year college education students enrolled in Personal and Social Development (Presched_105) were divided into two classes with 44 participants in each section. Despite the heterogeneous grouping some characteristics were comparable in terms of age, socio-economic status, level of literacy and the fact that both groups underwent one year training in simulated teaching. The teacher-researcher handled the two classes in order to monitor the behaviour and performance of both groups. This was also done to compare behaviour patterns and responses between the two groups as they expressed their teaching and reporting skills in their own unique ways.

2.3 Content, Strategy, Materials

Prior to the conduct of the study, the participants underwent simulated teaching for one year. In the experiment proper, the control group went back to lecture and reporting method, while the experimental group continued to use simulated teaching. In handling both classes, only the method of teaching differed. The same content was used by the teacher-researcher for both classes which were the topics found in the syllabus of the course Personal and Social Development. The course is designed to acquaint students with certain aspects that promote self-awareness, confidence, and personal well-being. The teacher's role is to guide the students in understanding and internalizing the important milestones that shape the child's character and personality, build his self-esteem and create ways of handling his own feelings, and varied emotions. The students will be provided with opportunities and activities that will help them understand their own life situation, human behavior and relationship with others. They can also gain knowledge in making decisions and taking responsibility for their actions. Classes were held twice a week with one hour and a half every session making a total of 6 hours per week. In one session, there were about 4-5 students who were able to teach or report depending on the length and complexity of the lesson. In the simulated class, the teacher conducted a 10-15 minute post conference with the students while in the lecture/reporting class, a 10-15 minute processing and discussion of the lesson would also be conducted. The use of instructional materials in both classes varied according to their creativity and availability of resources.

2.4 Instruments

The study used a pretest/posttest comprising 120 items which tested their knowledge and understanding on the principles of development, emotional, social, moral and psychological development, social adjustments, children's interests, family life and personality development. Its purpose was to determine both the control and experimental groups' level of academic performance in the specified subject. The test was tried out on another group of preschool students not involved in the study tested for reliability with a coefficient of 1.00 using Kuder-Richardson 20, and then examined and improved by some colleagues in the academe.

2.5 Statistical Treatment

Three types of t- tests served as statistical tools: the one – sample t-test to determine the pre-posttest levels of both control and experimental groups; the t-test for dependent means to find the pre-posttest mean gain difference in both groups; and the t-test for independent means to verify whether there was a significant mean gain difference between the students who had prolonged exposure to simulated teaching and those who had less exposure to the method.

3. RESULTS AND DISCUSSION

3.1 Pre / Posttest Levels of Academic Performance

Fig. 1 shows how each of the control and experimental group fared against the hypothetical mean in the pretest and posttest which was 60 or 50% of 120, the total number of items in the pre / posttest. Results clearly reveal that both groups failed to meet the hypothetical mean of 60.Attributed to this poor result could be the fact that both groups did not possess the content knowledge in most of the topics being tested. However, since the entry points of both groups before the treatment were of the same level (i.e., below average), it is, therefore, stressed that the conduct of the experiment was devoid of bias. Meanwhile, the posttest results disclosed a difference in the actual means of the two classes. Compared to the control group who attained a mean score considered to be a little below average (M=57.3), the experimental group obtained a higher mean score of 75.4 which is above average and highly significant. This finding suggests that in using a method where they were worked with each other and were forced to be active learners who talked through the course concepts in their own words gained knowledge faster than their counterparts who used a traditional method.

The failure of the lecture/reporting group may be attributed to an inhibiting factor in learning identified by Beach in Liu [45] as preoccupations of one's own knowledge or viewpoint and the inability to lead another person to a new insight. This is because although they are delivering a topic, they do it in the context of being students. They need to do it in order to pass the subject. Furthermore, they might have been too shy to ask for clarifications from their teacher when they found the topic too difficult. In simulated teaching, students are compelled to be others-oriented and contribute intellectually or affectively because they assume the role of "teacher". They need to do well because beyond the content mastery, they need to know what happens to the learner after being exposed to the information [46]. Students are encouraged to be active participants in the process and this leads to the development of critical thinking. The classmates were not too inhibited to ask questions because it was just their classmate teaching them.

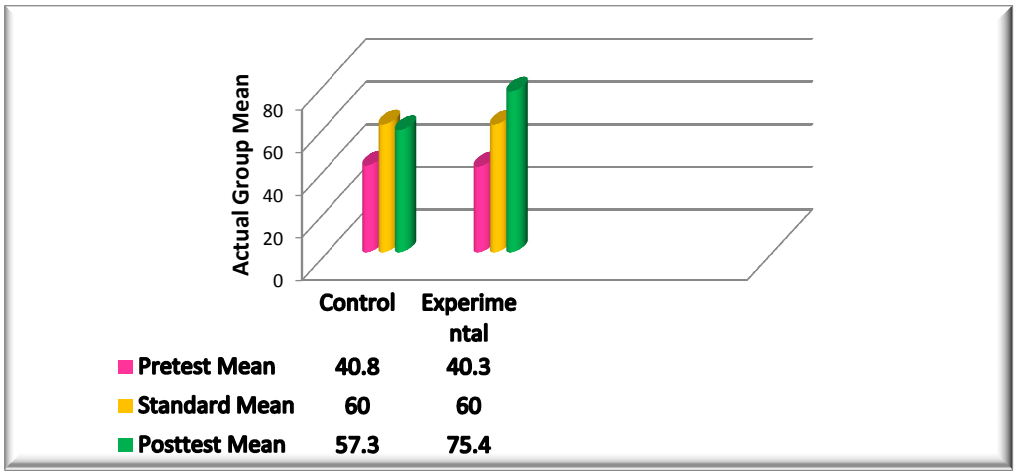


Fig. 1. Pre / post test levels of academic performance

3.2 Pre-post Mean Gain Difference in Control and Experimental Groups

Fig. 2 tells us that both groups benefited from the treatment as reflected in their mean gains which were highly significant. The control group gained a mean score of 16.4 while the experimental group gained a mean score of 18.0. The lower mean gain in the control group could be explained by the fact that from a pedagogical point of view, the crucial variable in teaching is active involvement of the learner as opposed to the passive exposure to the material. In a typical traditional classroom the setting consists of one person who presents and imparts orally facts and concepts to students whose own participation is often limited to note-taking or purely listening. Thus, there is limited engagement on the part of the learners.

3.3 The Difference in the Performance between the Control and Experimental Groups

Fig. 3 provides the answer to the main question in the study which is to find out which method of instruction proved to be more effective in teaching—the simulated teaching or the lecture / reporting method. Results indicate that the simulated teaching group significantly achieved a higher mean gain (M=18) compared to the lecture / reporting group. This finding affirms that the use of simulated teaching proved to be more effective in bringing out a higher academic performance than the traditional method of teaching. The result further establishes the influence of simulated teaching as a positive agent that provides a sense of realism to education students' learning experiences.

The findings further suggest that at the low end, some features inherent in simulated teaching like delivery of the lesson, the use of instructional materials and student-teacher interaction are used to construct synthetic representations of the task environment that offer fidelity of the actual teaching process and performance [47]. In essence, the psychological fidelity embedded in simulated teaching actually provides a basic foundation for learning concepts while physical fidelity offers the contextual richness that drives important cues and contingencies into the instructional experience [48].

The goal here is neither to replicate the actual performance environment nor for the teacher to abdicate his / her responsibilities and duties; but rather to prompt the essential underlying psychological processes relevant to key performance characteristic in the real-world setting [48]. Higher levels of immersion such as that found in simulations have the potential to enhance learners' feelings of presence, or the perception of their presence in particular environment [49,50]. It promotes active teacher-student interactions which allow for longer retention of information compared to the information presented to the learner by the lecturer [51]. It offers a wider scope of opportunities to learn because it allows students to acquire and practice the non-technical skills in teaching such as collaboration, communication, and leadership. Gradually simulations have evolved into what Drolet and Thivierge [52] call 'a key tool to teach more universal competencies'.

3.4 Potentials and Limits of Simulated Teaching

Apart from the analyzed quantitative data, students' interviews revealed significant insights on the advantages and limits of simulated teaching. For instance, the simulation group signified that they felt pressured in delivering a good lesson, preparing quality instructional materials and engaging students in the discussion. This was specifically strenuous for those who were intellectually challenged and less creative in making effective resources. The feeling of inadequacy heightened their anxieties; subsequently resulting in failures and mishaps before, during and after teaching. However, they reported that the intensity of the reality shocks was only felt strongly at the beginning. After surpassing the difficult adjustment period of survival (i.e., not dropping the subject) their focus changed from fear of failure to overcoming their waterloos in teaching. This mindset did not come as a surprise knowing that they were in a context where they only had two options: to teach or not to teach. Their repeated exposure to simulated teaching provided them something which could never be acquired in mere lectures—and that is familiarity with the routines of teaching. The more chances they had to teach the more they acquired competencies in one or more areas of teaching.

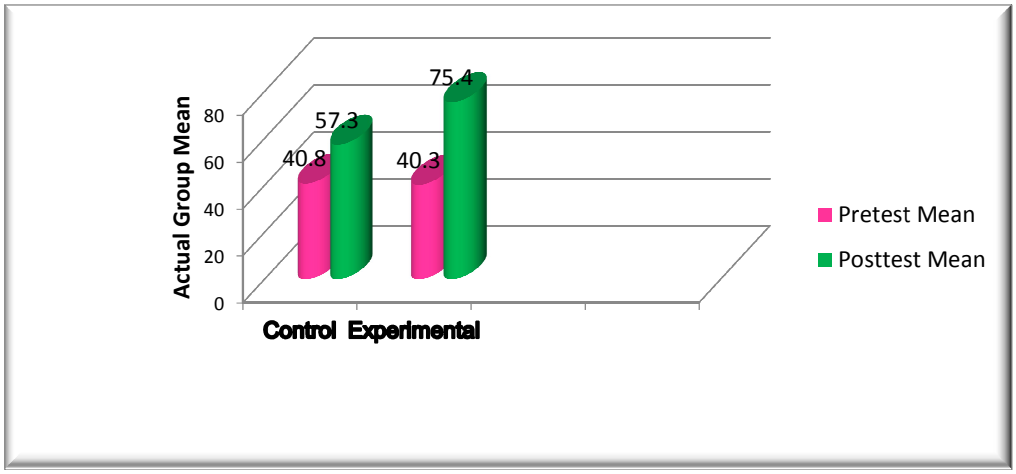
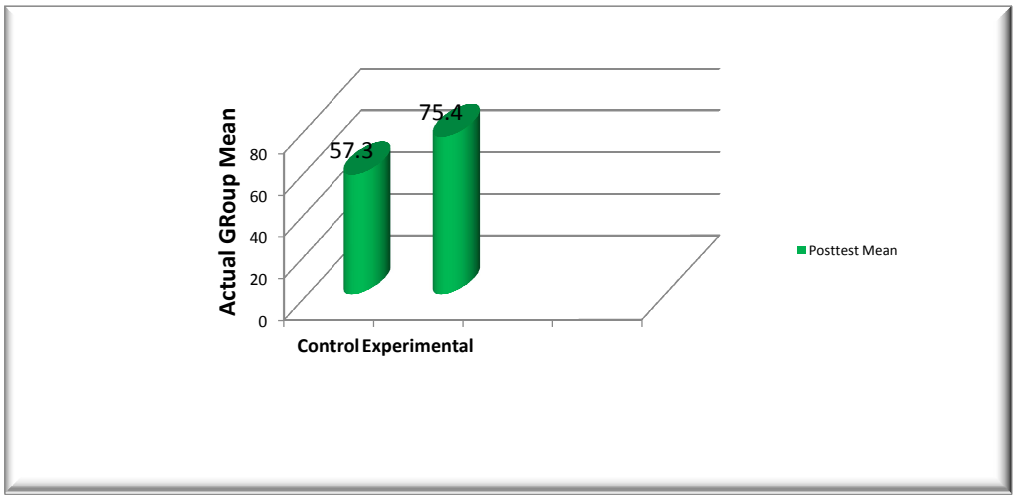


Fig. 2. Mean gain of two groups



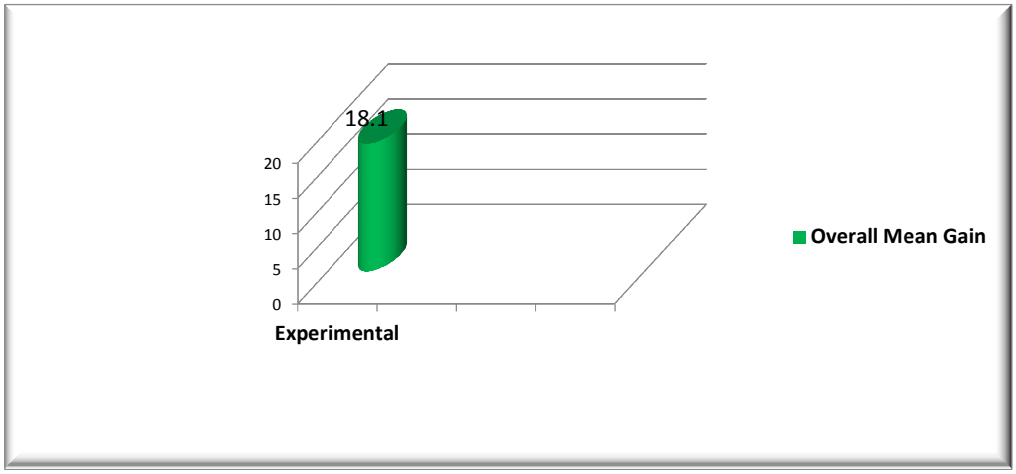


Fig. 3. Mean difference between two groups

On the positive side, the lecture / reporting group reported that they found relief in being set free from the rigors of assuming the role of a teacher. Negatively speaking, their lax behavior allowed them to focus more on themselves, and not on their classmates. Posing themselves as passive listeners to lectures or one-way reporters to their peers may have resulted in the blurring of their identity as the core element in the teaching-learning process. The dwindling of their motivation may have consequently resulted in their mediocre performance. Surprisingly though, there were a few who still assumed the role of the teacher even if they were not required to do so. They confessed that their prior experience in simulated teaching helped them to get accustomed to the teacher's high expectations of their own performance. In other words, to quote Chen and Martin [10], "education should not be confined to the acquisition of knowledge" which poses only a small and indirect role in promoting sustainable behavior; but rather it should "promote a relevant, healthy and active impact of social context". With simulated teaching, students step on the shoes and echo the voice of a real teacher, hoping that their shadows of doubts and fears will concomitantly be replaced with the light of confidence. Simulated teaching is, in a real sense, a big leap into the dark-trusting only in the agency of sincere and effective mentoring of the teacher.

The control group's students' prior experience in simulated teaching may therefore be considered a limitation of the study which could be addressed in future research. Although the participants' training was cut off due to the experiment, it may not have been avoided that when they fell back to the lecture/reporting method, traces of their prior knowledge and training could still have prevailed in their performance which may have influenced the results of the study. It is therefore suggested that the same study be conducted to students who have no prior experience in simulated teaching.

4. CONCLUSION

The findings of the study clearly indicate the multiple benefits of using an authentic pedagogy in ushering education students to the path of expert teaching performance.

Overall, the greatest benefit of simulations is their ability to immerse education students into a direct teaching experience by creating a micro- or synthetic classroom that captures their awareness and exposes them to important contextual characteristics relevant to the domain of teaching. The high level of immersion possible with simulations may help engage the twenty-first century students who have grown up on *playful* learning environments. The success of the pedagogy lies deeply in the student's perspective of what simulated teaching could mean to them. From a traditional point of view, students who are engaged superficially in simulated teaching may tend to think only of themselves. They attempt to measure performance against their peers and they may fall into thinking that they can only succeed if the results compare favorably with that of their classmates. However, in genuine simulated teaching situations, collaboration should replace rivalry as students are becoming responsible for the learning of their peers rather than focusing on *defeating* them in performance ratings. Logically, the latter view can never be fully realized without experience. The expert teacher is seasoned with prolonged, deliberate practice under the careful guidance of a competent and dedicated mentor. Knowledge, to quote Piaget [53], "is derived from action, not in simple associative responses but in the much deeper sense of the assimilation of reality into the necessary and coordinated series of actions". To know an object is to act upon it, in order to grasp the mechanisms of that transformation as they function in connection with the transformative actions themselves. To know about teaching is to assimilate the realities of teaching into structures of renovation which are the structures built by intelligence as a direct extension of the students' heuristic actions. Therefore, when students teach, they learn twice because it is through playing this role that they really learn how to learn. After all, there is no better teacher than the simple, yet, mighty "*Experience*".

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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