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Simulation Models for Teacher Training: Perspectives and Prospects

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Abstract
It has always been a mind dwelling exercise for the trainers to meet the training needs of the future role players of any organization. May it be corporate offices, Government offices and charitable organizations; training is needed at various stages of job from executives to administrators, from teachers to principals, from line officer to JE and from nurses to Doctors etc. For this purpose, various innovative methods and procedures have been used from time to time. Simulation is also one of such kind of technique which is gaining its momentum worldwide these days. Though simulation has its history way back to the period of World War II when two mathematicians Jon Von Neumann and Stanislaw Ulam used it to solve the puzzling problem of behavior of neutrons, its importance in the field of Teacher training has been recognized more only after NCFTE,2005 and 2009. This paper hence deals with the use of simulation models in Teacher Education for Teacher training and also throws light on its future prospects.
Keywords : Simulation , Teacher Education, Teacher Training, Teacher Educators

1. Introduction

It has always been a mind dwelling exercise for the trainers to meet the training needs of the future role players of any organization. May it be corporate offices, Government offices and charitable organizations; training is needed at various stages of job from executives to administrators, from teachers to principals, from line officer to JE and from nurses to Doctors etc. For this purpose, various innovative methods and procedures have been used from time to time. Simulation is also one of such kind of technique which is gaining its momentum worldwide these days. Though the history of simulation goes wide back to the period of World War II when two mathematicians Jon Von Neumann and Stanislaw Ulam used it to solve the puzzling problem of behavior of neutrons, its significance now a days is being recognized widely by almost all the fields including Teacher training.

2. Historical Background of Simulation:

Today Simulation is arguably one of the most multifaceted topics which is used widely in almost all the disciplines and area of work due to its numerous benefits. Simulation is extensively being used as a tool to increase capacities whether it is of an engineer, doctor, computer professional, administrators, executives, students and/or teachers. So far as the history of simulation is concerned, it dates back to the period of World War II as said above.

In October 1961, IBM presented the "Gordon Simulator" to Norden which was a systems design company. In December 1961, a paper on General Purpose Systems Simulator (GPSS) was presented by Geoffrey Gorden at the fall Joint Computer Conference. At that time, GPSS was used to design a system for the FAA to distribute weather information to general aviation.

Early simulation groups were established at: Boeing, Martin Marietta, Air Force Logistics Command, General Dynamics, Hughes Aircraft, Raytheon, Celanese, Exxon, Southern Railway, and the computer manufacturers were IBM, Control Data, National Cash Register, and UNIVAC. In November 1967, first Conference on Application of Simulation using the General Purpose Simulation System (GPSS) was held in New York and since then the popularity of simulation as a powerful tool kept on increasing by leaps and bounds. The number of sessions held on simulation doubled by 1971 and continued to rise to about forty sessions in 1977 and sixty sessions in 1983 as compared to 12 in 1967. Since the 90s, Simulation has developed a lot.

In Teacher Education courses, internship has been given a great importance but the role of simulation has not gained that importance. It is only after NCFTE, 2005 and 2009 that Simulation was started given consideration in Teacher education and is now being adopted by Teacher education institution. But still it has not been used in its full vigor. The need is to train these institutions for various simulation models and techniques to be used for betterment of Teacher training and education. It is predicted that in the future those institutions that are not using simulation may be faced with the challenge to stay afloat in the competitive world.

3. Need of Simulation in Teacher Education:

Teachers build the future of any nation. Dr. D. S. Kothari in the Kothari Education Commission report (1964-66) says " the destiny of India is now being shaped in her classrooms…" The importance of a Teachers' role in any

person's life cannot be neglected. It has been said that no one can rise above the level of its teachers. Hence it becomes quite essential for the one who wants to be a teacher to possess all the skills of good teaching. Hence simulation here plays an important role in training the future teachers. This is why simulation has been given a significant place in the curriculum of Teacher Education. Simulation is nothing but the imitation of the operation of a real-world process or system over time in an artificial environment which is exactly a copy of the real world phenomenon. Hence the trainee gets the training in a real kind of artificial environment without affecting the cost of practicing it in the real world. In Teacher education also, the training is given to the student teachers in a simulated environment in multifold ways. In this way, the real students can also be saved from the experimental teaching of student teachers. Hence there is a need of simulation in Teacher education too.

4. Simulation in Teacher Education:

Simulation is used in many contexts, such as simulation of technology for performance optimization, safety engineering, testing, training, education, and video games. Often, computer experiments are used to study simulation models. Simulation is also used with scientific modeling of natural systems or human systems to gain insight into their functioning. Simulation can be used to show the eventual real effects of alternative conditions and courses of action. Simulation is also used when the real system cannot be engaged, because it may not be accessible, or it may be dangerous or unacceptable to engage, or it is being designed but not yet built, or it may simply not exist. In Teacher Education, basically two types of models of Simulation can be used:

4.1. Real Model
4.2. Virtual Model

4.1 Real Model:

In Real Model of Simulation , one student teacher who is to practice classroom teaching skills, may act as a teacher and rest of the class can act as students. Teacher can act as an observer and record the performance and provide feedback later. The steps which can be followed in creating a Physical simulation model are as below:

- Create a natural classroom environment. For this purpose either other student teachers except the one who is to act as a teacher can act as students a batch of students can be created by inviting students from the experimental schools.
- Students should be made comfortable and encouraged to actively participate in the session.
- Ask student teacher to present a well prepared lesson in front of the students in the classroom by using all the requisite skills of teaching like skill of Blackboard writing, skill of questioning, skill of stimulus variation and so on.
- See how student teacher deals with the individualized personalities of the students.
- Take feedback from the students.
- Ask the practicing student teacher to improve on the week points as recognized through students' feedback.

4.1.1 Benefits:

The feedback from students and the teacher helps student teacher recognize his weak points of teaching and she focus on improving that. Moreover syllabus, schools and students do not suffer due to inexperience of a teacher. Last but not the least the student teacher himself/herself notices his/her weaknesses in handling a class and tries to improve that.

4.2 Virtual Model:

In this kind of model, use of media and IT helps in providing a simulated classroom environment. In such models, simulated classroom environment is created with the help of computerized technology. Classroom is built with having students with different personalities. The task of the student teacher is to recognize those learning difficulties of students during teaching and guide them for betterment. For example, a student who has low vision is put in the class. The student is made to sit on the last bench. For the tasks being given, he complains of headache and shows incapability of reading blackboard. Hence during training session, it is observed whether teacher was able to locate such child in the classroom and give some remedial teaching or not. There are many of such kind of exceptional children who needs individualized attention in the class. During simulation, it is easily found whether teacher has become capable of handling such type of children in his/her classroom or not. The best of such kind of models is that simulated environment can be created at anytime with not much additional cost. Many Teacher education Institutions are using such kind of simulations in real life.

Examples:

simSchools:

In 2003, the simSchool platform was established which acted as a "flight simulator" for teachers in the form of a simulated classroom game. This project was started with the help of a grant from the U.S. Department of

Education for Preparing Teachers to Teach with Technology program. The model of teaching and learning embodied in the simulator is a synthesis model using various Child psychology theories, learning theories, cognitive, affective, conative domains theories and individual differences theories etc. Technically, it is an artificial intelligence model which uses a hill-climbing algorithm to mimic how learners adjust and adapt themselves to meet the cognitive, affective and psychomotor requirements of a task. The performance of a student teacher is recorded and gives a detailed moment to moment analysis of his decisions and its impact on students. Hence it helps in improving teaching.

Simulation Video Technique:
simSchools are generally available online and can be purchased by any individual or institution for using technology based simulation for teacher training. In addition, there is simulation video technique which can be used to train teachers. In this, special software concerning class simulation is designed exclusively for the institution on the same pattern of simSchool. University of Central Florida is also using Simulation Video technique for improving teacher education. (http://www.youtube.com/watch?feature=player_embedded&v=_9VVAFW1Rx8)

4.2.1 Benefits:

- Performance Optimization: Performance of the learning student teacher, no doubt, is improved through simulation. University of Central Flourida is a good example of the same.
- Low Stakes: In virtual models, no real child is harmed by the experimental teaching of a student teacher.
- Understanding Individual differences: The model provides a student teacher the facility to work with a wide diversity of virtual students, including special needs children. Hence it gives them a more understanding of the individual differences.
- Flexibility: The model gives the flexibility to create, experiment and explore different strategies of teaching learning to the student teachers.
- Free from constraints: Again this virtual model, on one hand, provides freedom from financial, time, and administrative constraints of physical classrooms and on the other hand, it provides "virtual" field work with real educational benefits.

5. Future Prospects:

- Whichever model is being used for providing simulation in Teacher training, it promises a better performance of teachers in their actual classrooms in future.
- In future when it is really going to be a tough challenge to meet training needs of the student teachers in real school environment, models of simulation will prove really helpful for the future teacher to experience real classroom problems with no time and administrative constraints.
- Various projects concerning simulation for Teacher training are under process and funded by many agencies of education. So modifications are on the way.
- Like engineering, medical and computers fields, simulation will be widely used in teacher training also in future due to cost effectiveness and ease of use.
- Performance of teachers will be optimized due to flexibility of experimenting different strategies of teaching learning in classrooms. It will help the one to become better teachers in future.

6. Conclusion
Hence we can say that simulation in Teacher training is the future. We must pay due importance to it due to its usefulness and other time and space benefits. Moreover Government and concerned agencies too should provide grant in aid to the teacher training institutions so as to create a better infrastructure for simulation based trainings.

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