

Gender Differences in the Use of Stimulated Chemistry Practicals at Secondary Level

Farkhanda Jabeen

Fatima Jinnah Women University, Rawalpindi.

Muhammad Tanveer Afzal

AIOU, Islamabad

Waqar Un Nisa Faizi,

Islamia College Peshawar

The focus of this investigation was to see how simulated chemistry practicals affected the performance of male and female students at secondary level. The simulations of ten (10) chemistry practicals were developed. The researcher gave an orientation of three (03) days to the students and teachers about the use of simulation to conduct the chemistry practicals. After orientation, students performed chemistry practicals in the laboratory supplemented with simulations according to the time table in ten (10) weeks. The nature of the research was experimental. The quantitative data was collected and examined. Fifty eight (28 males and 30 female) students were selected as a sample. One(1) male and one female(1) secondary school was chosen to observe the effect of simulation on the performance of male and female students in three aspects i.e. written paper, oral viva and practical manual related to chemistry practicals. At the end practical examination i.e. post-test was taken on the pattern of Peshawar Board of Intermediate and Secondary Education (PBISE). An Independent sample t- test was applied for the comparison of two groups. From the result of an independent t-test it was found that simulations and gender have no relationship. Therefore, null hypothesis was accepted on the basis of the result of an independent sample t- test. It is concluded that both male and female are equally benefited from simulated software.

Keywords: gender, performance, comparison, simulation, written paper, oral viva, practical manual.

Simulations are artificial settings that have been precisely and skillfully designed to govern learner's perceptions of reality. A simulation as an activity that involves the imitation of reality in a simulated world (Jones, 1998). Virtual learning environments and simulations are considered effective if they have the characteristic of

expanding, enhancing, providing and reproducing the content and experiences of the learner in an artificial environment (Cannon-Bowers & Bowers, 2009).

Simulation is a virtual representation of reality. An interactive mode of simulations provides an experiential learning medium to the learner results in an effective learning. Simulators would be effective for learning about difficult situations where an individual is unable to find adequate and reliable data. Simulation provides guidance to the learner by providing hints and clues. Simulation is the solution of many problems related to unique challenges and when the cost of making a mistake while selecting alternatives is very high. They speed up and slow down time to provide a glimpse into the future. They are rigorous, exploratory, and immersive. They encourage participants to be creative and innovative by interacting with the simulations. Above all, there are no risk factors associated with making decisions in an artificial environment (Dumblekar, 2004).

A particular type of computer modeling instrument that aids inquiry learning by providing visualization chances not available in real-world situations is called simulation (Van Joolingen, De Jong, & Dimitrakopoulout, 2007). In general, at present computers and other instructional technologies are being used in schools at a higher rate. In the past, such tools were underutilized for the development of conceptual understanding in science classrooms (Mistler-Jackson & Songer, 2000).

The researchers have suggested that the teachers mostly used technology for administrative purposes (Doherty & Orlofsky, 2001; Pflaum, 2004; Waight & Abd-el-Khalick, 2007).

Some researchers consider that simulations are similar to the static visualization but others consider them as two separate and different concepts. Simulations are dynamic, interactive whereas static visualization lacks interactivity. An animation shares the characteristics active user interaction with the simulation (Plass, Homer, & Hayward, 2009). The computer based interactive animations of a phenomena are called visualizations (Linn, Bell, & Davis, 2004).

In order to create the replica of a real laboratory the simulator combines the various effects of voice, movement, smell and vision. The racing car games are examples of low-end simulators. For The training of individuals for any field can be made effective by the use of simulation. Simulations are complex computer based recreations of the real things. Simulated science laboratories are the replications of actual practicals. The simulated software replicates the laboratory environment, therefore, there is no need for infrastructure. Simulated laboratories are economical and cost effective as compared to actual chemistry laboratories. Moreover, these simulated computer based laboratories are perceived as being at least as effective as wet laboratories (Shin, Park, & Kim, 2015). Simulated laboratories demand active participation from the learner and hence improves their practical skills (Faria & Whiteley, 1990; Smith & Pollard, 1986).

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