Journal of Advances and Scholarly Researches in Allied Education
Vol. 15, Issue No. 11, November-2018, ISSN 2230-7540

Role of Innovative Teaching Methods in the Field of Practical Based Education

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Abstract – Models of teaching, like plans, patterns, or blueprints present the steps necessary to bring about a desired outcome. Models create the necessary environment, which facilitates the teaching learning process. There are many powerful models of teaching designed to bring about particular kinds of learning and to help students to learn more effectively. Information processing models share an orientation towards the information processing capability of students and the ways in which they can improve their ability to master information.

Keywords: Model, Teaching, Education

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INTRODUCTION

Models of teaching is a recent, advanced and fast growing area of educational research. Almost all the studies on models of teaching have used experimental design. It is observed that major work in the field of models of teaching has been done since 1980. Most of these studies have been short term studies with a limited treatment.

Some studies have not even specified duration of the treatment, number of exposure, number of demonstrations, practice, feedback session etc. Many studies have conducted to compare the efficacy of various models of teaching. In most of the comparative studies, the effectiveness of information processing models among themselves and against that of traditional methods of teaching in relation to many criterion variables showed that the performance of the students taught through different models was superior to the performance of the students taught through traditional approach.

The experimental group was exposed to Inquiry Training strategy and the control group was taught as usual conventional methods. It was observed that there was a significant difference in all the objectives and total scores of achievement in biology among control and experimental groups. This showed that the Inquiry Training was highly effective in achieving all the objectives of achievement in biology.

This review discussed the information processing models used by different researchers to study their effectiveness in the teaching different science subjects with an aim to help the future researchers possessing the interest in using information processing models.

Latent Class Analysis (LCA), using MPlus 4.1, was used to determine whether mathematics teacher efficacy exists as different efficacy groups. Rather than conceptualizing mathematics teaching efficacy as a continuous outcome, the researchers conceptualized the mathematics teaching efficacy of participants as a result of participants having different levels of mathematics teaching efficacy for both the PMTE and the MTOE.

REVIEW OF LITERATURE

Jamini (2011) investigated the relative effectiveness of AOM and CAM on conceptual learning efficiency and retention of chemistry concepts in relation to divergent thinking which indicated that although both AOM and CAM were effective in fostering concept learning, AOM was comparatively more beneficial in concept learning to pupil with high divergent thinking while CAM was more beneficial to pupils with low divergent thinking.

Remadevi (2008) has applied information processing models in teaching chemistry at the secondary and higher secondary levels with respect to (a) Knowledge level of cognitive achievement; (b) Comprehension level of cognitive achievement; (c) High Intelligence categories; (d) Low Intelligence Categories; (e) Categories of high achievers on scientific attitude scale; and (f)

Categories of low achievers secondary and higher secondary on scientific attitude scale.

Sreelekha and Nayar (2014**)** conducted a study to compare the achievement level between traditional method and concept attainment model with respect to knowledge objectives, understanding objectives and application objectives. The major finding was CAM was effective in improving the overall level of achievement in chemistry.

Daniel (2008) conducted a study to address the effectiveness of using an advance organizer as the sensitization technique within an undergraduate content-based first-year chemistry laboratory activity in order to improve students' conceptualizations of the role creativity plays in the scientific process. The major finding of this study is that using an advance organizer pertaining to creativity, when implemented as an introduction to a problem- based laboratory activity, can lead to a statistically significant greater percentage of students constructing more informed views.

Domin (2008) used an advance organizer pertaining to the nature of science (NOS) aspect of the role creativity plays in science, incorporated into a problem-based laboratory activity of an undergraduate first-year chemistry curriculum. The advance organizer was presented in one of three versions to different sections of students: (1)definite explication of the NOS learning outcome, (2) indefinite explication, and (3) no explication. An NOS survey was administered to 235 students prior to implementation of the advance organizer and to 136 students after completion of the instructional activity involving the advance organizer. The results of this study indicate that the different versions of the advance organizer differ with respect to altering students' conceptualization of creativity: specifically, only the indefinite explication of the intended learning outcome led to a significant change in the percentage of students holding more informed views.

ANALYSIS

The current study was done at Government Secondary school, Delhi and 94 students were randomly selected as sample. The hypothesis was that participants would fall into one of two different efficacy groups: low or high mathematics teaching efficacy. Since mathematics teaching efficacy is an unobserved trait, efficacy group membership was treated as a latent variable. In this case, four separate LCAs were conducted on the PMTE and MTOE efficacy scores for entering and midpoint pre-service elementary teachers (PSETs).

LCA was used to identify the number of efficacy classes that best fit the data for each subscale. One difficulty in determining the number of classes is that no single indicator is commonly accepted to determine the appropriate number of classes in a surveyed population. Instead, several model fit indices criteria are considered together in order to determine which class model best fits the data. In the present study, Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC), Vuong-Lo-Mendell-Rubin likelihood ratio test (LMR LRT), Bootstrapped Likelihood Ratio Test (LRT), and Entropy were used to examine the hypothesis of a two-efficacy group model.

Each of these types of criteria is interpreted in different ways. Information Criterion values (AIC and BIC) are used to choose between competing statistical models. In general, lower AIC and BIC criterion values indicate a better model. Likelihood ratios test (LMR LRT and Bootstrapped LRT) utilize -values to determine model fit. Finally, the entropy ranges from 0 to 1, with 1 indicating a greater precision in membership classification.

For example, when analyzing a one-efficacy group model versus two-efficacy group model, a -value of or less indicates that the two-efficacy group model is better suited for the data, whereas a -value greater than indicates that the one-efficacy group model is a significantly more sufficient model. If there is a discrepancy between the likelihood ratio test values, the -value of the Bootstrapped LRT is a more reliable measure than the -value of the LMR LRT. A description of a 2 versus 1 efficacy groups would indicate if two-efficacy groups or one-efficacy group are better suited for the data and 3 versus 2 efficacy groups would indicate if three-efficacy groups or two-efficacy groups are better suited for the data.

Based on the LMR LRT -value of and Bootstrapped LRT -value of , the findings suggest that a two-efficacy group model is a better fit for the data than a one-efficacy model. Since the LCA showed that the two-efficacy model is a better fit for the data, it was important if the data was more reflective of a three-efficacy model versus a two-efficacy group model. The LMR LRT -value and Bootstrapped LRT -value () were higher than criterion, indicating that the two-efficacy was a better fit for the data. Further, another confirmation was that the lower AIC (575.65 versus 577.60) and BIC (585.61 versus 592.53) indicated that the two versus one class model better fits the data. In both comparisons, the entropy values indicate that the two-efficacy group model is the best fit for the data. The entropy of 0.91 implies that 91% of the participants are accurately categorized in a group. These findings support the hypothesis that there are indeed low and high-efficacy groups of PMTE for both entering and midpoint PSETs.

FINDINGS OF THE STUDY

The major findings of the study were:

(1) The pupils taught through IPM were found to have significantly higher achievement than those taught through CM with respect to knowledge level of cognitive achievement, comprehension level of cognitive achievement and application level of cognitive achievement at .01 level.

(2) The pupils belong to high intelligence categories taught through IPM were found to have significantly higher achievement than those taught through CM.

(3) The pupils belong to low intelligence categories taught through IPM were found to have significantly higher achievement than those taught through CM.

(4) The pupils belonging to the categories of high achievers on scientific attitude scale taught through IPM were found to have significantly higher achievement than those taught through CM.

(5) The pupils belonging to the categories of low achievers on scientific attitude scale taught through IPM were found to have significantly higher achievement than those taught through CM.

CONCLUSION

Hence, it can be concluded that the performance of the high achievers on the post-test was significantly better than that of low achievers. Since there was no significant difference between the mean scores of low achievers of experimental and control groups, it effected the significant of treatment. The overall results of the study indicate that inquiry based instruction, as a backup strategy to support traditional teaching methods. Improved students' achievement in the subject of chemistry at secondary level with higher achievement gains for the groups of high achievers. The results of the study were mostly in line with those of previous researches carried out in other cultures. However, individual variations were found regarding the impact of inquiry.

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