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Title of Thesis: Development of a Model Chemistry Laboratory Curriculum at + 2 Level and Studying its Effectiveness

Abstract

Laboratory work is an essential component of chemistry curriculum especially at + 2 level. Development of skills of observation, measurement, prediction, interpretation and decision making are dependent on laboratory work experience of students. But unfortunately, at present, chemistry is generally taught as a subject which calls for abstract thinking, writing long formulae and complex structures and handling complicated equipments. This method of teaching chemistry has discouraged both teachers as well as pupils. The main reason for this process is that the experiments which form a part of the syllabus are not relevant or interesting and are not related to the issues connected with the real life situations. Besides this, there are various constraints such as large teacher-pupil ratio in the class / laboratory, lack of physical facilities for performing experiments as required by the rigid and time-bound heavy syllabus.

Keeping these issues in context, this study attempted to look into the state of existing senior secondary school chemistry laboratories, identify the gaps in the prevailing system of teaching chemistry at + 2 level, develop a chemistry laboratory curriculum having modified experiments and techniques to bridge the so identified gaps, and evaluate the effectiveness of the designed chemistry laboratory curriculum.

Conclusions of the Study

Majority of teachers observed that the objectives of existing chemistry laboratory curriculum are not clearly formulated and are not related to our present day needs. They opined that the experiments prescribed in the existing chemistry laboratory curriculum do not support in conceptual development of students. In their own laboratory instructional practices teachers preferred adopting demonstration and group experiments in most of the cases. The stereotypical mode of assessment system is also one of the reasons of the chemistry laboratory practices not being seriously taken as the assessment system in senior secondary classes looks for merely setting up of apparatus, recording of data, and reporting mainly. It hardly assesses conceptual understanding, ability of observation and ability of analysis of students.

Majority of the schools were found not to have adequate chemistry laboratory facilities, particularly in terms of space, furniture, apparatus, and chemicals. Despite CBSE's prescribed 60 laboratory periods requirement, only 15% teachers were able to conduct practicals between 45 to 60 periods. Out of the conducted laboratory classes, 60% of the teachers followed demonstration method. Rest 40% followed group experiments. Laboratory safety arrangement was another concern for majority of the respondents, as 60% of them reported that their chemistry laboratories lacked in having adequate provisions for safety arrangements.

The achievement test scores of the students of treatment group and control group, after transacting the designed chemistry laboratory curriculum on the randomly selected treatment group of + 2 level students, were subjected to the test of statistical significance. The result showed that the students who practiced the laboratory activities of the proposed model chemistry laboratory curriculum, performed better than those of the control group.