ABSTRACT

Title	Assessment of Science Teachers Metacognitive Awareness and its Impact on the Performance of Students
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The study was aimed to examine the impact of science teacher's metacognitive awareness on the performance of students in the subject of chemistry. The main objectives of the study were to examine the nature and concept of metacognition, measure the metacognitive perception of secondary school science teachers, identify their metacognitive activities, relate all these to student performance and measure the perceived metacognition of students.

For literature review, a number of empirical studies and research articles on metacognition were reviewed. Efforts were made to collect primary sources. A number of research journals were consulted for review as enlisted at annexure 12 and 3.

For selection of sample a multistage sampling technique was used. The sample size was determined by using criteria given by Johnson & Christensen (2000. p178). Thus for this study a sample of 60 urban science teachers (35 male and 25 female) and 60 rural science teachers (35 male and 25 female) were selected randomly from the population. With each science teacher a sample of 15 students of grade X was also randomly selected. Thus, a total of 1800 students and 120 science teachers were chosen as a sample for the study, this being highly representative of the population.

The review of literature presented a detailed picture of the research conducted on different aspects of metacognition. After an extensive literature review the researcher adapted Schraw and Dennison (1994) Inventory because it was claimed to be a reliable and valid instrument. Based on Schraw and Dennison, 1994 inventory, the researcher constructed separate inventory for measurement of metacognitive awareness of teachers and students. Each of the inventory consisted of 37 items having sub scales of procedural knowledge, declarative knowledge, conditional knowledge, planning, management strategies and evaluation, all derived from the original Schraw and Dennison survey (Annexure 1 & 2). The researcher also developed a multiple-choice test in the subject of chemistry to assess the performance of students. The test items basically involved deep thinking. The items were based on the textbook of chemistry being taught in the schools. The final version of the test consisted of 30 items (Annexure 3).

Before actual launch, the inventory and the chemistry test were pilot tested to check for clarity, ambiguity and to check for timing. For the pilot test, 10 science

teachers and 100 students were selected. Very minor adjustments were made as a result of the pilot but the tests appeared to work well.

Before undertaking the research exercise, formal approval was obtained from the Directorate of Schools and Literacy department for the collection of data (Annexure 4) and School Principals, explaining the purpose and requirements of the study through a letter (Annexure 5). Then, in a meeting with school science teachers, the objectives of the study and application procedure were discussed. The directions were administered in oral format by the researcher. The researcher personally administered the instruments in all schools. Before giving instruments, a brief introduction about the research was provided to the students. The inventory was first administered to the respondents followed by the subject-based test to students. Average completion time for the inventory and achievement test was ten and thirty minutes respectively.

The data obtained involved response patterns from 120 chemistry teachers and 1800 students to the 37 questions in the survey as well as some personal information about the respondents. Student chemistry test data was also obtained. All the data was entered onto a spreadsheet before statistical analysis. Some of the data were of an integer nature following an approximation to a normal distribution. Other data were ordinal in nature, following no clear distribution pattern. Thus, both parametric and non-parametric statistical approaches were employed.

The data have been analyzed using two different approaches. In the first approach, it was assumed that metacognitive awareness was formed of six

underlying skills and that a 'score' for metacognitive awareness could be calculated by collating the scores on the 37 questions.

It was found that male teachers achieved higher scores on knowledge of cognition and regulation of cognition; similarly, the overall score of male teachers on MAI was also higher than female teachers. However, the study revealed that this difference was not significant.

It was also found that teachers with more than 15 years experience and with in-service training possessed higher scores on the metacognitive inventory. Further teachers with higher academic and professional qualifications achieved higher score on the MAI. It was also revealed that teachers who always consulted library achieved higher mean score on the inventory. Similarly, the study did not reveal any significant gender differences in the MAI score of students. The study further revealed that children of highly educated mothers and the students who had always the opportunity of tuition performed better on the achievement test and the inventory

Students of highly metacognitively aware teachers have a higher mean score both on the chemistry test and metacognitive inventory, similarly performance of highly metacognitively aware students on the achievement test was better than low metacognitively aware students.

In the second approach, each question was analyzed separately which indicated that metacognition is not a single variable but is highly multivariate. This approach was considered as factor analyses; of both the response patterns of the students and the response patterns of the teachers showed no underlying structure at

al. This undermines the claims of the original authors of the inventory but, more importantly, suggests that metacognition is not a single variable or even the six variables which were derived from the original survey.

Following this approach, it was found that some specific teacher skills (of a metacognitive nature) were correlated with student test performance (see table 4.3.1). These included the perception of having a good memory, consciously focusing on information, pausing regular while teaching, considering all options for solving problem as well as having a clear conception of student goals, an awareness of student learning and being willing to summarize lessons. It can be argued that these are the some of the characteristics of a 'good' teacher and, therefore, are likely to generate better test results. The study recommended that these areas may be focused in the training programs of teachers. It was further recommended that as parental guidance has a key role in the performance of students. Therefore, the parents may give attention to this aspect for the betterment of their kid.