

Quality of Assessment in Teaching Learning Process: Evidences from Students' Self-Efficacy in Chemistry



EDUCATION

KEYWORDS : Assessment practices, Difficulty in learning chemistry, Examination Reform, Self efficacy, School Chemistry

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ABSTRACT

Globally, examination reform has been a much-discussed theme for many decades. Assessment of learning is technically the process of achievement testing of the attributes targeted by the instructional process. Quality assessments should strike a balance between evaluating basic skills and the capability to transfer their learning to new contexts. Reforms in assessment practices consider many factors including student anxiety, attitude towards school and attitude towards subjects. Recent criticism against evaluation practices highlights them being very weak and adopting lenient grading which affects quality of education at all levels. However, when students believe that a subject matter is hard it creates examination anxiety irrespective of the mode of assessment. Different subjects generate different types of anxiety. This study compared the efficacy beliefs of students towards assessment practices in select hard spots of chemistry with their self-efficacy beliefs about nature of chemistry in general as well as their efficacy in chemistry classroom and co-curricular activities. The students are having least self-efficacy beliefs with respect to assessment even at this state of examination reform. In this context, assessment reforms have to be reconsidered, to strengthen the teaching learning process in ways that will turn students efficacious. Students need acquaintance to deal with the assessment in a healthy way. Loosening of assessment- evaluation system and grading all with A, B will not serve the purpose. Increasing the number of unofficial, less formal and more open examination practices, improving the teaching learning process and quality of instruction may reduce examination anxiety among students.

The educational system and its structure witnessed many attempts of reforms in Kerala during the past decades and it brought in significant changes. Many of these reforms were in connection with several Committees and Commissions employed by Indian Government, which considered examination with utmost importance. The manner in which examinations measure the student assessment at all levels has long been an area of deep concern. However, such recommendations and pleas for the reform of examinations have seemingly had little effect since the same complaints are heard repeatedly. In this context, it is essential to consider what students feel about examination. Examination anxiety and stress are more visible in difficult subjects and areas, including chemistry. Majority of pupils face difficulties in learning chemistry mainly in the unit on Periodic Table and Chemical Bonding (Gafoor & Shilna, 2014a). Therefore, this study compared the efficacy beliefs of students towards assessment practices in chemistry against their efficacy towards chemistry in general, efficacy in select topics of chemistry, classroom chemistry and chemistry co-curricular activities.

An outline of Examination Reforms in India

More than a century back, the Indian University Commission (1902) noted that the teaching stood subservient to assessment and not assessment to teaching. The Hartog Committee (1929) criticized the academic bias of assessment at school level. The Sargent Plan 1944 also stated similar disapproval. The Radhakrishnan commission (1948) observed that examination reform have main concern in education reform as a whole. The Mudaliar Commission (1952-53) made rich recommendations on examination reform like reduction in the number of external examinations, introducing objective type tests, keeping school records to assess overall attainments, worth of symbolic marking for purposes of evaluation and grading rather than numerical marking. The Education Commission (1964-66) considered the examination reform at all phases of education and suggested evaluation as a means to assess the learner development in an objective basis. The Central Advisory Board of Education (CABE) Committee on Examination Reform (1970) also made wide-ranging recommendations like continuous assessment of students, credit based system of evaluation, and that examination system should be designed to evaluate learner's analytical capability and problem solving skills and not rote learning capacity. The National Policy on Education, 1986, identified assessment as a

constant process so that the student might be assisted to progress his achievement level and as a means for enhancement of quality of education. The Programme of Action (POA) took up a number of detailed short-term and long-term procedures for examination reform at the school level as well as at the university level.

Examination Anxiety in chemistry

Examinations are associated with anxiety and stress for students owing to their dominant position in our education system. Assessment, to be sure, is a vital element in the overall quality of the teaching-learning procedure and it is a fundamental component for a graspable educational experience. A well-designed assessment practice gives provision for clear expectations, establishes a judicious workload, and offers opportunities for students to self-monitor, practice and have feedback. It has been noticed that most students fear chemistry and see chemistry as difficult to understand, which may be owing to the abstract nature of chemistry and the use of uninteresting methods by most of the chemistry teachers. Students' anxiety for chemistry learning can also be attributed to students' perception about the difficult nature of chemistry, involvement of multitude of facts, and its lack of connection from reality. Students' anxiety for chemistry learning even leads to loss of interest in the sciences itself. The interest towards chemistry is found to decline as students move from upper primary classes to high school and then to higher secondary classes (Gafoor & Shilna, 2014b).

The study of chemistry at the secondary school level helps students in developing basic skills, knowledge and competence required for problem solving in their environment. According to Ohodo (2005) chemistry contributes to the attainment of the aims of education and specifically helps individuals to develop critical thinking and competences required to deal with effective process skills; observation, classification, measurement, counting numbers, recording, communication, prediction, hypothesis, inference, experimentation, interpretation of data, research, controlling variable and generalization. A poor chemistry base at the secondary school will threaten future effort to master in the subject.

Individuals who possess a high degree of self-efficacy are expected to attempt challenging tasks, to stick at longer at them,

and to employ more effort in the process. Self-efficacy predicts intellectual performance better than skills alone and it directly influences academic performance through cognition. Self-efficacy beliefs also contribute to performance since they influence thought processes, motivation, and behaviour (Bandura, 1997). In the current context, chemistry self-efficacy refers to a student's belief that he or she is capable of successfully performing tasks connected with chemistry content. Research suggests that self-efficacy for chemistry is positively related to students' chemistry grades and attitudes towards chemistry (Zusho, Pintrich, & Coppola, 2003). Efficacy beliefs vary between individuals and may fluctuate within an individual for different tasks. Tippins (1991) observed that female students have lower self-efficacy in Math and Science compared to male students. In this study, the efficacy beliefs of students were assessed in five domains namely assessment practices in chemistry, chemistry in general, efficacy in select topics namely periodic table (PT); chemical bonding (CB) and organic chemistry (OC), classroom chemistry and chemistry co-curricular activities to identify domains of chemistry learning that have comparatively higher and lower efficacy beliefs. The efficacy beliefs of girls and boys were also compared.

Objectives

To compare the efficacy beliefs of students towards assessment practices against their efficacy in nature of chemistry in general, efficacy in select topics, classroom chemistry and co-curricular activities

To examine gender difference if any in self-efficacy beliefs in chemistry

Methodology

A survey was employed to compare the efficacy beliefs of students towards assessment practices in select hard spots of chemistry with their self-efficacy beliefs about chemistry in general as well as their efficacy in select topics of chemistry, efficacy in chemistry classroom and chemistry co-curricular activities. The selected topics were periodic table (PT); chemical bonding (CB) and organic chemistry (OC).

Sample

The sample of this study consists of 199 standard IX students, both males and females, from three high schools from that many revenue districts in Kerala.

Tools used

A scale of self-efficacy in chemistry having 53 items were employed to measure the efficacy beliefs of 9th standard students towards chemistry in general, self-efficacy in select topics of chemistry, classroom chemistry, chemistry co-curricular activities, and assessment practices in chemistry. Self-efficacy belief of students towards chemistry in general is a measure (11 of five point Likert statements) of extent of student's belief that he or she is capable of successfully performing tasks connected with learning concepts and facts of chemistry in general. Self-efficacy in select topics of chemistry is obtained with 11 statements related to three specific topics namely periodic table (PT), chemical bonding (CB) and organic chemistry (OC). Self-efficacy belief towards classroom chemistry is a measure (10 statements) in relation to participation in learning activities, laboratories, peer group discussion on chemistry and doing homework. Self-efficacy beliefs towards chemistry co-curricular activities is a measure with 8 statements related to science club activities, assignments and projects. Self-efficacy beliefs towards assessment practices in chemistry is a measure having 13 statements were related to examination anxiety and stress.

Results and Discussion

The comparison of self-efficacy in chemistry revealed that students possess dissimilar efficacy beliefs towards assessment

practices in chemistry than the other four domains under consideration, i.e., chemistry in general, self-efficacy in select topics of chemistry, classroom chemistry, and chemistry co-curricular activities.

The students have least self-efficacy beliefs with respect to assessment practices in chemistry.

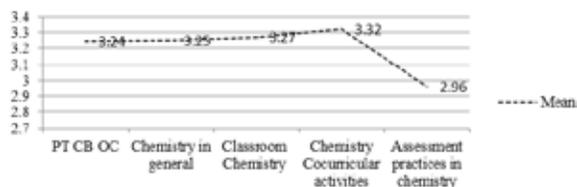


Figure 1. Self-efficacy beliefs of students towards different domains in chemistry

Figure 1 shows that the self-efficacy beliefs towards assessment practices is markedly low compared to other four domains namely chemistry in general, self-efficacy in select topics of chemistry, classroom chemistry, and chemistry co-curricular activities except for assessment practices in chemistry. This shows that students are still not happy with the assessment practices even at this stage of examination reform.

Boys have higher self-efficacy beliefs in chemistry

As the self-efficacy beliefs for assessment practices are found low for students in general, this was cross verified in sub samples based on gender separately. When the average self-efficacy beliefs of boys and girls in all the five domains were compared, it revealed that boys are having higher self-efficacy beliefs.

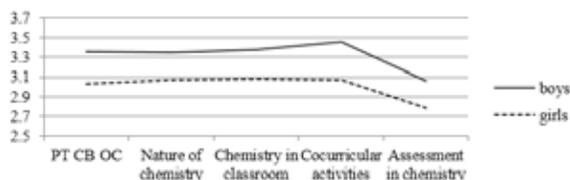


Figure 2. Comparison of self-efficacy beliefs of boys and girls

There are many researches showing advantage of boys over girls in self-efficacy beliefs related to academics. Tippins (1991) viewed that girls tend to under estimate themselves. Sadker & Sadker (1995) observed that even from seventh grade, girls tend to underestimate their abilities in Mathematics and Science though their performance remains the same as boys. The results may be interpreted in view of the observation that female students seemed to express the highest doubts in their capabilities whereas male students frequently seemed overconfident (Yazachew, 2013).

Conclusion and Suggestions

Students have the least self-efficacy beliefs towards assessment practices in chemistry even after the adoption of relatively flexible current evaluation practices including continuous and comprehensive evaluation system. Less efficacious students lack confidence in doing project and assignment and were found to have examination anxiety and stress. Students should get timely positive reinforcement and motivation for their assignments and projects.

Organization and management need to be reformed in tune with modern educational practice.

Even though students have assessment anxiety, it may be comparatively less than that were in an earlier examination driven system. It is observed that students' efficacy belief in perfor-

mance in assessment situations is less than the other areas of teaching learning like co-curricular and classroom activities. While students feel comparatively better with projects, assignments and the related assessments, they still feel anxiety, stress and fear with the examinations and the results there of. Nowadays everyone connected to schooling realize that projects, assignments and such group and out of classroom activities originally intended as learning acts, are very generously graded. It seems that students continue to be at unease where they feel their extent of learning is really put under scanner. The reason may be that students have not turned efficacious in learning though they get satisfactory scores without much effort. Hence, for learning to takes place and for students to be efficacious in learning, assessment and transferring what is learned, these elements of schooling have to be thickly integrated with one another such that their identity disappears. The school organization and management need be reformed accordingly.

Integrating multiple methods of teaching-learning can make students efficacious towards assessment.

More diverse assessment practices are mandatory to make the students efficacious. In this perspective, assessment reforms should strengthen the teaching learning process in ways that will turn students to face examination and assessment situations without fear. However, loosening of assessment- evaluation system and grading all with A, B will not serve the purpose. Increasing the number of unofficial, less formal and more open examination practices, improving the teaching learning process and quality of instruction may reduce examination anxiety among students. As the classroom environment is the most important factor in favouring learning, teachers should be aware of innovations in the field of methods of teaching chemistry for secondary school students. The teaching-learning process can be made effective with the use of innovative instructional strategies to reduce stress and examination anxiety among students. An integrated approach of teaching with new methods or strategies may help the students to learn the abstract chemistry concepts effortlessly and thereby deal the examination without fear.

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