A Study of Relationship Between Beliefs of Intelligence and Self-Efficacy to Learn and Academic Achievement in Chemistry

Dr. N. S. Jadhav
Asst. Prof.
MA. Mphil. MEd. Mphil. MA. Ph.D. PGDHE
K.S.R. College of Education Nehru Nagar, Belgaum
nsjadhav662@gmail.com

Abstract

The purpose of the study is to a study the relationship between beliefs of motivation to learn and academic achievement in chemistry. The study adopts Descriptive survey method for investigation. The population of the study consists of 200 students in IX standard private English medium school were selected using random sampling technique. It is concluded that; i) Students' intelligence about the chemistry will act as supporter for the academic achievement of secondary school students; ii) Students' self-efficacy about the chemistry will act as supporter for the academic achievement of secondary school students.

Key words: Intelligence and academic achievement, self-efficacy and academic achievement

Introduction

Motivation is an important topic in education, as teachers and instructional designers strive to develop learning environments that are intrinsically rewarding. Unfortunately, many traditional paradigms suggest that most students find learning boring so they must be extrinsically goaded into educational activities. Malone and Lepper (1987) suggest that this need not be the case and identify several different ways to make learning environments that are intrinsically rewarding.

Malone and Lepper define activities as intrinsically motivating if "people engage in it for its own sake, rather than in order to receive some external reward or avoid some external punishment. We use the words fun, interesting, captivating, enjoyable, and intrinsically motivating all more or less interchangeably to describe such activities".

Teachers are concerned about developing a particular kind of motivation in their students – the *motivation to learn*, defined as "a student tendency to find academic activities meaningful and worthwhile and to try to derive the intended academic benefits from them" (Brophy, 2010; p. 11). It involves more than wanting or intending to learn. It includes the quality of the student's mental efforts. Reading the text many times may indicate persistence, but motivation to learn implies more thoughtful, active study strategies, such as summarizing, elaborating the basic ideas, outlining in own words, drawing graphs of the key relationships, etc. (Brophy, 1988).

Meaning Motivation

The term 'motivation' has its origin in the Latin word "mover" which means to "move". Thus, motivation stands for movement. One can get a donkey to move by using a "carrot or a stick", with people one can use incentives, or threats or reprimands. However, these only have a limited effect. These work for a while and then need to be repeated, increased or reinforced to

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secure further movement. The term motivation may be defined as "the managerial function of ascertaining the motives of subordinates and helping them to realize those motives".

According to Dubin motivation could be defined as "the complex of forces starting and keeping a person at work in an organisation. Motivation is something that moves the person to action, and continues him in the course of action already initiated". Motivation refers to the way a person is enthused at work to intensify his/her desire and willingness to use and channelise his/her energy for the achievement of organisational objectives. It is something that moves a person into action wand continue him in the course of action enthusiastically. The role of motivation is to develop and intensify the desire in every member of the organisation to work effectively and efficiently in his position.

Motivation is the way in which urges, desires, aspiration, striving or needs direct, control or explain the behaviour of human being". Motivation has very close relationship with the behaviour. It explains how and way the human behaviour is caused. Motivation is a form of tension occurring within individual, with resulting behaviour aimed at reducing, eliminating or diverting the tension. Understanding the needs and drives and their resulting tensions helps to explain and predict human behaviour ultimately providing a sound basis for managerial decision and action." Thus, motivation is the term, which applies to the entire class of urges, drives, desires, needs and similar forces.

Objectives of the Study

1. To find out the relationship between the beliefs about intelligence and academic achievement in subject chemistry.
2. To find out the relationship between beliefs about self-efficacy and academic achievement in the subject chemistry.

Hypotheses

1. There is no significant relationship between the beliefs about intelligence and academic achievement in Chemistry.
2. There is no significant relationship between beliefs about self-efficacy and academic achievement in Chemistry.

Methodology

The study adopts Descriptive survey method for investigation

Sample

The population of the study consists of 200 students in IX standard private English medium school were selected using random sampling technique

Tools

i. Construction of Rating Scale on five types of beliefs using Likert's 5 point scale and validated using scientific procedure.
ii. Construction and validated of academic achievement test in Chemistry on selected topics in IX standard science text book.

Statistical Techniques

To test the null hypotheses regarding the relationship between independent and dependent variables Pearson's Co-efficient of correlation technique was used.

Analysis and Interpretation

Hypothesis: There is no significant relationship between the beliefs about intelligence and academic achievement in Chemistry.

The relationship between beliefs about intelligence and academic achievement in chemistry was tested using correlation technique. The Pearson's correlation technique was used.

Table-1: Relationship between Beliefs about Intelligence and Academic Achievement in Chemistry		
r-value	t-value	p-value
0.3012	4.4454	0.00001*

*p<0.05

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The obtained 't' value 4.4454 is greater than the tabled 't' value 2.76 for two tailed test and at 0.01% level of significance. It thus implies that the obtained correlation is significant. Thus, the null hypothesis is rejected and alternative hypothesis is accepted. This reveals that there is a significant relationship between belief about intelligence and academic achievement in chemistry of secondary school students.

Major finding:

From the above analysis it is revealed that the beliefs about intelligence are having positive and significant relationship with the academic achievement in chemistry. It means that, students' intelligence about the chemistry will act as supporter for the academic achievement of secondary school students.

Hypothesis: There is no significant relationship between beliefs about self-efficacy and academic achievement in Chemistry.

The relationship between beliefs about self-efficacy and academic achievement in chemistry was tested using correlation technique.

The Pearson's correlation technique was used.

Table-2: Relationship between Beliefs about Self-Efficacy and Academic Achievement in Chemistry		
r-value	t-value	p-value
0.3496	5.2507	0.0005

*p<0.05

The obtained 't' value 5.2507 is greater than the tabled 't' value 2.76 for two tailed test and at 0.01% level of significance. It thus implies that the obtained correlation is significant. Thus, the null hypothesis is rejected and alternative hypothesis is accepted. This reveals that there is a significant relationship between belief about self-efficacy and academic achievement in chemistry of secondary school students.

Major finding:

From the above analysis it is revealed that the beliefs about self-efficacy are having positive and significant relationship with the academic achievement in chemistry. It means that students' self-efficacy about the chemistry will act as supporter for the academic achievement of secondary school students.

Findings

1. Students' intelligence about the chemistry will act as supporter for the academic achievement of secondary school students.
2. Students' self-efficacy about the chemistry will act as supporter for the academic achievement of secondary school students.

Conclusion

In this study, the researcher aimed to a study of relationship between beliefs of motivation to learn and academic achievement in chemistrysecondary school students. From the analysis, it is concluded that Students' intelligence and self-efficacy about the chemistry will act as supporter for the academic achievement of secondary school students.

Educational Implications

On the basis of the findings of the study and the observations made by the investigator during the study a few recommendations which may help in developing academic achievement of students.

i. Belief About Outcomes : The influence of expectations on motivation can be described using *expectancy* X *value theory*, which states that people are motivated to engage in a task to the extent that they expect to succeed on the task *times* the value they place on the success (Wigfield & Eccles, 2000). Students with high expectations for success persist longer on tasks, choose more challenging activities, and achieve more than those whose expectations are lower (Eccles, *et al*., 1998; Wigfield, 1994). Past experience is the primary factor in

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influencing expectations. Students who usually succeed expect to succeed in the future.

ii. Beliefs About Intelligence : There are two views : *entity view of intelligence* which believe that intelligence is essentially fixed and stable; and *incremental view of intelligence* which believes intelligence, or ability, is not stable and can be increased with effort. If learners believe that ability can be increased with effort, difficulty and failure merely suggest that more effort or better strategies are needed then their motivation and learning increase, and their success provides evidence that their ability is increasing (Schunk & Zimmerman, 2006).

iii. Beliefs About Capability : The belief that one is capable of accomplishing a specific task is *self-efficacy* (Bandura, 2004). Self-efficacy depends on four factors – past performance; modeling; verbal persuasion; and emotional state.

Past success on similar tasks provides evidence that learners are capable of completing the task. Observing others' success raises expectations and provides information about how a task should be performed. Verbal persuasion encourages learners to try challenging tasks, and success then increases self-efficacy. Finally, students' negative emotional states can reduce self-efficacy by filling working memory with thoughts of failure and anxiety.

Self-efficacy strongly influences on motivation to learn. High-efficacy learners accept more challenging tasks, exert more effort, persist longer, use more effective strategies, and generally perform better (Bandura, 1997; Schunk & Ertmer, 2000).

iv. Beliefs About Value : Value refers to the benefits, rewards, or advantages that individuals believe can result from participating in an activity. Three types of values – Attainment value, Utility value, and Cost – influence motivation (Wigfield & Eccles, 2002). Attainment value relates to the importance an individual attaches to doing well on a task. The belief that a topic, activity, or course of study will be useful for meeting

future goals is Utility value. The consideration of what a person must give up to engage in an activity is the cost (Wigfield & Eccles, 2002).

Beliefs about outcomes (expectations), intelligence, capability (self-efficacy), and value help us to understand why students are likely to engage in and persevere on tasks. Their beliefs about their performances and why they perform can also influence their motivation. This leads to the discussion of attributions.

v. Beliefs About Causes of Performance : Attributions are explanations, or beliefs, related to the causes of performance. A cognitive theory of motivation that attempts to systematically describe learners' beliefs about the causes of their successes and failures and how these beliefs influence motivation to learn is *Attribution theory. Ability, effort, luck,* and *task difficulty* are the attributions learners most commonly offer for school success and failure, others such as effective or ineffective learning strategies, lack of help, interest, unfair teacher practices, or clarity of instruction are also cited (Weiner, 2001).

Motivation tends to increase when students attribute failure to lack of effort, or ineffective strategies, because effort and strategy use can be controlled, whereas it tends to decrease when they attribute failure to causes they can't control, such as luck or ability if they believe ability is fixed (Weinstock, 2007).

vi. Learned helplessness is the debilitating belief that one is incapable of accomplishing tasks and has little control over the environment. It results when one attributes failure to lack of ability. Learned helplessness has both an affective and a cognitive component. Students with learned helplessness have low self-esteem and often suffer from anxiety and depression (Graham & Weiner, 1996). Cognitively, they expect failure, so they exert little effort and use ineffective strategies, which result in less success and an even greater expectation for failure (Dweck, 2000).

Learners can improve the effectiveness of their attributions with training (Robertson, 2000). Teacher can promote productive attributions in

students by encouraging them to attribute their successes to effort and competence and their failures to lack of effort or ineffective strategies.

Teacher can present a model effective strategies, which is particularly effective for students who believe they are already trying hard. As students see their competence increase, their motivation to learn will also increase.

Teachers should also examine their own beliefs about teaching and learning. If they believe that students respond primarily to *reinforcers* and *punishers*, teacher design learning experiences that reinforce their students. On the other hand, if teacher considers students as *thinking beings*, he will design learning experiences that help them to see that their competence and self-efficacy are increasing, and they will encourage healthy attributions for their successes and failures.

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