A STUDY OF REFLECTIVE THINKING AND LEARNING STRATEGIES IN RELATION TO SCHOLASTIC ACHIEVEMENT OF STUDENTS STUDYING IN SENIOR SECONDARY SCHOOLS OF DELHI

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ABSTRACT

The purpose of this study was to examine the relationship between Reflective Thinking, Learning Strategies and Scholastic Achievement of students. Sample consisted of 300 students selected randomly from different senior secondary schools of east district of Delhi. Tools used were Reflective Thinking Questionnaire (RTQ) developed by the researcher and Revised Study Process Questionnaire (R-SPQ-2F) developed by Biggs et al. (2001). Results indicated that there was significant positive correlation between Reflective Thinking and Learning Strategies. Also significant positive correlation was found between Learning Strategies and students Scholastic Achievement. However, no significant correlation was found between Reflective thinking and Scholastic Achievement of students.

Keywords: Reflective Thinking, Learning Strategies, Scholastic Achievement

INTRODUCTION

All children are naturally motivated to learn and are capable of learning. Making meaning and developing the capacity for abstract thinking, reflection and work are the most important aspects of learning. Children learn in a variety of waysthrough experience, making and doing things, experimentation, reading, discussion, asking, listening, thinking and reflecting, and expressing oneself in speech, movement or writingboth individually and with others. They require opportunities of all these kinds in the course of their development. Schools must provide to students opportunities to question, enquire, debate, reflect, to enable them to arrive at concepts or create new ideas. If we want to examine how learning relates to future visions of community life, it is crucial to encourage reflection on what it means to know something, and how to use what we have learnt. The learner must be recognised as a proactive participant in his or her own learning. (NCF, 2005)

In order to achieve these goals, the curriculum shall focus on the requirements and capabilities of learners and aim at developing core competences which a global 21st century citizen should possess. Such core competences may be functional and participatory learning, leading to the development of higher order thinking skills encouraging inquisitiveness and keen observation, actively exploring and discovering solutions, and applying knowledge, attitude and skills in daily life. Also there is a need for developing thinking skills and problem solving, which involves cultivating the ability and habit of thinking creatively and reflectively, making logical analyses and decisions, and effectively solving problems and resolving conflicts. (Senior School Curriculum 2015-16, CBSE)

Developing reflective thinking is the outcome of the understanding of what one might actually be, and it is the most vital ability one can gain all through life. Thus it is possible to state that developing reflective thinking is the best investment for our future. It is a mode of thinking which would be used correspondingly with metacognition, critical thinking, analytical thinking, and creative thinking among modern education approaches during education process. The most important factor which separates the reflective thinking from all these thinking types is that it presents as a solution interpreting, deferring, translating to the individual, comprehending the issues taught in the school and making predictions for the future.

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CONCEPT OF REFLECTIVE THINKING

One of the most important conceptions of century and qualifications that individuals need to have is life-long learning skill. Life-long learning skills require using reflective thinking skills and adapting learning to new situations with a flexible manner for making knowledge understandable (Herrington and Oliver, 2002).

The basis of reflective thinking is based on John Dewey's (1933) approach, learning by doing and living. Dewey propounded that reflective thinking theory accepts reflective (reflective education, reflective research, reflection on practice) education, as one of the important concepts for the education of the individuals. Dewey described reflective thinking as "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends". He also stated that reflective thinking adds meaning to the experience through its reorganization and reconstruction and leads the way for further goals requiring more comprehensive tasks. Reflective thinking requires the learner to achieve the learning goals and turn into the behavior. Later, learner evaluates his/her own performance and has a perception of the progress he/she made, makes a discussion about the product, this way it will be possible to benefit from that experience for the future occurrences. A deed can be counted as successful to the extent that its doer reflects his/her education towards life experiences. Dewey indicated that the most important necessity of the society is the learning of the students reflecting the issues that they learn at school to the real life.

Boud, Keogh, and Walker (1984) extended Dewey's view of reflective thinking and argued that reflection is an important human activity in which people recapture their experience, think about it, mull it over and evaluate it. They defined reflection in the context of learning as "a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations" (p. 19). This perspective of experiential learning theorists imply that reflection is an important activity in a learning situation that enables learners to make meaning from their learning experience and to construct new perspectives that lead to improved learning actions and performance in future learning.

Hatton and Smith (1995) talked about various levels of reflective writing where the lowest level is descriptive writing, which is simply reporting events and interpreting these events as personal worries. A higher level of reflection is the dialogic reflection in which a student engages in a dialogue with himself or herself. This type of reflection is characterized by an exploration and consideration of different reasons. Critical reflection is "thinking about effects upon others of one's actions…" (Moon, 2004, p.45), and this is based on social, political and/or cultural considerations. A notable strength of Hatton and Smith's (1995) taxonomy of reflection is that it offers specific characteristics of reflective writing that allow one to determine whether or not and at what level reflection is being achieved.

Daudelin (1996) provided a definition of reflection that explicitly captures its relation to learning, "Reflection is the process of stepping back from an experience to ponder, carefully and persistently, it's meaning to the self through the development of inferences; learning is the creation of meaning from past or current events that serves as a guide for future behavior."

Taggart and Wilson (1998) defined reflective thinking as a process of making logical decisions on educational issues, and then assessing the decisions made by teachers. In line with Van Manen's (1977) levels of reflectivity, Taggart and Wilson (1998) represented three levels of reflective thinking: technical, contextual, and dialectical. The reflective thinking pyramid "builds progressively from a basic general premise to a peak of reflection epitomised by individual autonomy and self-understanding" (Taggart & Wilson, 1998, pp. 41)

Moon (1999) writes, "Reflection could be seen as a tool that facilitates personal learning towards the outcome of personal development which ultimately leads towards empowerment and emancipation" (p. 88). Reflection can be involved in both direct and mediated experiences. Moon (2004) defined reflection "as a form of mental processing that one may use to fulfill a purpose or to achieve some anticipated

outcome; it is applied to relatively complicated, ill structured ideas for which there is not an obvious solution."

Taylor's (2006) model of reflective thinking proposes three main types of reflection: technical, practical, and emancipatory reflection. Technical reflection draws on empirical or scientific knowledge to improve day to day work practices and procedures. Practical reflection is interpretative in nature and focuses on making sense of human interactions. Finally emancipatory reflection is focused on critiquing power of relationships to bring about positive political and social change. A key element of Taylor's (2006) model is that no one type or level of reflection is superior to another as each serves a different purpose.

From the various definitions stated above, we can conclude that the concept of reflective thinking is quite complex and there is no single definition that fully captures the essence of reflective thinking (Moon, 2007; Ruth-Sahd, 2003) mainly because specific definition are provided by theorists based their own specific work. In a teaching learning situation, reflective thinking can be defined as purposeful activity process which the student realizes to follow, analyze and evaluate his/her own learning in view of teaching learning targets, persistence of his/her motivation, gaining deep meanings, using proper learning strategies, making contact with his/her peers and teachers to reach learning targets to generate new learning approaches impacting directly to the advanced learning processes and performance. According to Bloom's taxonomy (1956), critical reflection is considered one of the most desirable educational objectives. Similarly, according to the SOLO taxonomy, reflection is one of the highest extended abstract levels of learning and most indicative of deep learning (Biggs & Collis, 1982).

Reflection is also the key concept in Mezirow's (1981, 1991a, 2000) theory of transformative learning for adult education and is defined as the, '. . . critique of assumptions about the content or process of problem solving. The critique of premises or presuppositions pertains to problem posing as distinct from problem solving. Problem posing involves making a taken-for-granted situation problematic, raising questions regarding its validity' (Mezirow 1991b, 105). As regards to levels of reflective thinking various authors have concluded that Mezirow's descriptions were useful in assessing them (Chirema 2007; Jenson and Joy 2005; Kember et al. 1999; Kember and Leung 2000; Richardson and Maltby 1995; Wong et al. 1995, 1997). Kember and his colleagues (Kember et al., 2000; Kember, McKay, Sinclair, & Frances, 2008) explained reflective thinking in four dimensions as Habitual Action, Understanding, Reflection, and Critical Reflection based on Meizrow's theory.

Habitual Actions: These are the actions, learned before and mastered through frequent use and started to be performed automatically. Using a keyboard, riding a bike, driving a car can be given as examples of this level. Habitual action or non-reflection occurs when a student responds to an academic task by providing an answer without attempting to reach an understanding of the concept or theory that underpins the topic. Such a response is consistent with a surface approach to learning, but the two constructs are not equivalent. Non-reflective thinking commonly occurs in response to numerical problems. Students can substitute numbers into formulae and manipulate them algebraically to calculate the value for a variable, without any real understanding of the physical meaning of the concept.

Understanding: According to Mezirow (1991), thoughtful action makes use of the knowledge, without attempting to appraise that knowledge (cited in Kember et al., 2000). Our learning that has taken place in schools; Mezirow's "book learning" is classified under this category. As the name suggests, the understanding category is distinguished from the habitual action one by the student attempting to reach an understanding of a concept or topic. Concepts are learnt from a book without an understanding of how they might be applied in practice. The form of learning is a common outcome of lectures that are restricted to theory without showing relevance or application.

Reflection: As cited by Kember et al. (2000), Mezirow describes reflection as validity testing. Reflection involves the critique of assumptions about the content or process of

problem solving. The critique of premise or presupposition pertains to problem posing as distinct from problem solving. Problem posing involves making a taken-for-granted situation problematic, raising questions regarding its validity (Mezirow, 1991, p. 105). Concepts will be interpreted in relationship to personal experiences. Situations encountered in practice will be considered and successfully discussed in relationship to what has been taught. There will be personal insights that go beyond book theory.

Critical Reflection: This is a higher level reflective thinking. Mezirow calls it "premise reflection". In this level, learners become aware of why he/she perceive, think, feel, or act (cited in Kember et al., 2000). Kember et al. (2000) stated that it would not be easy to transform perspectives. Mezirow's explanation of premise reflection is derived from critical theory and the work of Habermas (1970, 1972, 1974). Premise or critical reflection implies undergoing a transformation of perspective. To undergo critical reflection it is necessary to conduct a critical review of presuppositions from conscious and unconscious prior learning and their consequences. Critical reflection is, therefore, unlikely to occur frequently.

CONCEPT OF LEARNING STRATEGIES

'Learning strategies' are defined as "systematic plans, thoughts, affect and behaviour that are consciously invoked by learners to facilitate information processing, especially during the learning and the thinking processes" (Lopez 2001:49; Mayer 2008:290-292; Weinstein & Hume 1998:120) Furthermore, learning strategies enable the learners to retrieve and to apply such newly-formed knowledge in their daily lives (Herrmann et al. 2006:103; Lopez 2001: 50, Mayer 2001:86; Simmons & Kameenui 1998:304, 349).

Biggs (1993) proposed a framework for understanding student learning through the consideration of the relationship between what teachers and students do and think and the nature of student learning outcomes (Dart et al., 2000). These results in a model are commonly referred to as the 3P model. This model relates the main components in a classroom learning in terms of the three P's: Presage (students' characteristics and teaching context), Process (task processing), and Product (nature of outcome). It helps to apprehend the approaches to learning and their position in the context of the learning environment. Biggs (1987, p. 15) provided a summary of the characteristics of deep and surface approaches to learning. A student who adopts a deep approach:

* is interested in the academic task and derives enjoyment from carrying it out;
* Searches for the meaning inherent in the task (if a prose passage, the intention of the author);
* personalises the task, making it meaningful to own experience and to the real world;
* integrates aspects or parts of task into a whole (for instance, relates evidence to a conclusion), sees relationships between this whole and previous knowledge;
* and tries to theorise about the task, forms hypotheses.

And a student who adopts a surface approach:

* sees the task as a demand to be met, a necessary imposition if some other goal is to be reached (a qualification for instance);
* sees the aspects or parts of the task as discrete and unrelated either to each other or to other tasks;
* is worried about the time the task is taking;
* avoids personal or other meanings the task may have;
* and relies on memorisation, attempting to reproduce the surface aspects of the task (the words used, for example, or a diagram or mnemonic).

Attempts to establish a relationship between learning strategies and reflective thinking are ongoing, with only a few empirical studies published (Kember, Leung, Jones, Loke, McKay, Sinclair, Tse, Webb, Wong, Wong, & Yeung, 2000; Leung & Kember, 2003; Phan, 2007). With respect to the learning approach, evidence from research focusing on students in higher education (Caro, 2005; Drew and Watkins, 1998; Watkins et al., 1991; Wong and Watkins, 1998; Phan, 2006) suggests that deep and strategic approaches to learning relate positively to

academic performance while the surface approach relates negatively. On reflective thinking practice, the empirical evidence appears to be limited to the works of Phan (2007; 2008; 2009). The conclusion emerging from these studies is that reflective thinking, learning strategies and academic performance appear to be positively correlated with each other. But there is currently lack of research into these theoretical frameworks, especially in India where the scores obtained by students in class XIIth decide student's future career. These marks obtained are most important for further education. Hence in the present study, the investigator has chosen only reflective thinking and learning strategies as the predictors considering their novelty and extraordinary influence to scholastic achievement. From the review of the literature it is evident that there have been rarely any studies conducted in India related to these variables.

OBJECTIVES

The specific objectives of the study are as follows: -

1. To study the reflective thinking level of students studying in senior secondary schools.
2. To study the learning strategies of students studying in senior secondary schools.
3. To study the relationship between reflective thinking and learning strategies of students studying in senior secondary schools.
4. To study the relationship between reflective thinking and scholastic achievement of students studying in senior secondary schools.
5. To study the relationship between learning strategies and scholastic achievement of students studying in senior secondary schools.

HYPOTHESES

The null hypotheses framed for the study are as follows-

H01 There is no significant difference in proportion of students in different levels of reflective thinking studying in senior secondary schools.

H02 There is no significant difference in proportion of students adopting different learning strategies studying in senior secondary schools.

H03 There is no significant relationship between reflective thinking and learning strategies of students.

H04 There is no significant relationship between reflective thinking and scholastic achievement of students.

H05 There is no significant relationship between learning strategies and scholastic achievement of students.

OPERATIONAL DEFINITIONS

The operational definitions of the different key terms involved in the present study have been defined as follows:

REFLECTIVE THINKING

Reflective thinking is measured in terms of levels as the ability to do habitual action, understanding, reflection and critical reflection as measured by the tool developed by the researcher.

LEARNING STRATEGIES

Learning strategies adopted by students are divided into two categories as deep and surface, as measured by the tool.

SCHOLASTIC ACHIEVEMENT

Total marks (percentage) achieved by the students in class XI examinations in School.

METHODOLOGY

Keeping in mind the objectives of the present study the researcher adopted the descriptive method.

POPULATION AND SAMPLE

In the present study, population comprised of all the students studying in class XII in various senior secondary schools of East zone of Delhi. For a total sample of 300 students, the investigator randomly selected 50 students from six senior secondary schools.

TOOLS USED

Reflective Thinking Questionnaire

Reflective Thinking Questionnaire was developed by the investigator on the basis of the concept of reflective thinking as in four levels: Habitual Action, Understanding, Reflection, and Critical Reflection (Kember et al., 2000). Twenty statements regarding various classroom situations were constructed and four options were provided according to the various levels of reflective thinking and were scored from 1 to 4 (lowest to highest)

1. a statement related to Habitual Action and was given 1 marks
2. b statement related to Understanding and was and was given 2 marks
3. c statement related to Reflection and was given 3 marks
4. d statement related to Critical Reflection and was given 4 marks

Reliability of the tool was determined by test retest method with a time gap of three months and was found to be 83.

The Revised Two Factor Study Process Questionnaire: R-SPQ-2F

The Revised Two-factor Study Process Questionnaire (R-SPQ-2F) developed by Biggs et al. (2001) measures two dimensions: surface and deep approach. This 20 item instrument evaluates how students approach learning topics or courses that are most important to them.

SCHOLASTIC ACHIEVEMENT

Personal information data sheet was used by researcher to seek information regarding the academic performance (percentage) of the students of class XIth.

ANALYSIS AND INTERPRETATION OF DATA

OBJECTIVE 1: To study the reflective thinking level of students studying in senior secondary schools.

The total numbers of students among different Reflective Thinking Levels are shown in the table below (Table 4.1).

Table 4.1 Distribution of students among different Reflective Thinking Levels

S.NO	REFLECTIVE THINKING LEVELS	NUMBER OF STUDENTS	PERCENTAGE OF STUDENTS (%)
1	Habitual Action	97	32.33
2	Understanding	133	44.34
3	Reflection	51	17.00
4	Critical Reflection	19	6.33
	TOTAL	300	

From the above table it is evident that from the total sample studied almost 75% of students are below the Reflection level of Reflective Thinking. Only a few students (6.33%) are on the highest level of Reflective Thinking i.e Critical Reflection. 17% students are at the reflection level. Maximum students (44.34%) are on the understanding level. 32.33% students are on the lowest level i.e. Habitual Action. Therefore, the null Hypothesis (H01) “There is no significant difference in proportion of students in different levels of reflective thinking studying in senior secondary schools.” is rejected.

OBJECTIVE 2: To study the learning strategies of students studying in senior secondary schools.

On the basis of the scores obtained through RSPQ-2F the students were categorized into using deep and surface approach of Learning Strategies as shown in the table below (Table 4.2).

Table 4.2 Distribution of the students on deep and surface approach of Learning Strategies

S.NO	LEARNING STRATEGIES	NUMBER OF STUDENTS	PERCENTAGE OF STUDENTS (%)
1	Deep Approach	124	41.33
2	Surface Approach	176	58.66
	TOTAL	300	

It may be seen from the above table that 58.66% (176) students use surface approach and around 41.33% (124) students use deep approach to learning. Therefore, the null hypothesis (H02) "There is no significant difference in proportion of students adopting different approaches of learning strategies in senior secondary schools" is rejected as students adopt different learning approaches to study.

OBJECTIVE 3: To study the relationship between reflective thinking and learning strategies of students studying in senior secondary schools.

OBJECTIVE 4: To study the relationship between reflective thinking and scholastic achievement of students studying in senior secondary schools.

OBJECTIVE 5: To study the relationship between reflective thinking and learning strategies and scholastic achievement of students studying in senior secondary schools.

For the above three objectives, in order to find out the relationships between Reflective Thinking, Learning Strategies and Scholastic Achievement correlation was computed as per Garrett (1979). The final correlations obtained are shown in the table below (Table 4.3).

Table 4.3 Correlation between Reflective Thinking, Learning Strategies and Scholastic Achievement of students

	REFLECTIVE THINKING	LEARNING STRATEGIES	SCHOLASTIC ACHIEVEMENT
REFLECTIVE THINKING	0	0.141*	0.143
LEARNING STRATEGIES	0.141*	0	0.119*
SCHOLASTIC ACHIEVEMENT	0.143	0.119*	0

***Significant at .05 Level**

From the above table we can infer that the correlation between Reflective Thinking and Learning Strategies is .141. This value is significant at .05 level of significance. Hence the null hypothesis (H03) "There is no significant relationship between reflective thinking and learning strategies of students" is rejected. It means that reflective thinking and learning strategies are closely related with each other. Students adopting better learning strategies will also be able to think reflectively.

Also there is no significant correlation between Reflective Thinking and Scholastic Achievement of students. The obtained value of 'r' is .143 which is not significant both at.01 and .05 level. Thus the null hypothesis (H04) "There is no significant relationship between reflective thinking and scholastic achievement of students" is accepted. It means that Reflective Thinking is not related significantly with Scholastic Achievement of students.

It is further evident from the above table that there is positive correlation between Learning Strategies and Scholastic Achievement of students. The computed value of 'r' is .119 which is significant at .05 level of significance. Hence the null hypothesis (H05) "There is no significant relationship between learning strategies and scholastic achievement of students." is rejected. It means that Scholastic Achievement is affected by the Learning Strategies of the students.

MAJOR FINDINGS AND EDUCATIONAL IMPLICATIONS

The present study is an eye opener to the reality of the present educational system in the light of the recent reforms with emphasis on constructivism. Constructivism as a pedagogy in classrooms is related closely with reflective thinking whereby the learner is unable to construct knowledge unless he/she reflects. Reflective Thinking among students is still not up to the mark as almost 75% of students are below the Reflection level of Reflective Thinking. Very few students are on the highest level of Reflective Thinking i.e Critical Reflection. Also around 60 % of the students use surface approach to study i.e mainly memorization of facts without proper understanding of the meaning. A significant positive correlation between Learning Strategies and Scholastic Achievement emphasizes on the

fact that our assessment procedures are mainly examining the surface learning of students.

Therefore, there is an urgent need to produce 'self learners and initiators' instead of 'followers' in the challenging world. The reforms initiated by CBSE in form of HOTS (High Order Thinking Skill) and PSA (Problem Solving Assessment) need to be understood in their proper essence. Teachers as "reflective practionioners" need to foster critical thinking skills among students using better child centered methods. More emphasis on deep approach with proper understanding of the meaning of the content and its relation with the outside world must be established. The revised textbooks, through various enrichment activities, facts to know columns need to increase student's interest and curiosity to know more, thereby increasing chances of reflective thinking. Parents must also be made aware of the concept of Reflective thinking so that they can foster the same in their children at home through various discussions and questioning.

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