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A Study of Academic Achievement of IIT Students in relation to their Metacognitive Awareness

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Abstract:

Academic achievement is a measurement of the outcome of teaching-learning activities. Study of factors affecting academic achievement of students is an important topic for researches. Present study investigated the academic achievement in relation to metacognitive awareness of first year students of IITs. Metacognitive awareness means cognition about cognition, or thinking about thinking. This research was a survey based descriptive method research, in which a total of 75 students of one of the IITs were considered as sample. It was random convenience sampling. Out of these 75 students, 45 were boys and 30 were girl students. For collection of data on metacognitive awareness, MAI-S&D (1994) was used. Cronbach alpha reliability of MAI-S&D was found 0.79. For getting data on academic achievement, JEE (Adv.) score of respective students was considered, which was collected as part the survey questionnaire administered for data collection. For data analysis purpose, Mean, Standard Deviation (SD), t-test and Pearson's coefficient of correlation was calculated. SPSS was used for calculation. It was concluded that there was a significant positive correlation between Metacognitive awareness and academic achievement among the IIT students.

Keywords: Academic achievement, Metacognitive Awareness, IIT.

Introduction:

Education is one of the most important necessities of human kind. It makes a person rational, capable and responsible and also helps us to know more about the world and makes us more sensitive to contribute to the civilization process to improve society. There are a number of educational activities carried out in the process of imparting education. Usually teaching-learning process is considered as educational activities. Academic achievement is a measurement of the outcome of such educational activities. It has always been an area of importance in education. Study of factors affecting academic achievement of students is an important topic for researches.

Academic success at all stages of education is of great importance to both students and teachers. In fact, the entire curriculum aims to achieve high academic standards, and the structure of the education system is carefully planned with this goal in mind. Academic success is usually measured by examinations or assessments. However, there is general agreement on the best way to proceed, or on the most important aspect of procedural knowledge, such as declarative skills or knowledge, such as facts. Academic achievement may be defined as successful completion, through effort, of the acquisition of academic content and skills. Based on the study of various research literatures, it is observed that though several researches have been conducted separately on finding relationship between academic achievements and other variables viz. intelligence, learning strategies, internet competencies etc. and very few studies have been carried out taking the variable metacognitive awareness. None of the studies were conducted in respect of the IIT students. The students of IITs are generally considered as extra ordinary students due the high level of credibility of the entrance test JEE for admission in IITs and teaching and research facilities

of IITs. Hence the output of the study is very much important for the society in terms of revealing metacognitive awareness and its relationships with academic achievement of the IIT students, so that prospective students can follow the same. Metacognitive awareness means cognition about cognition, or thinking about thinking (Livingston, 1997, & Padma, 2013). We can say that metacognition refers to a level of thinking that involves active control over the process of thinking that is used in learning situations. It is a special type of knowledge and ability that develops with personal experience and with education imparted through schools and colleges. It includes knowledge and regulation of one's thinking processes. John Flavell, an American developmental psychologist, is regarded as a founder researcher in the area of metacognition and he defined metacognition as the knowledge and cognition about cognitive phenomena. Metacognition is the higher mental ability to understand one's own understanding which helps the learner to solve problem, evaluate one's own knowledge and task at hand, think critically, which helps an individual achieve a particular goal, it helps a person to ensure that the learning goal is being reached (Nongtodu & Bhutia, 2017). It also has been described as the ability to calibrate or monitor one's performance and chart learning plans based on learning and performance estimate (Dunlosky & Thiede, 1998). It can further be defined as what we know about our cognitive processes and how we use these process in order to learn and remember (Ormrod, 2006). We can conclude that metacognitive awareness involves thinking about one's own perceiving, understanding, remembering, etc. Metacognition plays an important role in education because it helps learner to be capable of develop a plan, monitor and evaluate how much it's effective. It means metacognition helps the students in involving in learning process..

The main objective of the study was to find the relationship

between academic achievement of the first year students of IITs and their metacognitive awareness. For the purpose, following null hypotheses were formulated: -

- H0-1: There is no significant difference between Male and Female first year IIT Students in their metacognitive awareness.
- H0-2: There is no significant relationship between Academic Achievement of first year IIT Students and their metacognitive awareness.

Materials and methods:

Survey based research was conducted. All first year students of all IITs was the population. Convenience random sampling technique was used to select sample for the study from one of the IITs. Total 75 students consisting both male and female students of first year were part of the sample. All these student were admitted in IITs from the same entrance mechanism that is JEE (Advanced). The MAI-S&D (1994) (Metacognitive Awareness Inventor designed by Schraw and Dennison in 1994) was used as tool to find out level of metacognitive awareness of the students. In this tool, there were 52 items. The tool represents two components of metacognition viz. metacognitive knowledge and metacognitive regulation. Within the inventory there are 17 questions related to knowledge of cognition and 35 questions related to regulation of cognition for a possible. The content validity of the MAI-S&D was ensured by consulting experts and their evaluation. The cronbach alpha reliability coefficient of the tool was found as follows: MAI knowledge - 0.78, MAI regulation - 0.81, MAI total - 0.79. In addition to items in the questionnaire, data on the demographic aspects and JEE (Advanced) score was also collected in the same response sheet. JEE (Advanced) scores of individual students were considered as academic achievement of the students.

Results:

The responses of the questionnaire were arranged in MS-Excel and the excel sheet was later on converted into SPSS compatible file for data analysis purpose. Independent samples' t-test and Pearson correlation coefficient analysis was carried out to test the hypotheses formulated as H0-1 and H0-2.

In order to test the first null hypothesis (H0-1) that there is no significant difference between Male and Female first year IIT Students in their metacognitive awareness, t-test was carried out to find the difference between mean scores of the metacognitive awareness of male and female students under study. Output of the t-test is presented in the table-1 below:

Table-1: Results of Independent Samples t-test for Mean scores of Metacognitive awareness (MA) of Male and Female first year IIT students						
	Gender	N	Mean	S.D.	t-value	p-value
MA	M	45	33.2	8.8	0.207	.84*
	F	30	33.6	7.2		
*df= 73, p>0.05, NOT Significant						

Table-1 indicates that the 't' value for MA (Metacognitive Awareness) is found to be not significant at 0.05 level of significance. Hence the null hypothesis H0-1 that there is no significant difference between Male and Female first year IIT Students in their IUS is not rejected. Accordingly we can

conclude that there is no significant difference between Male and Female students in their mean scores of metacognitive awareness (MA) level. It is also found that difference in mean scores of metacognitive awareness of male and female students is 0.40.

Further in order to test the second null hypothesis (H0-2) that there is no significant relationship between Academic Achievement (AA) of first year IIT Students and their Metacognitive Awareness (MA), Pearson correlation coefficient was computed. Output of this computation is presented in the table-2 below: -

Table-2: Correlation of students' Academic Achievement (AA) with their Metacognitive Awareness (MA) Scores				
AA	Gender (total)	r-value (correlation coefficient)		
		MA-Knowledge	MA-Regulation	MA-Total
	M (45)	0.32	0.71**	0.75**
	F (30)	0.22	0.55*	0.70**
	N=75	0.68*	0.77*	0.80*
**Correlation is significant at the 0.01 level				
*correlation is significant at the 0.05 level				

Table-2 indicates that the pattern of results was similar. It was found that there is significant correlations of academic achievement with metacognitive awareness - regulation scores and metacognitive awareness - total score for female students and male students, but not with metacognitive knowledge. Students' academic achievement (AA) appeared to be highly related to metacognitive awareness - total score from female students (r = 0.70, p< 0.001), and for male students (r = 0.75, p< 0.001). Students' academic achievement was also positively related to metacognitive regulation for female students (r = 0.55, p<0.05), and for male students (r=0.71, p<0.001). For all the 75 students, academic achievement was correlated with each metacognitive awareness - knowledge (r = 0.68, p< 0.05), metacognitive awareness –regulation (r = 0.77, p <0.05), and metacognitive awareness - total (r = 0.80, p < 0.05). Hence in terms of all students and their total metacognitive awareness, the null hypothesis H0-2 that there is no significant relationship between Academic Achievement of first year IIT Students and their metacognitive awareness is rejected.

Discussion & Conclusions:

One of the topics in today's societies related to educational researches is how to improve the academic achievement of students. As our world is developing exponentially, the educational researchers are trying to know the factors for coinciding academic performance improvement. Particularly factors influencing the academic achievement of the IIT students will able to give a path to the prospective students preparing for admission in IITs, one of the prestigious public institutions in the country. This study examined the relationship between academic achievement and metacognitive awareness of students IITs. The present study revealed that: -

- There is no significant difference in the metacognitive awareness between Male and Female students of IITs.

- There is significant relationship between academic achievements and metacognitive awareness of students of IITs, which supports results of Abdellah (2014).

Based on the above study, we can advice the students that they should not spend their valuable times on surfing internet for vain activities. The study highlighted the need of developing skills of planning, ability to comprehend, and evaluate own thinking as it has direct and major bearing on performance academically. Promoting metacognitive awareness and skills could be a valuable method for improving learning and performance of the students.

In future, a study may be replicated on the basis of residence, branch of study etc. The study can also be conducted in relation to other variables like thinking and learning styles, self-regulated learning, etc.

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