

# Reviewing the Relation of Cognitive Load and Achievement Motivation in the Perspective of Post Pandemic Era

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**Abstract - In the year of 2021 the outbreak of COVID-19 has been continued and the schools are still partly closed. As it is known to all that cognitive load of the higher education students could get high as they have become dependent on virtual classes and a few of the physical classes are going on. During this pandemic situation students of secondary schools may have low achievement motivation due to lack of opportunities of expressing themselves in higher studies. These are all assumptions led us to the statement of the problem of this present study, that is to find the effect of pandemic stress on achievement motivation and cognitive load of secondary schools students of West Bengal. This study has suggested the ways of reducing cognitive load to assure high achievement motivation among the students of higher education.**

**Index Terms - Achievement Motivation, Cognitive Load, Post Pandemic Era.**

## INTRODUCTION

Achievement Motivation and Cognitive Load are the most important factors of a learner for their learning style. Studies have proven that learners feel over loaded due to their learning atmosphere and simultaneously their learning outcomes affect achievement motivation. Aspirations for future, reading habit, learning sources, online or offline method of studies etc. are the common issues in the field of education. These issues are related to learning style of the learners and affect their cognitive load due to acquiring some new information. This may affect their achievement motivation which helps them to be motivated for scoring high, achieving goals in future etc. So that the present study is relevantly probing the relation between cognitive load and achievement motivation of the students belonging to higher education as they are going to helm the society in the

near future. The year 2021 has been confined home for the pandemic caused by COVID-19, and students have become familiar with online education platform. The atmosphere made by this pandemic has thrown every person into various hurdles including economy, education, travelling etc. A big dilemma regarding job, further studies and livelihood has been increased in this pandemic which has changed the orientation of thinking and learning of the college students. The study has focused on the concepts of the main two variables following;

### Cognitive Load:

The cognitive load simply means the way learners process and store information. The complete mental effort necessary to place during the assignment in the working memory is known as cognitive load. Cognitive load in individuals differs according to their processing ability. There is a variation in the processing ability of experts and novices. Cognitive load in experts is less as they have more experience and knowledge in the field. Whereas novices have a high cognitive load as they have no experience (Bobis, Sweller, & Cooper, 1993; Chandler & Sweller, 1996). High cognitive load in individuals causes failure or obstruction in the specified task. Cognitive load is found higher in children and elderly people. Children have less knowledge and processing capacity which causes high cognitive load and aging in elder people causes a decline in processing capacity of working memory which creates high cognitive load (Chandler & Sweller, 1991; Wingfield, Stine, Lahar, & Aberdeen, 1988). There are three classifications of cognitive load; Intrinsic, Extraneous and Germane. *Intrinsic cognitive load* is the cumulative effort connected with the topic's complexity. The complexity of the topic cannot be altered so intrinsic cognition is

constant for a particular topic. Whereas *extraneous cognitive load* is associated with the instructional design and depends on the method by which material is being offered to the student. *Germane cognitive load* was defined as the collective effort required creating an everlasting pool of knowledge (Sweller, 1994). The overall sum of cognitive load for a specific individual beneath a specific circumstance is the sum of intrinsic, extraneous and germane cognitive load (Sweller, 2016).

#### Achievement Motivation:

Psychologist David McClelland studied workplace motivation extensively and theorized that workers as well as their superiors have needs that influence their performance at work. One of these needs is Achievement Motivation - which can be defined as an individual's need to meet realistic goals, receive feedback and experience a sense of accomplishment (Moukaddam, Shah, 2020). The task of achievement motivation researchers is to explain and predict any and all behavior that involves the concept of competence. The term achievement motivation may be defined by independently considering the words achievement and motivation. Achievement refers to competence (a condition or quality of effectiveness, ability, sufficiency, or success). Motivation refers to the energization (instigation) and direction (aim) of behavior. Thus, achievement motivation may be defined as the energization and direction of competence-relevant behavior or why and how people strive toward competence (success) and away from incompetence (failure).

### BACKGROUND OF THE STUDY AND STATEMENT OF THE PROBLEM

Both achievement motivation and cognitive load are the very potential components of students' academic careers. Nowadays the epidemic has loomed large and the students could have the stress regarding pandemic situation which may affect these components which may trigger their careers and future aspirations. Achievement motivation may have a relation with cognitive load which together can help a student in building knowledge. The world has become more competitive and a student has to prove oneself with knowledge, attitude and skill; if the cognitive load gets high one cannot faster his/her learning, then

achievement motivation may get affected. The present study is about to study the relation between these two important factors of learning. So the statement of the problem of the present study is;

Exploring Cognitive Load in Association with Achievement Motivation during Post Pandemic Era

#### Hypotheses

H<sub>0</sub>1: There is no significant correlation between Cognitive Load and Achievement Motivation of the students belonging to higher education in West Bengal.

#### Significance of the Study:

Individuals with high achievement motivation or low cognitive load are at their best when they can maintain a high level of involvement in ensuring the excellence of activities under their coordination or control. However they do relatively less well when required to manage excessive tasks or to function in highly stressful environments (Adsul, Kamble, 2008). The students belonging to higher studies are often deal with pressures related to finding job or a potential life partner. Also the pressure to earn good grades and to earn a degree is very high (Hirsch, Ellis, 1996).

#### Review of Related Literature:

Singh (2019), has explained that the exploratory research aims to determine the impact of Augmented Reality intervention on the student technical skills and cognitive load. The experiment was conducted in the two phases in the electronics engineering laboratory. In phase 1, sixty engineering students participated in the research. The participants were divided randomly into two groups: treatment group (N=30) and control group (N=30). The participants of the treatment group were taught with Augmented Reality learning system and the participants from the control group were treated with traditional teaching methodologies. To measure the student technical skills in laboratories, a laboratory skill test was designed by the teachers. To measure the cognitive load of students, cognitive load questionnaire was utilized which is based on the parameters defined in cognitive load theory.

Gohel (2019), has stated that the effect of affective properties if stimulus, its nature and cognitive load on time perception has received a growing amount of attention; the use of different time estimation tasks and stimuli makes it difficult to compare findings across studies. Studies investigating this issue have either

used participants with different mood/ arousal/ affective state or have tried to induce the mood/arousal level/affect by using various mood induction procedures. These procedures have been independent of the subsequent time perception task. However, in real life situation the time task itself is a source of mood/ arousal level (such as the taking an examination or waiting for a friend). It is thus interesting to see the effect of perceivers' affective arousal, induced through instruction about a stimulus, have on its subsequent recall.

Rahman, A. R. A., Abdullah, S. M. S., & Khalid, N. F. (2021) tried to identify the effect of the PiNTAS Module (Academic Intervention for University Students Program) on achievement motivation among low-achieving students. A total of 3,123 undergraduates from universities in Shanghai participated in an online survey from March to April 2020. The results showed that problematic social media usage among university students predicted their levels of anxiety. Mediation analysis indicated that psychological capital mediated the relationship between problematic social media usage and anxiety. Hindriana, A. F., & Setiawati, I. (2021) had aimed to analyze the decrease in students' cognitive load while performing laboratory activity using "VIPSTA" experiment worksheet. The subjects of the research were 72 students in grade 11. The cognitive load was measured in three aspects; intrinsic cognitive load (ICL), extraneous cognitive load (ECL), and germane cognitive load (GCL). The data were analysed descriptively to show differences in the component of cognitive loads and tested for multivariate correlation-regression to show relations between the components of cognitive load.

But the study on the relation of achievement motivation and cognitive load of secondary school students is hardly found. Thus in the present study researcher is trying to find out the effects of pandemic stress behind the student's achievement motivation and cognitive load in this epidemic. That is why the present study is very much relevant and significant.

#### METHODOLOGY

Method and Design of the Study: Survey method was applied for this present study and quantitative research design will be applied.

Population and Sample of the Study:

Students belonging to Higher Secondary Education in West Bengal is the population of this present study. 100 secondary school students were selected by *stratified random sampling* method from the districts of Hooghly and Purba Bardhaman of West Bengal.

Tool and Technique:

Three questionnaires, each consists of 10 questions were used to collect the data. These questionnaires were made by the help of three standardized tools made by *Deo, Mohan (1996)* for Achievement Motivation and *LASSI* for Cognitive Load. The questionnaire "*Cognitive Load in Association with Achievement Motivation*" was a combination of 20 items of the mentioned adopted tools. It was made in Google form to collect data in this pandemic situation just to avoid physical contact.

Variables:

In this present study three types of variables are there. These are -

1. Dependent Variable – Students' Cognitive Load.
2. Independent Variable- Students' Achievement Motivation

Procedure of Data Collection:

Data was collected through Google form from the students of secondary level schools in two districts of Hooghly and Purba Bardhaman in West Bengal. These schools were chosen randomly from respective districts by considering pandemic situation.

Procedure of Data Analysis:

Data was analyzed by the help of inferential statistics, *Pearson Correlation*. On the basis of these analysis researcher reached on its findings through Statistical Package for Social Science (SPSS).

#### DATA ANALYSIS AND INTERPRETATION

The data of this present study was collected through Google form of a questionnaire "*Cognitive Load Association with Achievement Motivation*". This tool consists of 20 items. A google form was made to collect data for avoiding physical contact with the sample due this pandemic situation. There is the link to avail the questionnaire (detail of the questionnaire is given in the appendices section).

[https://docs.google.com/forms/d/e/1FAIpQLSdyqIN\\_Egpl3Yhnie8biPz7K9M7ZQKpGz1foxgGBhgD2j21eg/closedform](https://docs.google.com/forms/d/e/1FAIpQLSdyqIN_Egpl3Yhnie8biPz7K9M7ZQKpGz1foxgGBhgD2j21eg/closedform)

Major Findings and Interpretation of the Correlation Result of Pandemic Stress and Achievement Motivation:

Dimensions of Cognitive Load	Dimensions of Achievement Motivation										
	Pleased to miss classes	Love for reading	Standards to achieve goal	Create new things	Excellent results academics	Leave every work half done	Nervous in examinations	Engaged in other work in class time	Expanded class time irritates	Finding the course worthy for future	Achievement Motivation
Busy in other works during classes	-.270**	0.040	0.091	-0.092	0.150	-.460**	-.208*	-.441**	-.266**	0.051	-.364**
Feel free asking teachers	-0.162	-.393**	-.596**	-.423**	-.327**	-0.041	-.282**	-0.056	-0.001	-.532**	-.344**
Take much time to solve academic task	-.236*	0.017	-0.021	0.003	0.034	-.550**	-.378**	-.394**	-.352**	-0.140	-.345**
Up-to-date in class-work	0.022	-.458**	-.582**	-.422**	-.486**	0.053	-.264**	0.038	-0.147	-.479**	-.402**
Skip to next question not to understand	0.151	0.152	0.024	-0.019	0.035	0.195	.329**	-.430**	-.374**	-.250*	-.272**
Trouble in figuring out the learning material	-.285**	-0.008	0.044	-0.088	-0.048	-.274**	-.345**	-.303**	-.381**	0.017	-.292**
Review class notes to understand	0.045	-.549**	-.555**	-.369**	-.382**	0.009	-0.075	0.034	0.144	-.447**	-.469**
Studies by maintaining routine	0.069	-.497**	-.534**	-.494**	-.502**	0.159	-.228*	-0.045	-0.056	-.383**	-.432**
Anxious due to unfinished work	.247*	-.285**	-.275**	-.263**	-.259**	0.053	-.563**	-.299**	-.307**	-.339**	0.003
Understand and take time yet	0.124	0.053	0.064	0.084	-0.105	0.142	-.416**	-.364**	.210*	-.293**	0.122
Cognitive Load	.212*	-.373**	-.435**	-.244*	-.315**	-.392**	-.296**	-.452**	-.393**	0.185	-.643**

Table 1: Correlation between Cognitive Load and Achievement Motivation

Hypothesis Testing:

H<sub>0</sub>1: There is no significant correlation between Cognitive Load and Achievement Motivation of the secondary schools students in West Bengal.

Every dimension of Pandemic Stress is significantly negatively correlated with Achievement Motivation; and most of the dimensions of both variables are significantly negatively correlated, though some do not have any significant correlations. Thus it could be said that the null hypothesis 1 (H<sub>0</sub>1) is rejected. Pandemic Stress is significantly negatively correlated with Achievement Motivation.

It has been shown in the result that there is significant negative correlation in achievement motivation and cognitive load. That means if the Pandemic Stress is high then Achievement Motivation will be decreased. It could be said that during pandemic situation students' cognitive load may get high for the family income got low, learning style got changed, online method of instruction, burden of daily chores etc. augmented suddenly. Pandemic has created a stressful situation to all of the inhabitants especially the students of higher secondary schools who did not appear for board examinations and could not go through proper evaluation. They are trying to cope up with the situation of getting chance of higher studies in renowned institutions or getting jobs after finishing

DISCUSSION OF THE RESULTS

their course in future. As their cognitive load get affected then the achievement motivation which is highly related with their aspiration and behavior.

#### CONCLUSION

This paper considers cognitive load and achievement motivation as its theoretical underpinnings, not only for identifying design principles that are supposed to improve the teaching and learning of programming, but also for designing an educational programming tool, which manifests these design principles. Many of the students have lost their family income due to pandemic still they are studying hard but some have lost hope for future. Teachers must understand the stressful situation of their students and can help them to decrease their cognitive loads by changing their instructional process and pedagogy. The curriculum could get minimize and guidance regarding careers could be organized to increase their achievement motivation.

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