Higher Secondary School Students' Responses on Pandemic Stress in Association with Cognitive Load

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ABSTRACT

Pandemic caused by COVID-19 has ruined the normal system of education, thus teachers and students have become reluctant to continue regular offline education programs. During this time students of higher secondary education coping up with the pandemic stress so their aspiration, learning style, achievements get affected. The present study has gauged the aspect of pandemic stress on cognitive load of the higher secondary school students in West Bengal, India. A questionnaire on pandemic stress in association with cognitive load was used for collecting data from 100 students belonging to higher secondary study in state government aided schools. It has been shown in the study that most of the students with high pandemic stress have high cognitive load. The study has suggested to the ways of decreasing cognitive load in the pandemic situation to persist the learning outcome of the students who will helm the society in future.

Keywords: Cognitive Load, COVID-19 Pandemic, Factor of Learning, Pandemic Stress

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INTRODUCTION

The word-wide pandemic caused by COVID-19 has changed the facets of our lives, including our freedom of regular livelihood. All the sectors, including educational provisions, went online in every country. Being a developing country, India has endeavored semi offline programs to facilitate educational systems. Every sphere of education became confined at home and started using online education programs insisted by the institutions. The stress has underlined inequalities between students, particularly regarding their differences in various resources like digital skills, support networks and home environment. Thus the present study will observe and gauge the pandemic stress of the students of secondary education in association with their cognitive load for the future aspects.

COVID-19 Pandemic:
In the era of 21st century, the term COVID 19 or Coronavirus is known to all of us, which derives from the medical terminology Novel Coronavirus (nCoV). Symptoms of COVID 19 are related to cough, headache, fatigue, breathing problems and loss of smell and taste; these begin within fourteen days of virus contact. Many of the affected persons could be asymptomatic and people exposed to virus-containing respiratory droplets and airborne particles exhaled by an infected person. These particles could reach the mouth, nose or/and eyes of others or be inhaled by them. Proximity of getting infected comes from mass gathering or physical contacts. Thus governments of countries had decided to impose lockdown to prevent its expedition.

Impact of Pandemic Stress amidst Higher Secondary School Students:
In psychology, stress is defined as the person's physiological (i.e., pertaining to the physical body) reaction to environmental demands. Stress is the mental state of ghastly pressure, which occurs when there is a discrepancy between the demands of the environment and an individual's ability to carry out and complete these demands. Stress affects the body to feel physiological pressure, which will result in a strain on a person physically and mentally. During higher secondary school days, students may feel the academic stress to score high and secure admission in good institution. As a result, students stress out about their educational careers enormously. Challenges related to rank or high

score or competing with others, causing intense emotional upheavals in adults and children, as well as the COVID-19 pandemic has had a significant effect on our regular lives. Public health actions, such as social distancing, are necessary to reduce the spread of COVID-19, but they can make us feel isolated and lonely too sometimes and can increase stress and anxiety. Learning to cope with stress healthily will make you, the people you care about, and those around you more resilient.

Functions of Cognitive Load in Learning:

Cognitive Load is the mental effort which assigns in the working memory; it is also divided into three classifications: 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. On the other hand, extraneous cognition is associated with the instructional design and depends on how the material is being offered to the student. Germane cognition was defined as the collective effort required creating an endless pool of knowledge (Sweller, 2011). High cognitive load in individuals causes failure or obstruction in the specified task. Cognitive load is found higher in children and older adults. Children have less knowledge and processing capacity, which cause a high cognitive load. And ageing in older people causes a decline in working memory processing capacity, creating a high cognitive load.

Statement of the problem:

During this pandemic situation students of secondary schools may have high cognitive load due to lack of opportunities of expressing themselves in higher studies which are caused by pandemic stress. This assumption led us to the statement of the problem of this present study that is to find the state of pandemic stress and cognitive load of secondary schools students of West Bengal. So that the problem comes out as;

"Analyze the States of Pandemic Stress according to the High and Low Cognitive Load of Secondary School Students in West Bengal."

Operational Term:

a) Pandemic Stress: Mental state during worldwide pandemic situation made by COVID-19 also lack of health, social and economical security people are hardly coping up with their situation. This mental state refers to pandemic stress.
b) Cognitive Load: Cognitive load refers the amount of information that working memory can hold or store at one time.

Hypothesis:

H01: There is no significant difference in the means of pandemic stress between the students with high cognitive load and students with low cognitive load of secondary schools in West Bengal.

Significance of the Study:

Stress is a necessary and unavoidable concomitant of daily living; it is essential because, without some stress, we would be listless and apathetic creatures, and inevitable because it relates to any external event, it is pleasurable or anxiety-producing (Arribathi, et al. 2021). Lockdown has brought a high level of helplessness among the working population as some are losing their jobs or may not get optimal levels of emotional support. So many people have developed suicidal thoughts, and even people are committing suicide (Browning, et al. 2021). Individuals with 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 function in highly stressful environments. Secondary school students are often deal with pressures related to finding a job or a potential life partner. Also, the pressure to earn good grades and to earn a degree is very high (Demetrion, 2021).

REVIEW OF THE RELATED LITERATURE

Literature related to the studies on Pandemic Stress

In a study of home-quarantined, **Yao, Chen and Xu (2020),** found that youth in China during the first month of the COVID-19 outbreak, 12.8% had PTSS levels consistent with Pandemic Stress and distress associated with negative coping styles. Symptom levels were expected to increase with time as quarantine continued. This is important since a formal diagnosis of PTSD requires symptoms to persist for more than a month. The researchers in another online survey, which was conducted early during the Wuhan outbreak, researchers looked at anxiety and depression symptoms (rather than specific PTSS) in relation to social media exposure (SME) to COVID-19 news. The study, which included approximately 5000 adults in China, found high SME was positively associated with higher odds of anxiety and a combination of depression and anxiety, compared with low SME. A longitudinal survey of the general population in

China during the initial outbreak, and again 4 weeks later, found the mean Impact of Events Scores to be above the cutoff scores for PTSD symptoms at both times, with moderate to severe stress, anxiety, and depression levels.

Literature related to the studies on Cognitive Load

Muthuprasad, T., Aiswarya, S., Aditya, K. S., & Jha, G. K. (2021), have found that educational institutes across the world have closed due to the COVID-19 pandemic jeopardizing the academic calendars. Most educational institutes have shifted to online learning platforms to keep the academic activities going. However, the questions about the preparedness, designing and effectiveness of e-learning is still not clearly understood, particularly for a developing country like India, where the technical constraints like suitability of devices and bandwidth availability poses a serious challenge. In this study, we focus on understanding Agricultural Student's perception and preference towards the online learning through an online survey of 307 students. They have explored the student's preferences for various attributes of online classes, which will be helpful to design effective online learning environment. The results indicated that majority of the respondents (70%) are ready to opt for online classes to manage the curriculum during this pandemic. Majority of the students preferred to use smart phone for online learning. Using content analysis, we found that students prefer recorded classes with quiz at the end of each class to improve the effectiveness of learning.

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.

From all the above the studies it has been known that cognitive load is one of the main factors of learning and pandemic may affect this which may hamper the future aspiration and achievements of the students. A few of the study has been performed on the secondary level. Others have been done on the college students etc. Recent research showed that because of the COVID-19 crisis, suicide, domestic violence, mental disorders, anxiety, and depressive disorders had increased worldwide. But the study on the relation of pandemic stress with 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 and cognitive load in this epidemic. That is why the present study is very much relevant and significant.

METHODOLOGY

Method:
Survey method was applied for this present study. Data was collected through the use of self made questionnaires. The present study followed comparative study.

Design of the Study:
In this present study quantitative research design was applied.

Population and Sample of the Study:
Students belonging to **Higher Secondary Education** in **West Bengal** are 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**. There was no categorical sample regarding gender or cast or Socio-economic Status. After collecting data, Secondary school students with **High and Low Cognitive Load were categorized**.

The break of the sample was as following;

Table1: Sample Break Up

Categorical Groups	Low	High
Cognitive Load	52	48
Total	**100**	

Tool and Technique:
Two questionnaires, each consists of 10 questions were used to collect the data. These questionnaires were made by the help of two standardized tools made by *Kujawa, Green, Compas, Dickey and Pegg (2020)* for **Pandemic Stress;** *LASSI* for **Cognitive Load**. The questionnaire *"Pandemic Stress in Association with Cognitive Load"* 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 -
i) Dependent variable – **Students' Cognitive Load.**
ii) Independent variable – **Students' Pandemic Stress.**
iii) Categorical variables – **Students with High Cognitive Load and Low Cognitive Load.**

Procedure of Data Collection:
There were 100 samples randomly chosen from two districts of West Bengal; Hooghly and Purba Bardhaman. Consents from the head masters were taken before collecting data from the students belonging to secondary education. Data was collected through Google form. 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, *One tailed independent sample t-test*. 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 **"*Pandemic Stress in Association with Cognitive Load"*.** 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/1FAIpQLSdyqlN_Egpl3Yhnie8biPz7K9M7ZQKpGz1foxgGBhgD2j21eg/closedform

Major Findings and Interpretation of the t Test Result of Pandemic Stress (Categorical Group: Cognitive Load)

Table 2 : Descriptive result of (Mean and SD) of Pandemic Stress regarding categorical groups of Cognitive Load (Low and High)

Group Statistics					
Cognitive_Load		N	Mean	Std. Deviation	Std. Error Mean
Pandemic_Stress	Low	52	32.0962	5.42781	0.7527
	High	48	28.8958	7.69426	1.11057

In this table it has been shown that there are 52 secondary students having low Cognitive Load, and 48 secondary students having high Cognitive Load among the 100 samples. The means of low and high Cognitive Load are respectively 32.09 (SD=05.42) and 28.89 (SD=07.69).

Table 3: t test result shows the difference of Pandemic Stress regarding Cognitive Load

Independent Samples Test								
	Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference
						Mean Difference	Std. Error Difference	
	F	Sig.	t	df	Sig. (2-tailed)	nce	nce	Lower	Upper

PS	Equal variances assumed	7.284	0.008	2.418	98	0.017	3.20032	1.32355	0.57378	5.82686
	Equal variances not assumed			2.385	83.801	0.019	3.20032	1.34161	0.53228	5.86836

The t test result indicates significant difference in the means of pandemic stress according to categorical groups of Cognitive Load (Low and High). At the 95% Level of Confidence the t test result is (t=7.28 p<0.05).

Hypothesis Testing 1:
H01: There is no significant difference in the means of Pandemic Stress between the students with high cognitive load and students with low cognitive load of secondary schools in West Bengal.

The result of t test shows significant difference in the means of Pandemic Stress between the students with high cognitive load and the students with low cognitive load of secondary schools in West Bengal as the result is (t=7.28 p<0.05), which means the calculated value is less than the table value. So the null hypothesis 1 (H_01) is rejected.

DISCUSSION OF THE RESULTS

The result has shown a difference in the Pandemic Stress of the secondary students with high and low Cognitive Load. During the pandemic losing jobs, or lack of basic equipments, insecurity makes a person stressed, and their family suffers a lot along with the student belong to them. Stress plays a significant role during pandemics such as COVID-19, as it enables people to share news and personal experiences and viewpoints with one another in real-time, globally.

CONCLUSION

This study may have a high impact on students' progress in future. This study stated the pandemic stress of the students belonging to secondary schools in West Bengal, which could refer to how to make low cognitive load during the pandemic situation; thus, students' learning may be increased (Arribathi, et al. 2021). So, this study has very much importance in the educational system during the pandemic scenario. Application of Cognitive Load Theory in the research context was based on the Pandemic Stress of the Students belong to Higher Secondary Education. During the second wave of Corona-Virus, people had been scared of facing various insufferable conditions, such as lack of vaccine, floating dead bodies in the river, the repeated siren of ambulances, scarcity of oxygen supply, pathetic conditions of hospitals and increasing statistics of death (Muthuprasad, et al. 2021). The business mongers have transformed this calamity into a business opportunity by selling used materials of dead bodies and black-marketing food and medicine. In this worst situation, quality education would be the only means to guide the generation to helm the future.

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