Psychological Health Impacted by Using E-learning Tools during COVID-19

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Abstract

At the starting of the 2020 New year, novel coronavirus contamination proceeds to influence our lives. The anxiety and stress caused by rising epidemic information, the weakness and fear caused by city closure and confinement, and the boredom and crabbiness caused by amplified occasion establishing all have an extraordinary effect creates psychological pressure on students. Psychological states of students over the year have significantly changed due to the current decision of government to re-open education through online learning system. Students have to spends hours of time in front of digital devices which leads to alter their psychological state in a poor way. Different factors are responsible for this such as middle-class families are incapable of procuring necessary digital devices, unfamiliar environment leads to low academic performance etc. In this paper a set of questionnaires were designed to understand the circumstances of student's mental health during ongoing pandemic. The outcome found by this study was traumatism. Students are going through depression in this period. If any solutions are not established as soon as possible then future generation of Bangladesh could face huge danger.

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Chapter 1

Introduction

1.1 General Introduction

Education is a must have component in our lives. It's one of the most important basic human rights. Education not only provide knowledge but also teach us how to make a peaceful society for living. At present time technology also become a huge part of our day-to-day work. It changes the way people used to work before. Technological impact falls on education as well. It is possible to learn instantly anything on internet now about any academical topics. Now there are many E-learning Tools available to use in educational sector. For instance, any video messaging service can be used for group studies, or even a teacher can conduct online classes as well. There are many online website or platform available for online courses. Such as, Coursera, Edx. 10 minutes school in Bangladesh and many more. Recently pandemic's sudden hit stopped everything for once. During Covid-19 all office work, schools, colleges, universities were shut down for an unknown time. As education can be stopped for a long time, people had to figure out some ways to continues education. Technology was the only choice people laid their hope for. Thus, uses of technology increased more than ever in history, especially in education sector. People stated to work from home, students attended classes form home all by using technological services. Now there are lots of benefits people can get from these technological services in their academic or non-academic career. But there are some significant number of drawbacks as well in using these E-learning tools, especially on our brain.

In this thesis paper, how human brain gets affected by using online education system. How overuse of E-learning tools makes a huge problem for students and that can lead to a greater threat in future, those things are studied in this work. A questionnaire was designed to study student's psychological health during this Covid-19. How their emotional state fluctuates while learning in online systems was observed from their answers and a result has secured based on that data.

1.2 E-learning tools

E-Learning software, also called Electronic Learning Software, enables you to deliver courses and instruction electronically via the Internet, a company Intranet or other platforms such as CD-ROM or DVD. There are as many types of e-Learning software available as there are e-Learning needs. Before you begin your search for e-Learning software, you must first decide what kind of e-Learning software will best meet your needs. The most common types of e-Learning software are listed below.

(i) Learning Management Systems (LMS)

Learning Management Systems are specifically designed to track the progress and performance of a wide range of learners. There are hundreds of academic and commercial systems from which to choose. While many LMS's provide different features, almost all of them track and store user performance. For example, most LMS's can track the number of hits to a certain area of a course as well as the amount of time a learner has spent on a particular area of a course. One drawback of implementing an LMS is the high cost. You can easily spend hundreds of thousands of dollars on a high-end LMS.

(ii) Content Management Systems (CMS)

A CMS helps instructors' catalog, track and manage corporate information. A CMS is effective when substantial amounts of information must be tracked and managed and is ideal for large organizations. Some learning experts do not feel that CMS's are a viable e-Learning software solution because they lack the end-user delivery and tracking mechanisms found in most LMS's. Content management systems take care of all the behind-the-scenes work and separate the content from the presentation.

(iii)Programming Languages

HTML or Hypertext Markup Language is a common programming language that is often used for e-Learning. HTML-based e-Learning can be accessed via a Web browser and does not require a plug-in or special download like JavaScript or Flash. Basic learning courses can be created with HTML, but on its own, HTML does not provide interactivity. To make an HTML-based course engaging and interactive other elements such as Flash, JavaScript and Shockwave must be incorporated. The benefit of HTML-based courses is that it provides a lot of flexibility for the programmer. However, writing HTML code is a specialized skill that requires the services of an HTML programmer.

1.3 History of E-learning Tools

The term "e-learning" has only been in existence since 1999 when the word was first utilized at a CBT systems seminar. Other words also began to spring up in search of an accurate

description such as “online learning” and “virtual learning”. However, the principles behind e-learning have been well documented throughout history, and there is even evidence which suggests that early forms of e-learning existed as far back as the 19th century.

Long before the internet was launched, distance courses were being offered to provide students with education on particular subjects or skills. In the 1840′s Isaac Pitman taught his pupils shorthand via correspondence. This form of symbolic writing was designed to improve writing speed and was popular amongst secretaries, journalists, and other individuals who did a great deal of note taking or writing. Pitman, who was a qualified teacher, was sent completed assignments by mail and he would then send his students more work to be finished using the same system.

In 1924, the first testing machine was invented. This device allowed students to test themselves. Then, in 1954, BF Skinner, a Harvard Professor, invented the “teaching machine”, which enabled schools to administer programmed instruction to their students. It wasn’t until 1960 however that the first computer-based training program was introduced to the world. This computer-based training program (or CBT program) was known as PLATO-Programmed Logic for Automated Teaching Operations. It was originally designed for students attending the University of Illinois, but ended up being used in schools throughout the area.

The first online learning systems were really only set up to deliver information to students but as we entered the 70s online learning started to become more interactive. In Britain, the Open University was keen to take advantage of e-learning. Their system of education has always been primarily focused on learning at a distance. In the past, course materials were delivered by post and correspondence with tutors was via mail. With the internet, the Open University began to offer a wider range of interactive educational experiences as well as faster correspondence with students via email etc.

1.4 Psychological impact on students

During Covid-19 the whole world leaders decided to shut down all educational institutions for the sake of student’s lives. No one wants to take risk on future generation. But to stop students getting spoiled, technology comes and save that problem. But many has overshadowing one major problem is how mentally students can get affected using E-learning tools over a long period of time. A major problem occurs during this online education services is students sleeping habits changed rapidly. As students now have to spend more time in front of digital devices, its blue light causes serious effects on sleeping habits. When classes required physical attendance of students, there were lot of social interaction among students and teachers. Social

interaction builds a strong communication skill which now lacks on online education systems. In a third world country like Bangladesh, it is not possible for all class of families to buy expensive digital tools that are being used for online education system. So, there are a noticeable number of students who are constantly going through mental pressure of not being able to attend online classes. As they won't join this year in their institutions, it is much likely they would have to spend a whole year by almost doing nothing. Later which will cost them in job life. Many student's academic performances drop during this pandemic. Due to the unfamiliar of using E-learning tools students suffer from lack of adaptability this new study environment, which of course later on will greatly affect on a student's life.

1.5 Significance of the Thesis

Overuse of anything has a huge bad impact. Using of E-learning tools also falls into this category. Students are now forced to use digital devices for studies. Since covied-19 started no one is not allowed much to gather in a group for any kinds of social interaction among friends, colleagues. So, after a long-time classis, students are depending on digital devices to maintain a social life. Which leads to a huge impact on student's psychological health.

The outcomes of this thesis should lead to deeper understanding of whether a bad impact on student's mental health exists or not. If so, whether it is a specific form of using too much time on digital devices or whether it is a standalone disorder. As this study is predominantly explanatory, it is expected that further explanatory and confirmatory research in this area will continue. Once the aspects associated with psychological health of students have been identified, it would then be appropriate to develop targeted measure and diagnostic criteria. People who are in charge of governmental health sector needs to understand the factors of dangers of this issue. A nations whole future depends on students. If this issue overlook now, then later it won't be easy to recover. Following this, the ultimate goal of any such research is the development of preventative strategies for at-risk individuals.

Chapter 2

Defining Psychological health

2.1 What is psychological health

Proper psychological health involves a normal emotional, behavioral, and social maturity to a person. This means such a person is in a healthy state of mental well-being, one that they can use to function normally in society and during everyday events. They have good emotional health, the kind affecting how we feel. They also have good behavioral health, involving how we act. Finally, they have great social health, the kind that involves our interactions with others. Psychological health includes mental, emotional, social, and spiritual dimensions of health.

(i) Emotional Health:

Emotionally healthy people usually respond appropriately to upsetting events. Emotional health affects social and intellectual health. Emotional turmoil may seriously affect one's ability to think, reason, and act rationally.

(ii) Social Health:

Socially healthy individuals enjoy a wide range of interactions with family, friends and acquaintances and are able to have healthy interactions with an intimate partner. They can listen, express themselves, and form healthy attachments. They act in socially acceptable and responsible ways and find the best fit for themselves in society.

(iii) Spiritual Health:

Spirituality is broader in meaning than religion and is defined as an individual's sense of peace, purpose, and connection to others, and the beliefs about the meaning in life. It goes beyond material values and is practiced in many ways. Spiritual health refers to the sense of belonging to something greater than physical or personal dimensions of existence.

2.2. Characteristics of Psychologically Healthy and Unhealthy People

Characteristics Healthy People:

- Zest for life, spiritually healthy, intellectually thriving, high mental acuity
- High energy. resilient, enjoys challenges, manages time and stress, focused
- Realistic sense of self and others, sound coping skills. non-bigoted/open/receptive
- Adapts to change easily, sensitive to others and environment
- Love of nature/environment
- Not quite there, but working to improve in all areas, recognizes strengths and weaknesses
- Good relationships with family and friends, accepting of diversity
- Healthy relationships, capable of giving and receiving love and affection
- Has strong social support, may need to work on improving social skills/interactions but usually no problems
- Not as effective as could be. but reasonably socially adept
- Has occasional emotional "dips' but overall good mental/emotional adaptors

Characteristics Unhealthy People:

- Shows poorer coping than most
- Has regular relationship problems, finds that others often disappoint
- Tends to be cynical/critical of others
- Lacks focus much of time, hard to keep intellectual acuity sharp
- Poor time manager, often overwhelmed by circumstances
- Quick to anger. a bit volatile in interactions, sense of humor and fun evident less often, overly reactive
- Overly stressed, seldom takes time out for fun, anxious and pessimistic attitude
- Still has friends, but friends tend to be similarly negative/critical
- Pessimistic/hopeless/cynical most of time
- Laughs, but usually at others
- Has serious bouts of depression. 'down" and 'tired" much of time
- A "challenge" to be around, becoming more socially isolated
- Has suicidal, life not worth living" thoughts fairly often
- Developing neurosis/psychosis

- Experiences many illnesses, headaches, aches and pains, lots of problems, gets colds/ infections more easily than most
- Has little fun, no time for self
- Spiritually down, no zest for life, self-absorbed

2.3 Mental Health threats to students

Mental health problems are common among college students and appear to be increasing. Most common disorders among students are mood disorders, personality disorders, and schizophrenia. Attention-deficit disorder is another growing mental health concern for students. Depression can be a major obstacle to academic success. Students who have weak communication skills, who find that college isn't what they expected, or who find that people they've known seem different often have difficulties. Of college students, 8.3% report having been diagnosed with depression.

Symptoms of Major Depression

- Sadness and despair
- Loss of motivation and interest
- Preoccupation with failures
- Difficulty concentrating
- Loss of sex drive
- Sleeping too much or too little; insomnia
- Feeling agitated
- Withdrawal from friends and family
- Diminished or increased appetite
- Significant weight loss or weight gain

2.4 Suicide: Giving up on a life

More than 34,000 suicides are reported each year. College students are more likely to attempt suicide. College is a time of significant transition. Many students are living away from home for the first time and have less access to support from family and friends. Along with increased freedom and independence, students face greater stress from a variety of sources, such as: increased academic demands, adjusting to a new environment, and developing a new support system. College also provides an opportunity to experiment with alcohol and other drugs, which may compound problems with mood and increase the risk for suicide. Many students come to college with a prior history of mental health difficulties or treatment. Environmental stressors in combination with a predisposition to experience mental health problems may increase risk for suicide. In a recent national survey 16% of college students reported being diagnosed with a

depressive disorder, many within the last year. Over 90% of persons who commit suicide have a diagnosable mental disorder, typically a depressive disorder or substance abuse disorder. Men are especially at risk for completed suicide. College age men are four to six times more likely to die by suicide than women. Women are two to three times more likely to attempt suicide using nonlethal means than men.

Warning Signs of Suicide

- Recent loss and seeming inability to let go of grief
- A history of depression
- Change in personality, such as sadness, withdrawal, irritability, anxiety
- Change in behavior, such as inability to concentrate, loss of interest
- Sexual dysfunction

Chapter 3

Literature Review

Xiaobo Zhou, in his psychiatry research mentioned, with the infectivity and harmfulness of the virus, and increasing number of confirmed cases and deaths, negative emotion was spreading under this grim situation, and the outbreaks threatened mental health of the population. A large number of people had emotional breakdown, and they felt helpless, fear, anxious, depressed, guilty and nervous. Therefore, how to maintain mental health of citizens became an important issue [1].

Qian-Hui SUNa, Ying SUb proposed six necessary steps addressing to the authorized people. They stated as to push the psychological knowledge of epidemic prevention to students, popularize the general knowledge of mental health maintenance, and smooth the network psychological counseling service channels and also to grasp the psychological dynamics, classify and do well the psychological support of the students in the epidemic period. Set up a regional network to assist the team, strengthen psychological counseling for students facing graduation and students whose relatives and friends have been diagnosed and isolated, and ease students' anxiety, irritability and other emotions through hotlines, the internet and other ways[2],

Jun Shigemura, MD, PhD er al indicated two things, First, peoples' emotional responses will likely include extreme fear and uncertainty. Moreover, negative societal behaviors will be often driven by fear and distorted perceptions of risk. These experiences might evolve to include a broad range of public mental health concerns, including distress reactions (insomnia, anger, extreme fear of illness even in those not exposed), health risk behaviors (increased use of alcohol and tobacco, social isolation), mental health disorders (post-traumatic stress disorder, anxiety disorders, depression, somatization), and lowered perceived health and second If nothing else, the death of the government quarantine worker must remind us to recognize the

extent of psychological stress associated with imperceptible agent emergencies and to give paramount weight to the integrity and rights of vulnerable populations [3].

Md Fouad Hossain Sarker et al, found that a majority of the students are found to be highly enthusiastic about the online courses. They are eager to participate and interact in the online platforms, which are somehow limited in the traditional classroom settings. However, there are several institutional, administrative and technical limitations of implementing e-learning in Bangladesh. It is recommended that better orientation of the users, quality content distribution though user-friendly systems and enhanced asynchronous interaction between the lecturers and students are the key pre-requisites to harness the optimum benefit from e-learning technologies in Bangladesh [4].

AmirAli Rastegar Kazerooni et al, A valid and reliable questionnaire, based on our previous study,1 was used to measure the effects of this activity. Overall, 71% of junior medical students believed the social media platform had a significant impact in terms of helping them adjust faster to the present emergency conditions. The only challenge students mentioned was that some were not sure how to apply the information gained to personal situations as the students continued to desire real and practical face to face consultation. Nonetheless, students generally described the participation in this initiative as a unique experience that was beneficial to professional growth. [5].

Jianyu Que et al investigated the prevalence of psychological problems in different healthcare workers (i.e., physicians, medical residents, nurses, technicians and public health professionals) during the COVID-19 pandemic in China and explore factors that are associated with the onset of psychological problems in this population during this public health crisis [6].

Yaghoob Nami et al explains the concept of mental health and the significance of promoting of the university students, analyzes the current status of psychological problems, and explores the measures taken to promote the mental health of the university students. The sample of this study was 289 students (133 girls and 156 boys) and randomly selected. More girls than boys suffer more symptoms of mental disorders. There can be psychological disorders such factors as: atmosphere, college and decide to take the age of marriage, age and educational decisions for the future - a job, a desire to progress and obstacles, among others. Students to understand problems, identify vulnerable people and psychological disorders to campus early diagnosis,

treatment and prevention, counselling, classes on campus more and more active form Future to improve student academic achievement and finally cause the development of society [7].

Wenjun Cao et al, investigated on the basis of questionnaire packet that included the 7-item Generalized Anxiety Disorder Scale (GAD-7) and those inquiring the participants' basic information and they received 7,143 responses. Results indicated that 0.9% of the respondents were experiencing severe anxiety, 2.7% moderate anxiety, and 21.3% mild anxiety. Moreover, living in urban areas (OR = 0.810, 95% CI = 0.709 - 0.925), family income stability (OR = 0.726, 95% CI = 0.645 - 0.817) and living with parents (OR = 0.752, 95% CI = 0.596 - 0.950) were protective factors against anxiety.[8]

Chapter 4

Uses of E-learning of Bangladesh

4.1 E- learning practices in Bangladesh

The number of internet users has been increasing rapidly in Bangladesh. According to the Global Digital Report, nearly half of Bangladesh's population currently uses internet (Mallick, 2018). The report also states that the volume of internet users since January 2017 has jumped by over 29 percent by the end of December, and the total number of Bangladeshi internet users stood at 81.66 m and of them, 76.22 m were active mobile internet users. These studies mostly explore the various initiatives, problems and recommendations for adopting e-learning in Bangladesh so that effective and quality teaching and learning could be ensured. Most of these studies, however, are based on limited sample size and scope. Certain models were used adhering to several tools and techniques in identifying and analyzing the ground realities of online education in Bangladesh. For example, Islam (2017) examined the possibility of introducing LMS for English language learning at higher secondary level. The author highlighted that this LMS can be used for the improvement of English language skills and enhancement of the learning process.

An ICT supported interactive learning environment was created by Bangladesh Open University in 2010 by using video, mobile phones, SMS-based tools administered in a LMS, and innovative pedagogy based on the student-centered learning model (Grönlund and Islam, 2010). This study illustrated the impressive use of mobile telephone for creating interactive learning environments which was supposed to reach a majority of the population including thousands of students. Since the adoption of the ICT in teaching and learning is still advancing in Bangladesh, social media is also used for student interactions. An empirical study conducted by Islam et al. (2016) examined group dynamics of undergraduate students in social media in a blended learning approach. In addition to face-to-face sessions on basic computer programming, students were asked to solve a set of tasks (questions) in social media in an interactive manner.

The results revealed that student interaction in the form of textual messages helped peers to solve the problems more effectively.

4.2 Constituting E-learning in Bangladesh

Digital Bangladesh is the electoral pledge of the present government to develop Bangladesh as a middle-income country by 2021. It is a good initiative as all developed countries have demonstrated that digitalization plays a de facto role in the development of a country. Realizing the significance of digitalization Prime Minister Sheikh Hasina is overseeing the Access to Information (a2i) program. For this project, the government has established Information and Communication Technology (ICT) division and about Tk. 19.30 billion (1,930 crore) has been allocated for the 2019-20 fiscal year. Since the government intends to introduce e-learning in the education sector, e-learning readiness should be the precursor. We should focus on four basic issues: connectivity (quality of internet infrastructure), capability (a country's ability to consume e-learning), content (the quality of online materials) and culture (public support and belief for e-learning expansion within the country). For overseeing all these issues, a national e-learning center should be established in advance. Most importantly, e-learning will stop question paper leakage as instant generated passwords will be used to print the public exam question papers. This onetime generated password will be sent to cell phones of some specific teachers before the eleventh hour of the exam. Therefore, the concern teachers' will be responsible if there is any leakage of the question paper. Also, for conducting exams, a lock-down browser can be utilized as it is inoperative outside exam hall; we can primarily apply this for university admission.

The ease of use for an eLearning system is a very important component in eLearning. Most of the teachers and students presently do not like this rapid change in the education system as eLearning lacks the "classroom environment." Thus, after developing user-friendly software, training both teachers and students is important. However, in spite of having this education-based software, we cannot expect a dramatic change in our education system, as we are not accustomed to the software-based online education scheme. We should keep in mind that using a smartphone does not ensure that we will be comfortable converting to eLearning.

4.3 Education System in Bangladesh During COVID-19

During the current COVID-19 pandemic situation, eLearning or distance learning has gained priority in the education sector; media, like Zoom, a video communication system, has gained huge popularity during these quarantine days. Here, we can also incorporate Facebook Messenger and YouTube channels. Despite using these as alternative emergency teaching means, none of them cover actual teaching or education purposes—rather these are suitable for business or official functions.

In teaching and with learning, evaluations/tests play a major role. Can any of the above-mentioned mediums achieve this goal? Specifically, can we make questions, like multiple-choice questions (MCQ), fill in the blank or multiple blanks, true/false, reordering jumbled words, or other types? Are they feasible for conducting listening and speaking exams? Can we even carry out a written exam or give feedback to students about their submitted assignments using university websites? Mostly, we cannot.

Whether any of the public or private universities in Bangladesh have any dedicated software that only serves teaching, learning, and educational goals. If the universities cannot take advantage of this, the scenario is really gloomy for higher-secondary, secondary, and primary levels. This means, for the current chaotic situation, the available measures which are taken by the ministry of education, educational institutions, and even teachers with limited resources are praiseworthy.

COVID-19 has disrupted education systems around the world, pushing the majority of children temporarily out of school. With close to 40 million children enrolled in school, Bangladesh is among the countries most affected by a complete shutdown. With all schools closed for a period of at least two months, the immediate challenge for the policymakers therefore is safeguarding learning time and well-being while children remain out of school. Regardless of its impact on household poverty, the Coronavirus pandemic will directly impact learning outcomes by reducing time spent in learning activities, in and out of school. While in-school disruption is universal, out-of-school learning deprivation will vary depending on socio-economic status of the household, access to technology, and parental capabilities. There is likely to be gendered response in terms of children's learning needs at home as well. If unaddressed, the sudden nationwide shutdown also risks reversing some of the earlier achievements with improved access to education such as close to universal primary school enrolment and attainment of gender parity in secondary education.

4.4 Boost of digitization in Covid-19

At the start of this year, most universities in Bangladesh lacked basic learning management systems and digital infrastructure. So, when institutions were required to close because of COVID-19, educators could no longer teach. The country's University Grants Commission (UGC) rose to the challenge and introduced policies requiring all universities to go digital, to make teaching and learning activities accessible online—including admissions.

Within four months, digitization was mainstreamed. An average of around 3,800 classes are held online daily with more than 220,000 students in attendance. Thus far, a total of around 203,200 classes have been conducted to more than 9.2 million attendees by 10,200 faculty members.

4.5 What explains this success?

A large part of it is due to the support and backing provided by the Bangladesh Research and Education Network (BdREN). One hundred forty-seven out of the 153 public and private universities in the country are receiving support from BdREN to teach online. The Government of Bangladesh with support from the World Bank initiated the process of digitizing higher education of Bangladesh through the Higher Education Quality Enhancement Project (HEQEP) in 2009. BdREN, an initiative of HEQEP, began laying the foundations of digital infrastructure for higher education institutions by establishing high bandwidth and secure network connectivity at institutions. Despite these efforts, no online classes were offered by local universities. Neither teachers or students felt comfortable or confident offering online classes or learning virtually from their homes. It took the pandemic and the UGC's ensuing instructions to bring the effort to full bloom. Bangladesh's Higher Education Acceleration and Transformation (HEAT) project will provide further support to universities and UGC to cope with COVID-19, and invest in the digital infrastructure of the education sector. It will also enhance BdREN's capacity to support higher education institutions and ensure connectivity for education and research institutions across the country. Bangladesh is experiencing a surge in its youth population and the pandemic has halted the progress of skilling up labors and hampering growth. With more support and funding, Bangladesh can adapt to the challenge and come out even stronger than before.

Chapter 5

Methodology

5.1 Type of study

The study was compiled to examine the psychosomatic impact of COVID-19's e-learning digital tools on Rajshahi Division, University level student's well-being. In response to the state of emergency imposed by COVID-19, All University in Rajshahi switched to the online learning model as an alternative to traditional face-to-face education. Data were gathered using an online questionnaire that is launched on an online survey platform (Google Forms) and then converted into .xlsx format.

5.2 Study Population

The target population of the questionnaire was students of two public universities and one private universities in Rajshahi. The survey was conducted among 379 students including male and female student in Rajshahi City.

5.3 Inclusion Criteria

- Both male and female
- Anyone studying on those Universities

5.4 Exclusion Criteria

- Graduate
- Student of other university in Bangladesh.

5.5 Questionnaires and Data collection

The questionnaire of the current dataset has two main parts, the first part aims to gather demographic data, while the other part aimed to collect data on (A) use of digital tools (mobile phone, laptop, i-pad) before and after COVID-19, (B) sleeping habits, (C) social interaction, (D) psychological state, and (E) academic performance. The questionnaire consisted of 20 items. In items 1 and 2, students were asked to select the digital tool they use the most before and after COVID-19 (item 1) and how many hours they spend using these digital tools before and after the pandemic (item 2). In the remaining 18 items, students were asked to fill in a Likert-type questionnaire ranging from 'strongly agree' to 'strongly disagree'. Items 1 through 7 compare the respondents' habits before and after COVID-19. Items 8 through 20 aim to collect responses about the impact of e-learning and prolonged use of digital tool on the students' social, psychological, and academic well-being.

Table 5.1 Dataset Questionnaires

A	**Use of digital tools (mobile phone, laptop, i-pad)**						
1	Which of the following digital tools do you usually use?	**Before COVID 19**	Laptop	Mobile phone	I pad/ Tablet	Personal Computer	Other
		After COVID 19	Laptop	Mobile phone	I pad/ Tablet	Personal Computer	Other
2	How much time do you spend using the digital tools in learning?	**Before COVID 19**	1-3	3-6	6-9	9-12	+12
		After COVID 19	1-3	3-6	6-9	9-12	+12
3	I always use digital tools (mobile, laptop, i-pad) in studying.	**Before COVID 19**	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
		After COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
4	When I use the mobile phone, tablet or laptop in e-learning I cannot concentrate and I am distracted.	**Before COVID 19**	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
		After COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
B	**Sleeping Habits**						
5	I have fixed hours for bed time and wake up.	**Before COVID 19**	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
		After COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree

6	Prolonged use of digital tools for learning (mobile, laptop, i-pad) affected my sleeping habits.	**Before COVID 19**	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
		After COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
7	Continuous exposure to electronic screens in online learning is tiring and exhausting.	**Before COVID 19**	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
		After COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
C	**Social Interaction**						
8	Prolonged use of digital tools (mobile, laptop, i-pad) results in social distancing.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
9	Prolonged use of digital tools (mobile, laptop, i-pad) causes students' isolation.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
10	University learning contributes to strengthening the social personality of students.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
11	Staying home for long periods of time leads to lethargy and laziness.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
D	**Psychological State**						
12	Prolonged use of e-learning tools often leads to boredom, nervousness, and tension.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
13	The psychological element is a key factor in the success of the educational process.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
14	Some students cannot afford buying all necessary digital tools, which is embarrassing and frustrating.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
15	I don't recommend continuing with the online learning model because it is socially and psychologically unhealthy.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
16	Measures of lockdown, closures, and quarantine, brought by COVID-19 caused stress, frustration, and depression.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
E	**Academic Performance**						
17	Use of digital learning tools is responsible for my low academic performance.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
18	The volume of assignments via e-learning led to confusion, frustration and poor performance.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
19	Face-to-face interaction contributes significantly to boosting students' academic achievement.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
20	Taking quizzes and exams online from home was not comfortable and made me nervous.		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree

5.6 Data collection period

The Duration of data collection was about 5 month that started form August 2020 to December 2020.

Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
Gender	String	6	0		None	None	6	Left	Nominal	Input
Studyyear	String	11	0	Study year	None	None	11	Left	Nominal	Input
Age	String	5	0		None	None	5	Left	Nominal	Input
Yourcumula...	String	20	0	Your cumulativ...	None	None	20	Left	Nominal	Input
BeforeCOVI...	String	17	0	Before COVID-...	None	None	17	Left	Nominal	Input
AfterCOVID...	String	17	0	After COVID-19...	None	None	17	Left	Nominal	Input
BeforeCOVI...	String	4	0	Before COVID-...	None	None	4	Left	Nominal	Input
AfterCOVID...	String	4	0	After COVID-19...	None	None	4	Left	Nominal	Input
BeforeCOVI...	String	17	0	Before COVID-...	None	None	17	Left	Nominal	Input
AfterCOVID...	String	17	0	After COVID-19...	None	None	17	Left	Nominal	Input
BeforeCOVI...	String	17	0	Before COVID-...	None	None	17	Left	Nominal	Input
AfterCOVID...	String	17	0	After COVID-19...	None	None	17	Left	Nominal	Input
BeforeCOVI...	String	17	0	Before COVID-...	None	None	17	Left	Nominal	Input
AfterCOVID...	String	17	0	After COVID-19...	None	None	17	Left	Nominal	Input
BeforeCOVI...	String	17	0	Before COVID-...	None	None	17	Left	Nominal	Input
AfterCOVID...	String	17	0	After COVID-19...	None	None	17	Left	Nominal	Input
BeforeCOVI...	String	17	0	Before COVID-...	None	None	17	Left	Nominal	Input
AfterCOVID...	String	17	0	After COVID-19...	None	None	17	Left	Nominal	Input
Thedistance...	String	17	0	The distance le...	None	None	17	Left	Nominal	Input
Prolongedu...	String	17	0	Prolonged use ...	None	None	17	Left	Nominal	Input
Universityle...	String	17	0	University learni...	None	None	17	Left	Nominal	Input
Stayinghom...	String	17	0	Staying home f...	None	None	17	Left	Nominal	Input
Prolongedu...	String	14	0	Prolonged use ...	None	None	14	Left	Nominal	Input
Thepsychol...	String	14	0	The psychologi...	None	None	14	Left	Nominal	Input

Fig. 5.1 Variable View of Dataset

5.7 Data Analysis

The total 379 student's opinion has been collected as a dataset. This dataset analysis explains the advantages and disadvantages of having online learning systems. To acquire the result of analyzed data IBM SPSS 25 were used as the outcome would be in statistical format.

Student's distinctive info acts as demographic characteristics which later used as frequency distribution to make pie chart. Frequency distribution was used to compute the characteristics student's opinion on whether student should continue their education using digital learning tools. A frequency distribution is a representation, either in a graphical or tabular format, that displays the number of observations within a given interval. The interval size depends on the data being analyzed and the goals of the analyst. The intervals must be mutually exclusive and exhaustive. Frequency distributions are typically used within a statistical context. Generally, frequency distribution can be associated with the charting of a normal distribution.

Cross-tabulation is a mainframe statistical model that follows similar lines. It helps to make informed decisions regarding research by identifying patterns, trends, and the correlation between your study parameters. In this work, the data that was collected was used in cross-tabulation format in two separate schemes. One is after covid-19 and the other one is before covid-19. Dataset were also made in such a way that information's can be used in cross-tabulation format.

Multinomial Logistic Regression is the regression analysis to conduct when the dependent variable is nominal with more than two levels. Similar to multiple linear regression, the multinomial regression is a predictive analysis. Multinomial regression is used to explain the relationship between one nominal dependent variable and one or more independent variables.
From the dataset we gathered multinomial logistic regression was used to predict whether online learning system is beneficial for student's or not keeping in mind the psychological state as factor.

Chapter 6

Results and discussion

6.1 Demographic characteristics of the respondents of the study area

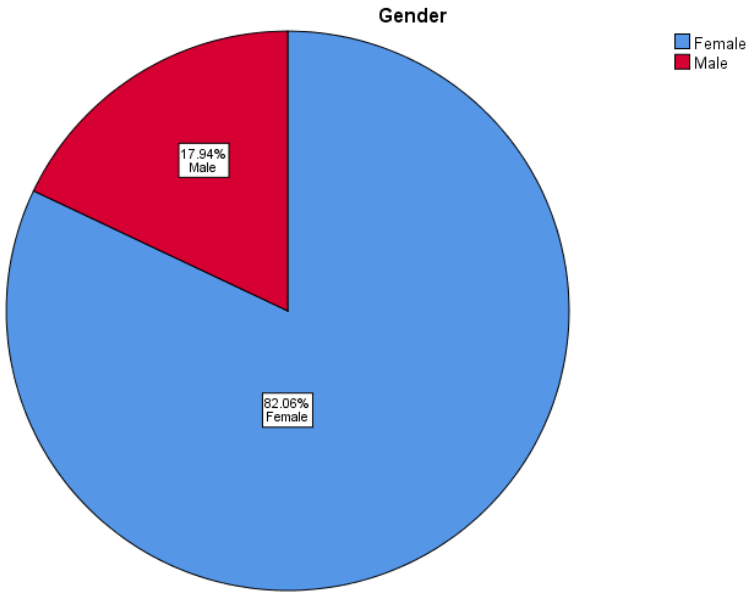

Fig 6.1 Demographic characteristics of genders

The above figure of pie-chart represents demographic characteristics of genders that were used for building dataset. For the survey female participation were remarkably higher compare to male. 82.06% female and 17.94% male has provided their opinion.

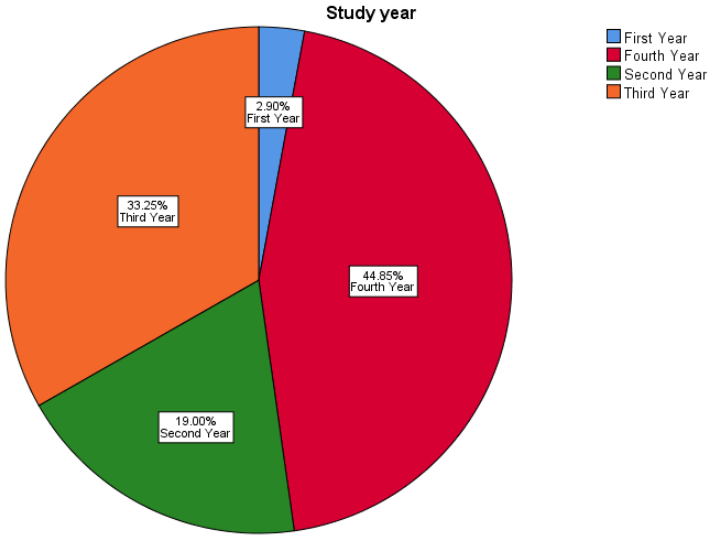

Fig 6.2 Demographic information of students present academic year

After collecting data from students their present academic year was necessary to analyze as these information's will help to better understand the fact of each individual psychological state. From the survey, fourth year student's viewpoint were highest among the other 44.85%. As it is expected due to the fact of falling into more depression as they face more responsibilities. Almost 2. 90%, 19.00% and 33.25% student's opinion were analyzed respectively.

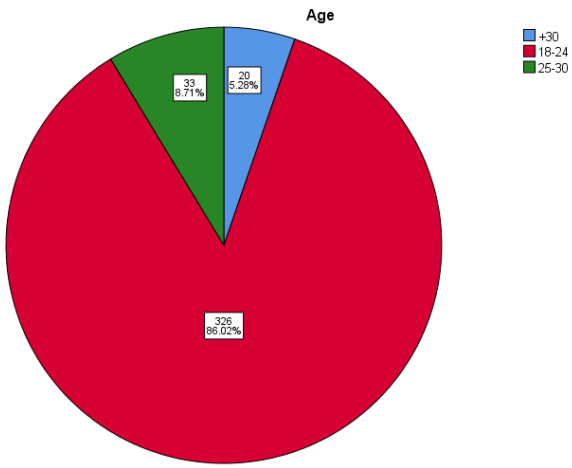

Fig 6.3 Demographic information of students ages

Since various academic year's students took part in making survey different ages of people perspective were assembled. 86.02% were from people of 18 to 24. And 5.28%, 8.71% people participated of ages over 30 years and 25 to 30 years respectively.

6.2 Cross-tabulation

Table 6.1 Cross-tabulation for Use of digital tools (mobile phone, laptop, i-pad)

		After COVID-19: Which of the following digital tools do you usually use?					
		I pad/ Tablet	Laptop	Mobile phone	Other	Personal Computer	Total
Before COVID-19: Which of the following digital tools do you usually use?	I pad/ Tablet	5	3	1	0	0	9
	Laptop	0	74	16	0	0	90
	Mobile phone	2	110	114	1	10	237
	Other	3	17	13	4	1	38
	Personal Computer	0	0	0	0	5	5
Total		10	204	144	5	16	379

		After COVID-19: How much time do you spend using the digital tools in learning?					
		+12	1-3	3-6	6-9	9-12	Total
Before COVID-19: How much time do you spend using the digital tools in learning?	+12	1	0	0	0	1	2
	1-3	9	50	100	61	34	254
	3-6	6	10	12	43	15	86
	6-9	7	2	1	6	13	29
	9-12	4	0	0	1	3	8
Total		27	62	113	111	66	379

		After COVID-19: I always use digital tools (mobile, laptop, i-pad) in studying.					
		Agree	Disagree	Strongly Agree	Strongly Disagree	Uncertain	Total
Before COVID-19: I always use digital tools (mobile, laptop, i-pad) in studying.	Agree	43	4	92	0	4	143
	Disagree	23	8	40	2	3	76
	Strongly Agree	2	0	41	1	1	45
	Strongly Disagree	7	0	3	7	0	17
	Uncertain	23	3	57	1	14	98
Total		98	15	233	11	22	379

		After COVID-19: When I use the mobile phone, tablet or laptop in e-learning, I cannot concentrate and I am distracted.					
		Agree	Disagree	Strongly Agree	Strongly Disagree	Uncertain	Total
Before COVID-19: When I use the mobile phone, tablet or laptop in e-learning, I cannot concentrate and I am distracted.	Agree	50	9	39	0	9	107
	Disagree	4	46	9	5	3	67
	Strongly Agree	10	2	71	1	4	88
	Strongly Disagree	0	0	0	13	0	13
	Uncertain	25	11	30	4	34	104
Total		89	68	149	23	50	379

Use of digital tools in terms of mobile phone, laptop and i-pad were constituted in the form of cross table. As seen from the above tables when it was asked what devices students used most during this pandemic uses of number of laptops and mobile phone increased significantly. Before covid-19 total number of laptops was 90 and after covid-19 that number reached at 204.
But when it comes for mobile opposite things were discovered. Before covid-19 total number of uses of mobile phone was 237 and after covid-19 it reached to 144.
When it comes to the time a student gets in general is always minimal. But this pandemic made it worse. Uses of E-learning tools excessively leads to insomnia. Almost 8 students used digital devices for 9-12 hour before covid-19. And 66 students are found to be used e-learning tools for this excessive amount of time. 45..233
Before covid-19 almost 45 students strongly agreed that they used digital devices all the time. But after covid-19 233 students strongly agreed. Now this result occur because of education systems has moved into online learning system. That leads to students spending more time on digital devices.
When students were asked whether they get distracted and cannot concentrate on study or not for using digital devices, 88 people strongly agreed before covid-19 that they do. But the number increased after covid-19 to 149 due to the more uses of e-learning tools.

Table 6.2 Cross-tabulation for Sleeping Habits

		After COVID-19: I have fixed hours for bedtime and wake-up.					
		Agree	Disagree	Strongly Agree	Strongly Disagree	Uncertain	Total
Before COVID-19: I have fixed hours for bedtime and wake-up.	Agree	41	51	9	22	28	151
	Disagree	3	15	1	2	3	24
	Strongly Agree	21	45	29	49	10	154
	Strongly Disagree	0	1	1	5	0	7
	Uncertain	2	4	3	3	31	43
Total		67	116	43	81	72	379

		After COVID-19: Prolonged use of digital tools for learning (mobile, laptop, i-pad) affected my sleeping habits.					
		Agree	Disagree	Strongly Agree	Strongly Disagree	Uncertain	Total
Before COVID-19: Prolonged use of digital tools for learning (mobile, laptop, i-pad) affected my sleeping habits.	Agree	34	2	41	1	0	78
	Disagree	29	23	60	0	1	113
	Strongly Agree	6	2	63	0	1	72
	Strongly Disagree	1	1	8	4	0	14
	Uncertain	25	3	48	0	26	102
Total		95	31	220	5	28	379

		After COVID-19: Continuous exposure to electronic screens in online learning is tiring and exhausting					
		Agree	Disagree	Strongly Agree	Strongly Disagree	Uncertain	Total
Before COVID-19: Continuous exposure to electronic screens in online learning is tiring and exhausting	Agree	43	0	70	0	2	115
	Disagree	12	9	40	0	0	61
	Strongly Agree	3	0	128	0	0	131
	Strongly Disagree	0	0	1	4	0	5
	Uncertain	8	2	46	1	10	67
Total		66	11	285	5	12	379

Every student used to maintain a daily routine and time-table for their classes and schedule time according to their necessity of sleep and other uses as well. That's why from analysis it can be seen that 154 students strongly agreed that they had a fix bet time before covid-19. But this time management breaks because of this pandemic. Only 43 students strongly agreed to have fix bed time now during covid-19.

There were couple of factors that changes a student's sleeping habit. After covid-19 all education system jumps into online. Thus, increases prolong uses of digital tools. 220 students strongly agreed that after covid-19 their sleeping time has changed and it has a bad impact on them.

Since our classes in online is not interactive that much compare to physical classes. After some period, the class become dull, tiring and more time-consuming. That's why in the cross table it can be seen that before covid-19 less people were strongly agreed and more people strongly agreed almost 285 students.

6.3 Frequency distribution

Table 6.3 Frequency distribution for social interaction and distance learning

The distance learning system, caused by the COVID-19 epidemic, resulted in social distancing.

	Frequency	Percent
Agree	143	37.7
Disagree	23	6.1
Strongly Agree	160	42.2
Strongly Disagree	10	2.6
Uncertain	42	11.1
Total	379	100.0

Prolonged use of digital tools (mobile, laptop, i-pad) causes students' isolation

	Frequency	Percent
Agree	124	32.7
Disagree	20	5.3
Strongly Agree	189	49.9
Strongly Disagree	4	1.1
Uncertain	41	10.8
Total	379	100.0

University learning contributes to strengthening the social personality of students.

	Frequency	Percent
Agree	107	28.2
Disagree	37	9.8
Strongly Agree	181	47.8
Strongly Disagree	9	2.4
Uncertain	43	11.3
Total	379	100.0

Staying home for long periods of time leads to lethargy and laziness.

	Frequency	Percent
Agree	101	26.6
Disagree	15	4.0
Strongly Agree	212	55.9
Strongly Disagree	6	1.6
Uncertain	42	11.1
Total	379	100.0

Due to the pandemic students do no get chance often to have a social life. Government restriction on social gathering also made it impossible. Also, physical classes are unavailable. There's gap interfering between student's relationship. Around 42.2% students strongly agreed to have resulted in social distance. As seen from table, 49.9% strongly agreed that prolonged uses of digital devices cause student's isolation. Physically student's get advantages of interactive classes in university learning. That's why around 47.8% strongly agreed to have a better educational environment before covid-19.

Since student's cannot go out during this pandemic most of the time students have to spend their time inside home. Thus, without class time students have to pass time in laziness. Around 55.9% strongly agreed.

Table 6.4 Frequency distribution for Psychological state and distance learning

Prolonged use of e-learning tools often leads to boredom, nervousness, and tension.

	Frequency	Percent
Agree	116	30.6
Disagree	15	4.0
Strongly Agree	219	57.8
Uncertain	29	7.7
Total	379	100.0

The psychological element is a key factor in the success of the educational process.

	Frequency	Percent
Agree	92	24.3
Disagree	3	.8
Strongly Agree	270	71.2
Uncertain	13	3.4
Total	379	100.0

Some students cannot afford buying all necessary digital tools, which is embarrassing and frustrating.

	Frequency	Percent
Agree	108	28.5
Disagree	3	.8
Strongly Agree	255	67.3
Uncertain	13	3.4
Total	379	100.0

I don't recommend continuing with the online learning model because it is socially and psychologically unhealthy.

	Frequency	Percent
Agree	84	22.2
Disagree	37	9.8
Strongly Agree	178	47.0
Uncertain	78	20.6
Total	379	100.0

Measures of lockdown, closures, and quarantine, brought by COVID-19 caused stress, frustration, and depression.

	Frequency	Percent
Agree	94	24.8
Disagree	19	5.0
Strongly Agree	225	59.4
Uncertain	40	10.6
Total	379	100.0

In the above frequency table student's psychological state and distance learning were analyzed in terms of opinion with frequency and percent. 57.8% students strongly agreed this online learning system leads

to boredom, nervousness and tension. And 71.2% strongly agreed that the psychological element is a key factor in the success of educational process. Since most of the families in Bangladesh falls under poverty limit, it is not possible for all students to buy the necessary digital tools. As seen from the above table 67.3% students strongly agreed Some students cannot afford buying all necessary digital tools, which is embarrassing and frustrating. 59.4% students strongly agreed that measures of lockdown, quarantine creates depression and frustration. 47.0% students strongly agreed that they don't recommend online learning systems.

Table 6.5 Frequency distribution for academic performance and distance learning

Use of digital learning tools is responsible for my low academic performance

	Frequency	Percent
Agree	113	29.8
Disagree	21	5.5
Strongly Agree	191	50.4
Strongly Disagree	9	2.4
Uncertain	45	11.9
Total	379	100.0

The volume of assignments via e-learning led to confusion, frustration and poor performance.

	Frequency	Percent
Agree	99	26.1
Disagree	28	7.4
Strongly Agree	212	55.9
Strongly Disagree	4	1.1
Uncertain	36	9.5
Total	379	100.0

Face-to-face interaction contributes significantly to boosting students' academic achievement.

	Frequency	Percent
Agree	109	28.8
Disagree	6	1.6
Strongly Agree	237	62.5
Strongly Disagree	5	1.3
Uncertain	22	5.8
Total	379	100.0

Taking quizzes and exams online from home was not comfortable and made me nervous.

	Frequency	Percent
Agree	86	22.7
Disagree	46	12.1
Strongly Agree	159	42.0
Strongly Disagree	31	8.2
Uncertain	57	15.0
Total	379	100.0

As seen from table this pandemic has huge impact on student's academic performance. Beside unhealthy psychological state leads to a bad score on marksheet. Around 50.04% people strongly believe that low performance is caused by prolong use of digital learning tools. Since classes are not conducting physically, lack of instructiveness with contents creates confusion, frustration which leads to poor performance. Physical classes a good understanding bond between teachers and students. But after covid-19 online classes are failed to established that bond in many ways. 62.5% students strongly believe that physical classes contribute significantly to boosting their academic performance. Conducting exam online is a difficult task for teachers and participating and score better performance is also hard compare to physical exam. Around 42% students believe that taking online quizzes or tests are not suitable for students.

6.4 Multinominal Regression

Table 6.6 Case processing summary for multinomial logistic regression

		N	Marginal Percentage
Prolonged use of e-learning tools often leads to boredom, nervousness, and tension.	Agree	116	30.6%
	Disagree	15	4.0%
	Strongly Agree	219	57.8%
	Uncertain	29	7.7%
Gender	Female	311	82.1%
	Male	68	17.9%
Age	+30	20	5.3%
	18-24	326	86.0%
	25-30	33	8.7%
After COVID-19: I have fixed hours for bedtime and wake-up.	Agree	67	17.7%
	Disagree	116	30.6%
	Strongly Agree	43	11.3%
	Strongly Disagree	81	21.4%
	Uncertain	72	19.0%
Valid		379	100.0%
Missing		0	
Total		379	
Subpopulation		27[a]	

a. The dependent variable has only one value observed in 96 (67.6%) subpopulations.

The case processing summary informs the user of any data that the SPSS program could not use in the analysis, usually due to missing values. Table 6.6 represents multinomial logistic regression of case processing summary with a view of gender, age, changes on bed time. As seen from the table 57.8% has strongly agreed on getting frustrated of online learning system.

Table 6.7 Estimate of parameters of multinomial logistic regression of causes for boredom, nervousness, and tension

Prolonged use of e-learning tools often leads to boredom, nervousness, and tension.[a]		B	p	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Disagree	Intercept	-18.791	0.000			
	[Gender=Female]	-1.936	0.023	0.144	0.027	0.766
	[Gender=Male]	0[b]				
	[Age=+30]	1.299	0.339	3.664	0.255	52.581
	[Age=18-24]	0.337	0.729	1.400	0.208	9.405
	[Age=25-30]	0[b]				
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Agree]	19.194	0.000	216657137.356	13425472.193	3496362324.626
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Disagree]	19.935	0.000	454521522.572	37755029.444	5471848850.966
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Strongly Agree]	18.613	0.000	121192393.478	8598557.479	1708146543.445
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Strongly Disagree]	21.360		1890101742.175	1890101742.175	1890101742.175
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Uncertain]	0[b]				
Strongly Agree	Intercept	1.026	0.247			
	[Gender=Female]	-0.892	0.185	0.410	0.110	1.533
	[Gender=Male]	0[b]				
	[Age=+30]	0.449	0.652	1.567	0.223	10.991
	[Age=18-24]	1.153	0.061	3.166	0.948	10.575
	[Age=25-30]	0[b]				
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Agree]	0.926	0.134	2.525	0.752	8.479
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Disagree]	1.165	0.042	3.207	1.043	9.855
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Strongly Agree]	-0.371	0.532	0.690	0.216	2.208
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Strongly Disagree]	2.752	0.011	15.679	1.896	129.673
	[After COVID-19: I have fixed hours for bedtime and wake-up. =Uncertain]	0[b]				

a. The reference category is: Uncertain.

b. This parameter is set to zero because it is redundant.

Parameter estimates (also called coefficients) are the change in the response associated with a one-unit change of the predictor, all other predictors being held constant. The unknown model parameters are estimated using least-squares estimation. If the p-value is LESS THAN 0.10 and the adjusted odds ratio with its 95% CI is above 1.0, the risk of the outcome occurring increases that many more times versus the reference category outcome. As seen from table 6.7 on the given opinion of disagreement by female on the basis of prolonged use of e-learning tools often leads to boredom, nervousness and tension was found for $p > 0.10$ with Exp(B) = 0.144 and 95% CI for Exp(B) = 0.027-0.766. Quite similar result was found in terms of ages between 18-24. The Exp(B) of student's age from 18 to 24 was Exp(B) = 1.400, 95% CI 0.208-9.405, $p < 0.10$. For student's strongly agreed opinion the Exp(B) of gender female was Exp(B) = 0.410, 95% CI 0.110-1.533, $p < 0.10$.

Chapter 7

Conclusion and future work

7.1 Conclusion

The results of the present study were the high rate of Psychological crisis among students that is consistent with research conducted in Bangladesh. There were already existent psychological disorders such factors as: atmosphere, college and decide to take the age of marriage, age and educational decisions for the future - a job, a desire to progress and obstacles, among others. Students to understand problems, identify vulnerable people and psychological disorders to campus early diagnosis, treatment and prevention, counselling, classes on campus more and more active form future to improve student academic achievement and finally cause the development of society. Another new factor added is this pandemic. During covid-19 students are getting more depressed about the new study environment they have to adapt as well as the financial crisis ongoing in many families. So, students having very difficult time to concentrate on study and more day passes, more depression surround them about their future.

7.2 Future Work

While most business sectors are suffering right now, there are a handful of industries—virtual reality, medical devices, touch-free technology—in which the pandemic has catalyzed innovation and growth. Among them is virtual mental healthcare, which sees a steep increase in demand for all ages, but particularly in the teen and young adult demographic. With depression, suicidal ideation, substance abuse, and binge drinking on the rise among college students, and 70 percent of teens struggling with mental health issues, teletherapy can be a lifesaver.

This thesis work can help people who are in charge make decision about what to do about this issue students are facing. Researchers can get an overall idea about what's the real problems and look for solutions.

Reference

[1] Xiaobo Zhou , “Psychological crisis interventions in Sichuan Province during the 2019 novel coronavirus outbreak”, Psychiatry Research 286 (2020) 112895

[2] Qian-Hui SUNa, Ying SUb, “Psychological crisis intervention for college students during novel coronavirus infection epidemic”, Psychiatry Research 289 (2020) 113043

[3] Jun Shigemura, MD, PhD, “Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations”, Psychiatry and Clinical Neurosciences 74: 277–283, 2020

[4] Md Fouad Hossain Sarker, Rafi Al Mahmud, M. Saiful Islam, Md Kabirul Islam, “Use of e-learning at higher educational institutions in Bangladesh”, Journal of Applied Research in Higher Education, https://doi.org/10.1108/JARHE-06-2018-0099

[5] AmirAli Rastegar Kazerooni, Mitra Amini, Parinaz Tabari, Mahsa Moosavi, “Peer mentoring for medical students during the COVID-19 pandemic via a social media platform”, 2020 John Wiley & Sons Ltd and The Association for the Study of Medical Education.

[6] Jianyu Que, Le Shi, Jiahui Deng, Jiajia Liu, Li Zhang, Suying Wu, Yimiao Gong,1,5 Weizhen Huang,1 Kai Yuan,1 Wei Yan,1 Yankun Sun,1 Maosheng Ran,6 Yanping Bao,2 Lin Lu1, “Psychological impact of the COVID-19 pandemic on healthcare workers: a cross--sectional study in China” Gen Psych: first published as 10.1136/gpsych-2020-100259 on 14 June 2020.

[7] Yaghoob Nami , Mohmmad Saleh Nami , Khalil Allah Eishani, “ The Students' Mental Health Status”, 4th World Conference on Psychology, Counselling and Guidance WCPCG-2013

[8] Wenjun Caoa Jianzhong Zhenga, Ziwei Fanga, Guoqiang Houc, Mei Hana, Xinrong Xua, Jiaxin Donga, “The psychological impact of the COVID-19 epidemic on college students in China”, Psychiatry Research 287 (2020) 112934