

Research Article

The Effect of Covid-19 on Academic Performance of Students: Government High School

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Abstract

In spring 2019, outbreak of COVID-19 virus epidemic turned into a pandemic which led to serious health threat to global public health. In pandemic, educational institutions all around the world adjourn the offline classes and shift to online classes. This cross-sectional study aimed to investigate the effect of COVID -19 on academic performance of high school student, studying in Viswa Niketan Higher Secondary School, i.e. Government community school.

A sample size of 422 participants was collected. The collection was done using questionnaire sheet distributed to students. Data analysed using SPSS version 21. Total no of participant who enrolled in study was 422. including high school students, teachers, researcher etc. The data represented the effect of Covid-19 on academic performance of most participant enrolled in study was 99.7%. The mean evaluation of online learning in general was 5.05 ± 3.25 and mean evaluation of practical class in online learning 3.82 ± 2.3 . Online classes alternative to offline classes, but beneficial for students during pandemic period. Online classes provide opportunity for self-study, low economical cost, save time and develops skills and make familiar to digital world from any corner of the world. High school syllabus contains theory and practical portion; theory portion was easy to grab online at the same moment difficult to grab practical portion. The practical portion requires demonstration, student-teacher interaction etc.so it is recommended that online study should be made more effective by using 3d tools, animation, hiring of trained manpower, so that content should be presented with more reliable and interesting way.

Introduction

In spring 2019, pneumonia of unknown origin was outbreak in Wuhan city, Hubei Province, China. The virus was identified as Coronavirus 2019. (ICTV, 2020; Zhu *et al.*, 2020). The outbreak of the virus epidemic turned into a pandemic which led to serious health threats to global public health. The Covid -19 from China, spread all over the world, therefore WHO declared it as pandemic on March 12, 2020. (WHO, 2020) These declarations of pandemic led to

early closure of educational institution, people are advised to isolate themselves and maintain social distancing for fear of being infected by the virus. (Sintema, 2020; Bedford *et al.*, 2020; UNESCO, 2020a)

Government or local authorities took several measures to control rapid transmission of viruses. These measures include travel restriction, mandatory quarantine for travelers, social distancing ban on public gathering, shutdown of educational institution, business and people are

asked to continue their work from home. (Lawrence and Lindsay, 2020)

These preventive measures adopted by government have created negative impact on education, health, business and other sectors.

In general, all levels of education are greatly affected by COVID-19. Some evidence declares about covid-19 outbreak influences student academic performance and university enrollments (Aucejo *et al.*, 2020; Pokhrel and Chhetri, 2021).

According to Owusu-Fordjour *et al.*, 2020, during peak of Covid-19, most governments choose to shift online learning methods to reduce transmission of viruses, which resulted in 370 million children missing school. American Council on education university enrollments expected to fall by 15%, 2020 and many students will face academic performance challenge and complexities due to online virtual classes.

The covid-19 pandemic, had adapted online method of teaching. These novel methods minimize interaction or contact between students and teachers or between themselves, so that spread of rapid transmission of virus was prevented.

Despite increasing interest in online teaching, student satisfaction and achievement remain most focused indicator of online teaching experience. student's satisfaction and achievement levels can be related to several factor, including student student-lecture interaction, course assessment, quality, internet quality, self-efficacy and student learning process (Oswusu-fordjour *et al.*, 2020) thus, mixed assumption about the influence of COVID-19 on online learning and students' academic performance. (Aucejo *et al.*, 2020; Elsalen *et al.*, 2020).

Some studies highlighted effect of covid -19 on academic performance of students. Some studies suggest that profound effect on medical, dental, and radiology trainee. The aim or objectives of study to investigate effect of covid -19 on academic performance of students in a government high school, science faculty.

Materials and Methods

Questionnaire Form

The questionnaire form was prepared and distributed to 430 participants enrolled in government high school (10+2), i.e. Viswas Niketan Higher Secondary School, Kathmandu, Nepal. The objective of questionnaire was briefly explained at the beginning of questionnaire. The questionnaire was distributed among students, teachers and researcher who was enrolled in high school. Questionnaire were distributed looking at the identity card. Eight participants were excluded as they were unable to show identity card. Only students, teacher and researchers

were enrolled in study and other members of school were excluded.

The questionnaire for this study consisted of 18 questions (12 closed-ended and 6 open-ended) divided into two sections as follow: The first section included 8 questions about the demographic characteristics of participants (gender, age, country, residence place, university, program level,) the second section evaluated the effect of COVID-19 pandemic on the study or research, and the online learning during the lockdown (the effect of lockdown on academic performance, electronic device used to study online, virtual learning tools used, time spent per day in online learning, evaluation of online evaluation of online learning both in the theoretical or practical parts, common problems encountered in the online learning, and suggestions to improve the online learning). This section consisted of ten questions as follow: three single-choice questions, three multiple-choice questions, one Likert-scale question, and three questions with free text answer.

Data Collection

A sample size was calculated to be 422 participants was calculated. The collection was done using questionnaire sheet distributed to students. The identity card of students was checked before disturbing question. Data was collection from period 21st May to 23rd May 2023. The high school students (students enrolled in high school, teacher and researcher data) was only collected. Data was collected from students studying in government high school.

Statistical Analysis

The Data were analysed using SPSS version 21.0 (IBM Corporation). The Descriptive statistics were presented as counts and percentages to summarize the collected data. To measure the effect of COVID-19 lockdown on the academic performance of veterinary medical students, 5-Point Likert Scale was used. Answers were converted into numeric values as follow (greatly affected = 5 points; considerably affected = 4 points; moderately affected = 3 points; slightly affected = 2 points; not affected = 1 point) (Mayer and Cavallaro, 2019). To evaluate the online education during the pandemic lockdown, a 10-Point Likert Scale was used. Participants were asked to evaluate the online education in general, and the online education in practical lessons during the lockdown (1 was the lowest evaluation and 10 was the highest evaluation).

Result

Total no of participant who enrolled in study was 422. including high school students, teachers, researcher etc. The participant enrolled in study was 45% (n=190) male and 55% (n=232) female. The age of participants enrolled in study was range from 15-19 years. The 5.2% (n=22) of participants enrolled belong to 15years, followed by 25.4% (n=107) belong to 16 year, 48.1% (n=203) belong to 17 year, 17.3% (n=73) belong to 18-year, 4% (n=17) belong

to 19 year. The 5.2% (n=22) of participants enrolled belong to 15years, followed by 25.4% (n=107) belong to 16 year, 48.1% (n=203) belong to 17 year, 17.3% (n=73) belong to 18-year, 4% (n=17) belong to 19 year. The 74.9% (n=316) of participants belong to city area and remaining 25.1%(n=106) from rural area.

The data represented the effect of Covid-19 on academic performance of most participant enrolled in study was 99.7%. The mean evaluation of online learning in general was 5.05 ± 3.25 and mean evaluation of practical class in online learning 3.82 ± 2.3 . About 52.1% (n=220) participants spent 5hrs in study followed by 18.7% (n=79) spent 3hrs followed by 14.5% (n=61) spent 4 hrs, 10.2% (n=43) spent 2hrs and remaining 4.5% (n=19) spent 1hour.

About 68.5% of participants used smart phone as learning device followed by 26.1% laptop, 5.5% personal computer. Most of participants used about 66.6% online classes as online study material followed by 18.7% youtube videos, 8.1% pdf lectures, 1.4% educational application and 2.6% educational website and 0.7% as zoom.

Area

Fig.1 shows area representing no of participants enrolled for study. It is evident with the diagram that 24.1% belongs to rural and 74.9% city area.

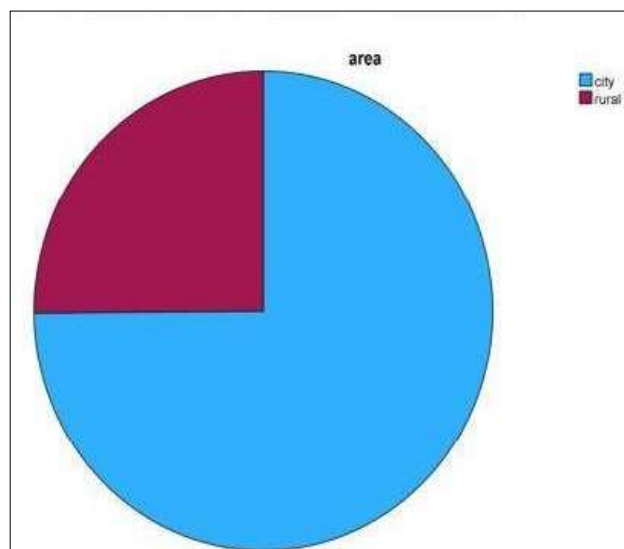


Fig. 1: Diagram showing participants enrolled in rural and city area.

Gender

Data collected for enrolment according to gender is represented in Fig. 2. Males were 45% and females were 55%.

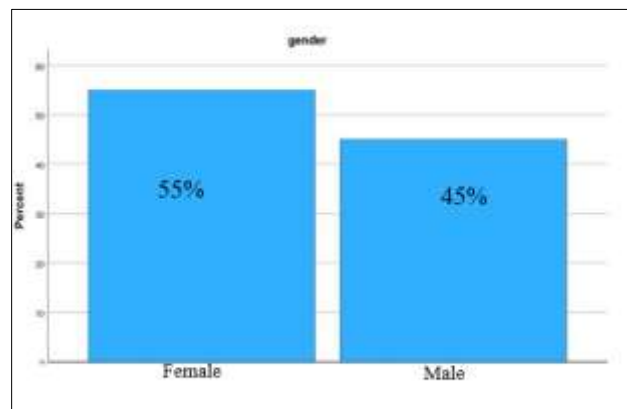


Fig. 2: A diagram showing gender of participant in percentage.

Age of Participants

Age of participants was recorded and it is shown in Fig. 3. Participants enrolled in study belonging to age group 15-years (5.2%), 16- years (25.4%), 17-years (48.1%), 18-years (17.3%) and 19-years (4%).

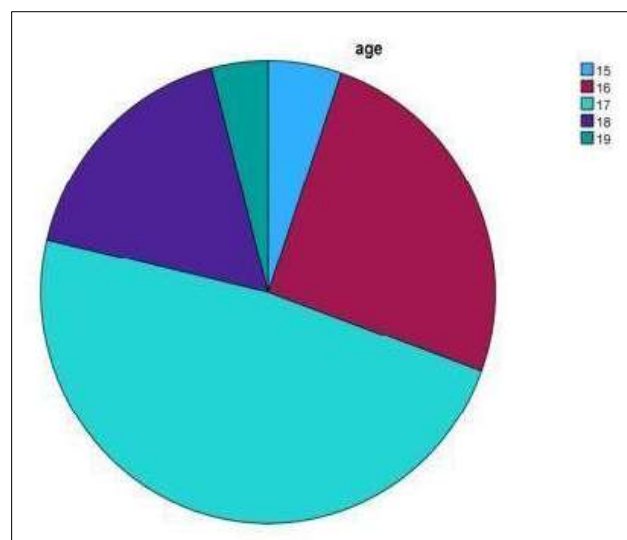


Fig. 3: A diagram showing age of participants.

Effect of COVID -19 on Academic Performance Of Students

Effect of COVID -19 on academic performance of students enroll in study shows not affected (2.8%), slightly affected (14.2%), moderately affected (27%), considerably affected (29.6%) and greatly affected (26.3%) respectively (Fig. 4)

Percentage of participants who use device like personal computer, phone, laptop etc to access online material is shown in Fig. 5. Data shows that laptop (26.1%), pc (5.5%) and phone (68.5%) respectively (Fig. 5)

Students' online study material i.e. online classes (66.6%), youtube video (18.7%), pdf lectures (8.1%), youtube (2.6%), edu website (1.4%), others (1.2%), zoom (0.7%) and education application (0.7%) respectively (Fig. 6)

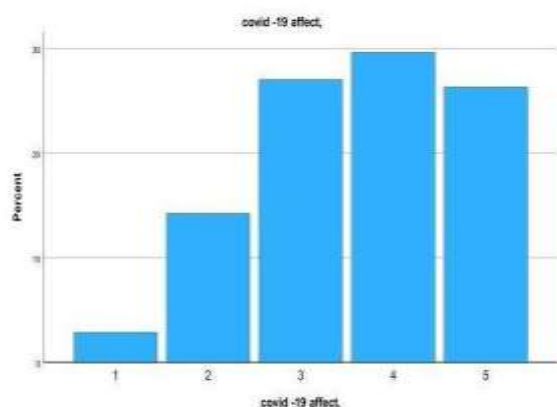


Fig. 4: Data represent effect of COVID -19 on academic performance of students.

[1=not affected, 2=slightly affected, 3=moderately affected, 4=considerably affected and 5=greatly affected and percent =no of participants represented in percentage]

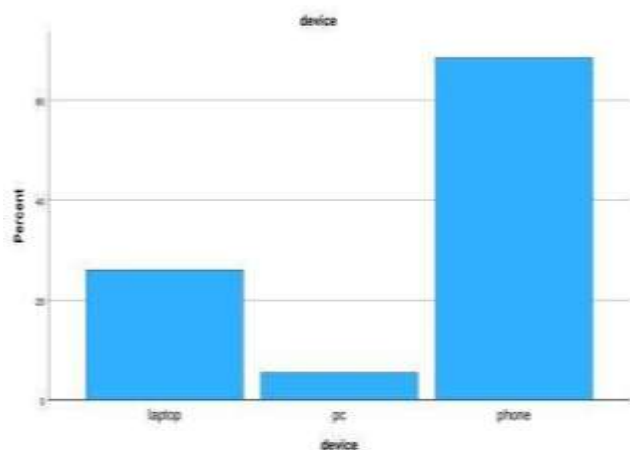


Fig. 5: A diagram represent the percentage of participants who use device like personal computer, phone, laptop etc to access online material.

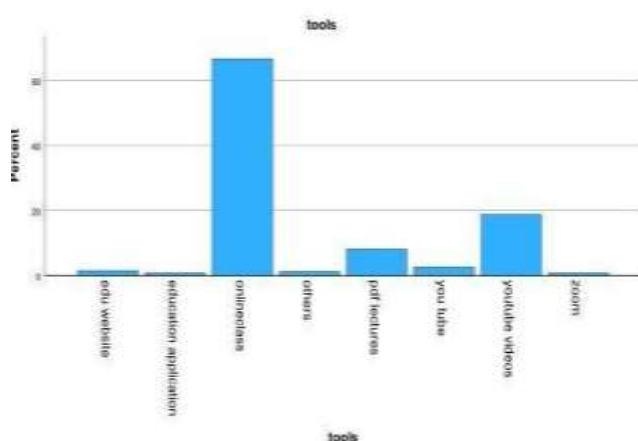


Fig. 6: A diagram showing online study material.

Evaluation of rate of online learning in practical subject represents number of participants who evaluate in online learning in practical subject presented in percentage i.e. highest number of participants marking 1 (18.2%) and lowest number of Participant marking 9 (0.5%) (Fig. 7).

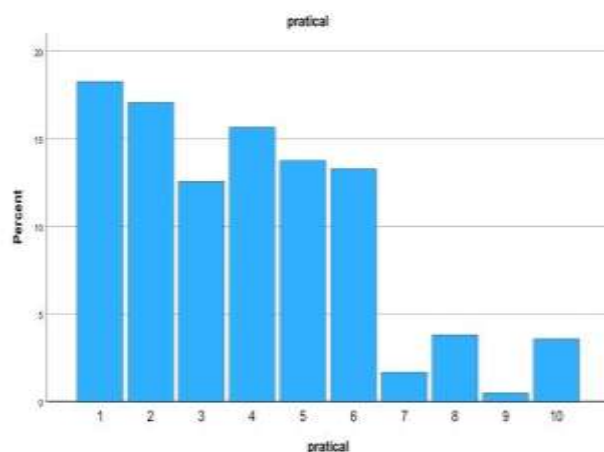


Fig. 7: Evaluation of rate of online learning in practical subject.

Evaluation of rate of online education in theory subject represents number of participants presented in percentage who evaluate online learning in theory subject i.e. highest number participant marking 5 (24.9%), lowest number of participants marking 8 (1.4%) and 9 (1.4%) (Fig. 8).

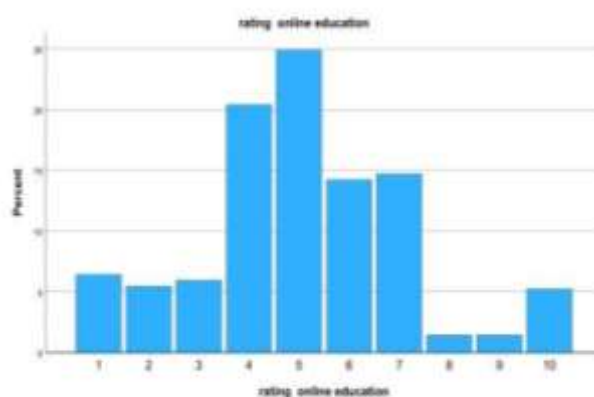


Fig. 8: A Diagram showing evaluation of rate of online education in theory subject.

Discussion

In spring 2019, pneumonia of unknown origin was out break in Wuhan City, Capital of Hubei Province, China and recognized as Corona Virus (Covid-19). (ICTV, 2020 & Zhu N. *et al.*, 2019).

These covid-19 epidemic not only limited to CHINA but spread all over the world and declared as pandemic. (WHO, 2020) Thus, these pandemic lead to all government and local authority around the world to declare lockdown, shut down of educational institution, business, hotels, transportation, ban of public gathering, mandatory quarantines for travellers, work from home etc. (WHO, 2020 and Bedford *et al.*, 2020)

The government or local authority implemented lockdown period, provisional closure of educational institution led to affect 60% of student population, all around the world. (Lawrence and Lindsay, 2020)

During pandemic, several methods/techniques of learning like tools and e-learning platforms were introduced as solution for persist/carry on educational process. (UNESCO, 2020a)

Thus, many educational institutions around the world, had have cancelled all the educational activities during lockdown to minimize gathering, to control risk of transmission of virus. (UNESCO, 2020a)

Thus, many educational institutions around the world, had prefer online method of teaching than face-face method of teaching. These novel method of teaching minimize contact between student-student interaction or student-teacher interaction. This transition assists in reduction of spread of virus. (Pragholapati *et al.*, 2020)

Our data showed that 422 participants enrolled in answering questionnaire, which represent an overall response rate 98.13%. The participants enrol in study were 45% male and 55% female, respectively. The age of participants enrolled in the study belong to 15-19 years. Similarly, 74.9% of participants belong to city area and 25.1% from rural area. The effect of covid-19 on academic performance of most participants enrol in study was 98.13%. These shows that students in enrol in science faculty higher secondary level were affected, these study agreement with various studies carried out in undergraduate levels i. e. dental, radiology trainee, veterinary students. etc. (Iyer *et al.*, 2020; Alvin *et al.*, 2020). In some studies, it has reported taking online courses had negative impact on student's progress and success, then traditional method of teaching. (Bettinger *et al.*, 2017). During pandemic school closures are considered to be most efficient intervention to curb the spread of virus (Haug *et al.*, 2020).

In our study, we found that smart phone was most popular and available device among high school students. The smart phone, followed by laptop while least used tool personal computer. In this context, we found that our study was supported by students uses smart phone and laptop at higher rate followed by iPad| tablets then PC to access online mathematics lesson and social media (Mulenga *et al.*, 2020; Wickramanayake *et al.*, 2018). Similarly, study carried on veterinary students also shows similar result. (Mahdy *et al.*, 2020) In undergraduate studies, medical students suggest that use of mobile device in studying anatomy among medical studies was found effective in South Africa. (Lazarus *et al.*, 2017).

In Online-learning method, need access to electronic device, availability of internet, speed of internet, knowledge about use of online tools and availability of internet service in rural area, all these factors contribute to student achievement in academic performance. It can be said that inaccessibility of these factors leads to transfigure effectiveness of online learning. (UNESCO, 2020; Xu *et al.*, 2019).

The study hour spent for online learning range from 1h/day to 12h/day. In average our participants spent 5hr to 1 hr per day in online. Some participant can easily manage their study hours, but rest cannot manage their time in online study, so it is challenging for participants for having good academic performance.

The advancement in information and technology has mark conveyance and quality of education. The virtual classroom and instructor have replaced traditional classroom, worldwide. (Tomas *et al.*, 2011).

Most students' welcome novel way of teaching owes to flexibility, convince and lower cost. (Avila *et al.*, 2013)

In our study we conclude that theory portion was easier to grab on online but practical portion was completely difficult to learn. In addition, some studies done on medical students prefer histology virtual microscopy laboratory than regular microscope laboratory. (Haris *et al.*, 2001). As an enrolment in science faculty, majority portion of theory is observed in practical like histology portion, zoology portion, botany portion etc. Consequently, majority of student was found affected from online study, some of the other reasons are lack internet facility, speed of internet, in excess of electronic device, lack of training to use online tools etc.

In contrast, few studies have explained that missing school for a prolong period due to covid-19 outbreak have positive influence student's academic achievement. (Kuhfeld *et al.*, 2020). Few studies suggest that in Ghana explained that online learning connectivity problem, cost of internet bundle, challenges with device, household production and overall perception of e-learning influence student's overall academic achievement at educational institution in Ghana.

The advancement and progress in communication and information technology have widely affected quality of education. The face-to-face method of teaching have been replaced by online method in educational institution which applied all over the world during pandemic. This virtual or online or novel method have been welcomed by students all over the world due to some beneficial points like flexibility, lower cost, save of time, self-opportunity to study, lower economical cost etc.

In case of high school in our study, online learning was implemented as alternative method for teaching and learning activities. In some studies, it is suggested to use both online and offline method to study (Murray *et al.*, 2017).

In other studies, have mention that students who do not have access to online teaching material due to lack of instrument because of economical and digital divide. (UNESCO, 2020; Xu *et al.*, 2019)

The most common problem found to be associated with online method of teaching, lack of availability of internet in some areas, speed and cost of internet, electronic device to

access online study, lack of communication between student and teacher.

In our study we conclude that insufficiency of digital device, paucity of internet, low budget on online learning tools leads untrained students and manpower in high school. These can be considered reason for impairment in digital skills. Conversely, was reported that most junior students in Indonesia were ready and only needed for a few improvements (Dwanyati *et al.*, 2020).

Computer and internet self-efficacy concerns confidence with computer and internet uses (Hatlevik *et al.*, 2018). Having confidence in using Microsoft office software or conducting internet research enables online problem-solving lessons, the stress caused by technology and improves academic performance (Compeau and Higgins, 1995).

Having computer and internet self-efficacy, self-control in online contexts and online communication self-efficacy assists student with transition to online learning environment (Miao *et al.*, 2020).

Before pandemic, majority of online learning focus on higher education. More students needed to address role of online learning in high school students and online academic performance and need to support high school students in preparing for online learning especially covid-19.

In general, improvement in online education, it is recommended to provide platforms for online learning, availability of electronic devices, access of internet, improvement of internet speed, free internet package, high budget on online materials etc should be provide in pandemic.

Additionally for improvement in high school, it is recommended to increase electronic device, budget should be granted, training should be given to use online tools, so that content should be presented in more interesting and reliable way.

Conclusion

The current study showed that Covid-19 pandemic lockdown affected the academic performance of high-school student in government school in Kathmandu. Online learning assists them in various ways to study course content, chance for self-study, they got an opportunity to learn online tools, update with latest software, e-tools and e-platforms.

The student in high school suggest that theory portion can be carried out with this novel method of learning but practical portion, demonstration, learning of skills-based practical, lack observation of procedure and communication gap between student and teacher, was found difficulty in practical portion in online method.

In science faculty, practical portion consists around 50% of syllabus. Majority of practical portion includes skill-based, should be learn in laboratory. Our study suggest that online learning can be make more effective, by using videos, 3D tools etc. Training should be organized and should be provided to teachers to use online tools, e-learning platforms, 3d tools in more reliable way to show content in real situation to students.

Ethics Statement

The student involving human participants were review and approved by ethical committee of government high school. The participants were agreeing to participate in the study upon answering questionnaire.

Conflict of Interest

The authors declare no conflict of interest regarding the publication of this work.

Authors' Contribution

Preeti Sharma have designed, analysis and wrote manuscript and data analysis. Dr. Mahesh Bk assisted in approval of final manuscript.

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Appendix

Questionnaire:

This questionnaire aims to analyze the effect of COVID-19 pandemic on the academic performance of students and researchers during the lockdown. School, PCL, Undergraduate and Postgraduate students are eligible to answer this questionnaire. The data of this questionnaire will be used for a research study and will be published in an international journal. Your identity is anonymous, and your participation in this study is completely voluntary. Answering this questionnaire indicates your consent to participate in this study.

Section A: Demographic characteristics

1. What is your gender?

- Male Female

2. What is your age?

..... years old

4. Where do you live?

- City
 Rural area

5. Which university do you enroll in?

6. What is the level of your study?

- Undergraduate student / Bachelor Level
 Postgraduate student /Master Level
 High School

*For Secondary school: In which Grade are you?

- Grade 10 - Grade 9 - Grade 8

7. For undergraduate students: In which academic year are you?

- First academic year
 Second academic year
 Third academic year
 Fourth academic year

8. For High school students: In which postgraduate course are you currently enroll in?

- First academic year
 Second academic year

B: Assessing the effect of COVID-19 pandemic on the academic performance of students

1. How did COVID-19 pandemic affect your study/ research?

- Greatly affected (5)

- Considerably affected (4)
- Moderately affected (3)
- Slightly affected (2)
- Not affected (1)

2. Which electronic device do you use to study online during lockdown?

- Laptop
- PC
- Smart phone
- Tablet

3. How many hours do you spend in on-line learning during lockdown?

- 1 hour/ day
- 2 hours/ day
- 3 hours/ day
- 4 hours/ day
- 5 hours/ day

4. How do you rate on-line education during COVID-19 pandemic? (1 is the lowest evaluation)

- ○ ○ ○ ○ ○ ○ ○ ○ ○
- 1 2 3 4 5 6 7 8 9 10

5. How do you rate on-line education in practical lessons during COVID-19 pandemic? (1 is the lowest evaluation)

- ○ ○ ○ ○ ○ ○ ○ ○ ○
- 1 2 3 4 5 6 7 8 9 10

6. Which virtual learning tools do you use during the lockdown?

- University platforms
- On-line classes
- Educational websites
- YouTube videos
- E. Books
- Educational applications
- PDF lectures
- Others

7. Which online learning tool do you use during the lockdown?

- Zoom

- Microsoft Teams
- Skype
- Web Whiteboard
- Edmodo
- Google Meet
- Social networks
- WhatsApp
- Others

8. What are the common problems associated with online learning during the lockdown ?

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9. What is your view for online education?

.....

10. Which is better method for teaching classes : Online or Offline classes? Comment

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