

Junior High School Students' Perceptions and Challenges of Online Learning Implementation during COVID-19 Pandemic

Limuel J. Abelgas

College of Education, Cebu Technological University, Cebu City, Philippines

Email: limuel.abelgas@ctu.edu.ph

<https://orcid.org/0000-0002-7405-3848>

Abstract

In March 2020, the World Health Organization (WHO) pronounced Covid-19 as a pandemic. Classes in all levels of education worldwide were suspended from curbing the virus transmission. This study used a quantitative-qualitative method wherein the students' perceptions on online learning implementation were treated using the weighted mean and standard deviation. While the challenges they encountered were analyzed through the Colaizzi method. There were 80 junior high school student respondents in Cebu, Philippines, selected through purposive sampling using the inclusion and exclusion criteria. Informed consent, assent, and ethical guidelines were adhered to before, during, and after the data were collected. This research utilized a researcher-made questionnaire after it passed the validity test. Its part 1 contained 10 questions pertaining to the students' perceptions on measured with a 5-point Likert scale. Part 2 comprised 5 open-ended questions, written in both Cebuano and English, focused on the students' encountered challenges in online learning. Data gathering was done by posting the questionnaires on Google Docs, and the respondents were given 2 weeks to answer it. Based on the findings, in terms of profile, majority of the students aged 13 to 16 years old, composed of 21 males and 59 females. They represented grades 7, 8, 9, & 10 equally – 20 students per level. Their parents' combined monthly income ranged dominantly from 10,000 to 14,999 Php. The students believed that the online learning was excellently done as far as the 10 indicators in the questionnaire as concerned. In terms of the challenges they encountered, the students' responses yielded the following three (3) themes: 1) Unstable Internet Connectivity; 2) Inadequacy of Technological Devices; and 3) Unfavorable Learning Environment at Home.

Keywords: Junior High School Students, perceptions, challenges, quali-quantitative research, Colaizzi method, Cebu, Philippines

Introduction

In March 2020, the World Health Organization (WHO) pronounced Covid-19 as a pandemic. It has disrupted all levels of education worldwide. The Philippine government placed its largest island Luzon and other major cities, under lockdown, ordering the suspension of classes at all levels to ensure the safety of its citizens and curb the virus transmission. Halfway to finishing the second semester, all educational institutions abruptly shifted to various remote or online learning forms and suspended the in-person teaching engagement (Mahlangu, 2018). The concept of online learning or e-learning is not new. Availability of Internet access

and the advances made in cloud technologies have helped promote the flexibility of the learning procedure and supplement it well to the conventional learning methods (Wang, Lew, Lau, & Leow, 2019) since the COVID-19 scenario has brought forward an unprecedented situation, where there has been a radical change in the mode of education delivery where synchronous or asynchronous or a mix of both approaches serves as the better choices.

The synchronous method is an online, real-time and direct interaction teaching-learning process where the students and teacher meet on a particular date via the video-conferencing application. Asynchronous is offline pedagogy where students are just assigned to do certain

tasks in the module, book, or any instructional reference and go over it by themselves at home but still under the teachers' guidance. The Department of Education (DepEd) issued memorandum no. 30, s. 2020 stating that the teachers are given the authority to let their students choose between printed and digital modes of distance learning to address both ends of those learners with and without technological and logistical resources. The Learners' Information System (LIS) revealed that 89 percent of the aforementioned division junior high school students had chosen to have a printed-modular approach (PA) where the students have to get the weekly- printed module to the schools; read and answer the activities; and afterward, submit the answered module to the schools again. The process is repeated until the school year ends. Educational leaders have agreed to such a way for it suited best the plight of the public school students. Meanwhile, this study would focus on the students who had chosen and undergone online learning for the technological and logistical resources; readiness and sustenance of the students are deemed crucial in its successful implementation. Several studies indicated that online learning and their adoption was widely affected by students' characteristics, which were regarded as important factors in online learning in developing countries (Bhuasiri et al., 2012). These traits consist of internet self-efficacy, experience in computers and the internet, anxiety with computer usability, and approaches to online learning (Chu & Chu, 2010). Students' attitudes are also affected via the excellence and easiness of using courses of online learning, the usability of online learning, and students' level and skills in computer (Aixia & Wang, 2011). Their computer experiences, which consist of apparent self-use, gratification and effectiveness, and application of online learning, play a dominant role (Liaw, 2011). After all, positive attitudes of students and behaviors regarding online learning are important and necessary towards the acceptance and adoption of online learning (Selim, 2007). Womble (2007) found a significant positive relationship between computer self-efficacy and student satisfaction in online learning environments. Bakalar (2018) identified a number of issues with online learning, stating that data packages and faulty signals are barriers to learning implementation. It was also discovered that

students are frequently late in gathering and finishing tasks and that grasping the information has become a major issue for them.. The involvement of parents with children and their collaboration with the teachers have to be prevailing for in some instances, and parents have to act as para-teachers

who supplement the teachers' inputs or answer their sons or daughters' clarifications during an offline session for the children to fully understand the subject matter that is not understood or conveyed well by a teacher (Eble et al., 2021). Tama et al. (2020) reasoned out that the learners' lack of internet and connecting device access, teachers' prior exposure to online learning, and the support system that includes any backing from schools, community stakeholders, and local education authorities are keys to succeed in online learning administration. Meanwhile, Bhuasari et al. (2012) pointed out that technological and logistical resources, readiness, and sustenance of the students are deemed to be crucial in its successful online learning. The learners' lack of or unstable internet connection and access to connecting devices remained prevalent problems in online learning. Chung et al. (2020) and Fabito et al. (2020) supported that poor internet connectivity remained the biggest challenge that the students had faced in participating learning online learning. According to Adnan and Anwar (2020), pupils are unable to use the internet due to both technical and financial concerns. Other concerns that need to be addressed with online learning include the lack of face-to-face interaction with the teacher, response time, and the absence of traditional classroom socialization. Mina et al. (2020) elaborated that the lack of devices, gadgets, or resources like a laptop, webcam, printer, ring light, and smartphones were some issues that the students faced in online learning. Phan & Dang (2017) also claimed that factors such as teachers' training, attitude, technical competence, time constraints, pedagogy, and methodology were among the major distance learning education elements for evaluation to ensure quality learning outcomes' occurrence. Yuhanna et al. (2020), however laid down that online learning improved accessibility of information and cost-effectiveness for the students do not have to travel and physically attend their classes.

Nonetheless, an offsetting factor comes in for the students and parents have to like pay internet post-pair-or-pre-paid subscription. On top of it, the students should also possess digital devices – smartphones, tablets, laptops, or desktops – to fully engage in online learning. According to DepEd Learners' Information System (LIS), the average income of the parents of those public schools students ranges from 8,000 Php to 14 000 Php with an average of school-aged offspring of 3 to 4 individuals. The expenses could most likely be burdensome, but these are expected to continue while online learning is in place due to pandemic. Fedina et al. (2017) supported that the educational leaders and teachers got motivated to implement distance education. Even so, it was undeniable that having millions of students who did not have the gadgets and/or internet connectivity – more especially those in far-flung areas; lack of technological specialists, readily-available modules; and other related-amenities, the distance learning implementation would be more likely to confront several issues and challenges. The aforementioned relevant data, studies, and literature served as the framework in this study's conception. While there were other factors that needed to be examined, this research had its focus on determining the junior high school students' perceptions in online learning as well as the challenges they encountered in the course of its implementation.

Methodology

Results and Discussion

Table 1 presents the demographic profile of the respondents to reveal relevant data about them.

This study used a quantitative-qualitative method wherein the students' perceptions on online learning implementation was treated using the weighted mean and standard deviation. While the challenges they encountered was analyzed through Colaizzi method. Colaizzi method is a qualitative approach to data analysis where it allows participants to express their experiences through narratives and other forms of expressions. Such data would then be subjected to: familiarization, identifying of significant statements, formulating meanings, clustering themes, and writing of exhaustive description (Morrow et al., 2015). There were 80 junior high school student respondents in Cebu, Philippines, selected through purposive sampling technique using the inclusion and exclusion criteria. Informed consent, assent, and ethical guidelines were adhered to before, during, and after the data were collected. This research utilized a researcher-made questionnaire in which part 1 contained 10 questions pertaining to the students' perceptions on measured with 5-point Likert scale; and part 2 comprised 5 open-ended questions, written in both Cebuano and English, that focused on the students' encountered challenges in online learning. Data gathering was done by posting the questionnaires on Google Docs, and the respondents were given 2 weeks to answer them. The quanti-quali data taken then underwent appropriate analysis.

Table 1
Demographic profile of the Students

Age			Gender				Educational Level			Parents' Monthly Income		
Category	f	%	Male	%	Female	%	Year	f	%	Category	f	%
19 & Above	1	1.25	29	36.25	51	63.75	Grade 7	20	25	20,000 and above	8	10
17-18	6	7.5					Grade 8	20	25	15,000 to 19,999	14	51.25
15-16	35	43.75					Grade 9	20	25	10,000 to 14,999	53	66.25
13-14	38	47.5					Grade 10	20	25	5,000 to 9,999	5	6.25
Total	80	100.00								4,999 and below	0	0

As shown in Table 1, the majority of the respondents fell within the age bracket of 13 to 16 as these were the usual level-appropriate ages for grades 7 to 10 students. In terms of gender, female students showed to be the more dominant population. Educational level-wise, there had been an equal distribution of the respondents among the grade year levels. This was purposely done in order to have a proper representation of all year levels, which, more

likely, render wide and reliable data as regards the junior high school students' perceptions on online learning implementation during the Covid-19 pandemic. The parents' monthly income was heavily occupied within the range of 10,000 to 14,999 Philippine pesos (Php). This had coincided with the data mentioned in the DepEd LIS 2020 as presented in this study's introduction.

Table 2 presents the student respondents' perceptions on Online Learning Implementation during the school year 2020 to 2021, where pandemic continues to prevent the schools from having in-person classes.

Table 2
Junior High School Students' Perceptions on Online Learning Implementation

INDICATORS	SA 5	A 4	N 3	D 2	SD 1	Mean	Verbal Description
1. The students are provided with digital references.	80	-	-	-	-	5.00	Strongly Agree
2. The students are given the opportunity to participate during online session.	65	12	3	-	-	4.78	Strongly Agree
3. The students' learning interests were captured by the teachers' online pedagogy.	-	24	44	12	-	3.15	Neutral
4. The students are given clear instructions about the activities, assessment tasks and its submission.	21	39	20	-	-	4.01	Agree
5. The students are given reasonable time to finish assignments and other activities.	24	44	12	-	-	4.15	Agree
6. The students are given multiple online platforms in sending the completed activities.	14	45	21	-	-	3.91	Agree
7. Instructional videos are uploaded for the students to catch up missed or not-totally-understood lectures.	35	36	9	-	-	4.33	Strongly Agree
8. The teachers provide feedback to the students for them to know and improve their weaknesses and strengths.	33	45	2	-	-	4.39	Strongly Agree
9. The teachers actively respond to the students' questions, clarifications and other concerns.	34	34	12	-	-	4.28	Strongly Agree
10. The teachers hold online sessions in accordance with the schedule.	46	22	12	-	-	4.43	Strongly Agree
AVERAGE WEIGHTED MEAN						4.24	Strongly Agree
STANDARD DEVIATION						0.50	

N = 80, Verbal Description and Scale Range: 5 – Strongly Agree (SA), 5.00 to 4.21; Agree (A) – 4.20 to 3.41; Neutral (N), 3.40 to 2.61; Disagree (D), 2.60 to 1.8; Strongly Disagree (SD), 1.80 to 1.00

As revealed in Table 2, statement numbers 1, 2, 7, 8, 9, and 10 had the **weighted means** within the scale of **4.21 to 5.00** with a verbal description of **Strongly Agree (SA)**. This meant that the JHS student respondents had perceived that the following indicators of online learning were excellently implemented: The students are provided with digital references; The students are given the opportunity to participate during an online session; Instructional videos are uploaded for the students to catch up missed or not-totally-understood lectures; The teachers provide feedback to the students for them to know and improve their weaknesses and strengths; The teachers actively respond to the students' questions, clarifications, and other concerns; and The teachers hold online sessions in accordance with the schedule. On one hand,

statement numbers 4, 5, and 6 had the **weighted means** within the scale of 3.41 to 4.20 with a verbal description of **Agree (A)**. This meant that the respondents had perceived that the following indicators of online learning were well implemented: The students are given clear instructions about the activities, assessment tasks, and its submission; The students are given reasonable time to finish assignments and other activities, and The students are given multiple online platforms in sending the completed activities. Statement number 3 notably had the 3.15 weighted mean, thus, having the verbal description of **Neutral (N)**. This meant that the respondents had perceived that this indicator was moderately implemented: the students' learning interests were captured by the teachers' online pedagogy.

Nonetheless, wholly, Table 2 had the average weighted mean of 4.24 with a verbal description of ***Strongly Agree (SA)*** and a standard deviation of 0.50. This described that the students believed that the online learning was excellently done as far as the 10 indicators in the questionnaire as concerned.

After the qualitative data had undergone data analysis through Colaizzi method, the

following three (3) themes had about the JHS student respondents challenges encountered in the implementation of online learning during the Covid-19 pandemic period: 1) Insufficiency of Technological Devices; 2) Inadequacy of Technological Devices, 3) Unfavorable Learning Environment at Home as described in the below table.

Table 3. JHS Students' Challenges Encountered on Online Learning Implementation

THEMES	f	%
1. Unstable Internet Connectivity	63	78.75
2. Inadequacy of Technological Devices	54	67.5
3. Unfavorable Learning Environment at Home	44	55

THEMES

Unstable Internet Connectivity

Stable internet connection serves as the connecting rod in delivering the educational insights from the teachers towards the students. Its presence is a must for meaningful and productive online learning to happen. Table 3 showed that 63 or 78.75 percent of the student respondents had perceived that unstable internet connectivity was the top problem they encountered in the implementation of online learning. The students' significant statements that led to the emergence of this theme substantiated that there were several occasions they came in late in the virtual classroom; and in the middle of a discussion, they suddenly went out; and teachers' instructions and inputs, especially in Mathematics classes, were hard to understand if poor internet connectivity struck. The respondents also claimed that poor and unreliable connectivity occurred more frequently during rainy days, which several times the teacher had to postpone the classes and just gave assignments. Some students also stated that during online oral examination or presentation of their outputs, they had resorted to going to their locality's Barangay hall; neighbours who offered wifi for fees, and family relatives who got a stable connection. The students, however, expressed gratitude for

many of the teachers who had sent them recorded instructional videos to reinforce learning. Bhuasari et al. (2012) pointed out that technological and logistical resources, readiness, and sustenance of the students are deemed to be crucial in its successful online learning. The learners' lack of or unstable internet connection and access to connecting devices remained prevalent problems in online learning. Chung et al. (2020) and Fabito et al. (2020) supported that poor internet connectivity remained the biggest challenge that the students had faced in participating learning online learning. Adnan & Anwar (2020) further attested that the students are unable to access the internet due to its technical implementation. Salac & Kim (2016) identified that the Philippines' Internet infrastructure lagged behind among those of contemporary developing countries in Asia and had a meager average Internet speed of 2.8 Mbps, placing the country at 104 among 160 countries. Its reason was the lack of competition in the internet connectivity market. According to Pokhrel & Chhetri (2021), internet bandwidth is relatively low with fewer connection points, and data packages are expensive in proportion to people's income in many developing nations, resulting in insufficient accessibility and affordability.

Inadequacy of Technological Devices

A learning environment that leverages the Internet and other technical devices and resources for synchronous and asynchronous instructional delivery and management of academic programs is referred to as online learning (Usher & Barak, 2020); hence, desktop computers, smartphones, laptops, and tablets are indispensable tools that students have to possess so they can engage in online classes. However, table 3 showed that 54 or 67.5 percent of the student respondents had perceived that lack of technology became a challenge for them as they continued their academic journey amidst the pandemic. The students' significant statements that led to the emergence of this theme elaborated that they and their parents decided to choose online learning for most of them wanted to avoid physical contact during the time when modules were to be gotten from schools. Yet, since they also have other sibling students who also had online classes, the dilemma came in when their classes' schedules had conflicts. Mina et al. (2020) noted that the students acknowledged that the lack of devices, gadgets, or resources like a laptop, webcam, printer, ring light, and smartphones were some issues they faced in online learning. Abel (2020) also discovered that lack of technological devices was one of the challenges encountered that gave anxiety to the students in online learning. The affordability and accessibility of educational, technological tools have existed for quite some time in the Philippines (Acosta, 2016). Given the respondents' profile data wherein the average income of the students' parents ranged from 10,000 Php to 14 999 Php, the procurement of cellphones for all the family members would not be a priority as it would more likely cause household financial distress. It is, therefore, a harsh reality that online learning could be well adapted by students with good financial support from their parents. Indeed the economically backward children are most likely unable to afford online learning devices.

Unfavorable Learning Environment at Home

With students now experiencing homeschooling during this COVID-19 pandemic, a conducive environment at home in accordance with all educational standards would differ from student to student because socio-economic conditions are not uniform. In the Philippines, majority of the public school students have mostly resided from slum areas, very narrow or no gaps at all dividing a house to other neighbouring abode. Table 3 presented that 44 or 55 percent of the student respondents had perceived that they had an unconducive learning environment at home. The students narrated that, in several situations, during online classes, their neighbours had drinking and singing spree that disrupted their focus and understanding of the insights given by the teachers. Others also had revealed that, inside their household where they had no room to stay when their younger siblings played and shouted, they felt annoyed and emotionally distressed, especially during discussion and oral examination. Some student respondents also mentioned that even in the course of online classes, they were assigned by their parents to look after their younger siblings and even instructed to do other household chores. They got frustrated sometimes but left with no choice but to be tenacious and persevering amidst the challenges. Indeed, Stress in the noise of their neighbors, surroundings, and environment is another big challenge for the students; sadly, all of these circumstances are inescapable to them. Consequently, a poor learning environment is detrimental for students to comfortably participate in remote learning. This difficulty has been repetitively revealed in students' responses. Creating a happy and supportive learning environment has always been a challenge in remote education, particularly for most disadvantaged families (Baticulon et al., 2020). If this problem occurs, study productivity and the utmost concentration of students are at stake (Chang & Fang, 2020).

Conclusion

Based on the findings, in terms of profile, majority of the students aged 13 to 16 years old, composed of 21 males and 59 females. They represented grades 7, 8, 9, & 10 equally – 20 students per level. Their parents'

combined monthly income ranged dominantly from 10,000 to 14,999 Php. The students believed that the online learning was excellently done as far as the 10 indicators in the questionnaire as concerned. In terms of the challenges they encountered, the students' responses yielded the following three (3) themes: 1) Unstable Internet Connectivity; 2) Inadequacy of Technological Devices; and 3) Unfavorable Learning Environment at Home.

References

- [1] Bearss, K., Johnson, C., Smith, T., Lecavalier, L., Swiezy, N., Aman, M., ... & Scahill, L. (2015). Effect of parent training vs parent education on behavioral problems in children with autism spectrum disorder: a randomized clinical trial. *Jama*, 313(15), 1524-1533.
- [2] Womble, J. C. (2007). E-learning: The Relationship Among Learner Satisfaction, Self-efficacy, and Usefulness.(Doctoral disertation), Alliant International University, San Diego.
- [3] Bakalar, B. (2018). Book Review: Justice on both sides: Transforming education through restorative justice. *American Journal of Qualitative Research*, 2(2), 145-149
- [4] Tamah, S. M., Triwidayati, K. R., & Utami, T. S. D. (2020). Secondary school language teachers' online learning engagement during the COVID-19 pandemic in Indonesia. *Journal of Information Technology Education: Research*, 19, 803-832.
- [5] Eble, A., Frost, C., Camara, A., Bouy, B., Bah, M., Sivaraman, M., ... & Elbourne, D. (2021). How much can we remedy very low learning levels in rural parts of low-income countries? Impact and generalizability of a multi-pronged para-teacher intervention from a cluster-randomized trial in The Gambia. *Journal of Development Economics*, 148, 102539.
- [6] Department of Education Learners Information System retrieved at <https://lis.deped.gov.ph/uis/login>
- [7] Adnan, M., & Anwar, K. (2020). Online Learning amid the COVID-19 Pandemic: Students' Perspectives. *Online Submission*, 2(1), 45-51.
- [8] Yuhanna, I., Alexander, A., & Kachik, A. (2020). Advantages and disadvantages of Online Learning. *Journal Educational Verkenning*, 1(2), 13-19.
- [9] Phan, T. T. N., & Dang, L. T. T. (2017). Teacher Readiness for Online Teaching: A Critical Review. *International Journal Open Distance E-Learn. IJODEL*, 3(1), 1–16.
- [10] Fedina, N. V., Burmykina, I. V., Zvezda, L. M., Pikalova, O. S., Skudnev, D. M., & Voronin, I. V. (2017). Study of educators' and parents' readiness to implement distance learning technologies in preschool education in Russia. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(12), 8415-8428.
- [11] Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J.J. & Ciganek, A.P. (2012). Critical Success Factors for E-Learning in Developing Countries: A Comparative Analysis between ICT Experts and Faculty. *Computers & Education*, 58(2), 843-855.
- [12] Chu, R. J., & Chu, A. Z. (2010). Multi-level analysis of peer support, internet self efficacy and e-learning outcomes—the contextual effects of collectivism and group potency. *Computers & Education*, 55(1), 145-154
- [13] Aixa, D., & Wang, D. (2011). Factors influencing learner attitudes toward online learning and development of online learning environment based on the integrated online learning platform. *International Journal of e-Education, e-Business, e Management and online learning*, 1(3), 264-268.
- [14] Mahlangu, V. P. (2018). The good, the bad, and the ugly of distance learning in higher education. *Trends in E-learning*, 17-29.
- [15] Wang, L. Y. K., Lew, S. L., Lau, S. H., & Leow, M. C. (2019). Usability factors

- predicting continuance of intention to use cloud E-learning application. *Heliyon*, 5(6), e01788
- [16] Liaw, S.S and Huang, H.M. (2011). A study of investigating learners attitudes toward e learning, 5 th International Conference on Distance Learning and Education, IPCSIT vol.12, IACSIT Press, Singapore
- [17] Selim, H. M. (2007). Critical success factors for online learning acceptance: Confirmatory factormodels. *Computers and Education*, 49, 396–413.
- [18] Morrow, R., Rodriguez, A., & King, N. (2015). Colaizzi's descriptive phenomenological method. *The psychologist*, 28(8), 643-644.
- [19] DepEd memorandum no. 30, series of 20202 retrieved at <https://www.deped.gov.ph/category/issuances/deped-memoranda/>
- [20] Chung, E., Noor, N. M., & Mathew, V. N. (2020). Are you ready? An assessment of online learning readiness among university students. *International Journal of Academic Research in Progressive Education and Development*, 9(1), 301-317.
- [21] Salac, R. A., & Kim, Y. S. (2016). A study on the internet connectivity in the Philippines. *Asia Pacific Journal of Business Review*, 1(1), 67-88.
- [22] Fabito, B. S., Trillanes, A. O., & Sarmiento, J. R. (2020). Barriers and challenges of computing students in an online learning environment: Insights from one private university in the Philippines. *arXiv preprint arXiv:2012.02121*.
- [23] Mina, J. C., Subia, G. S., Barlis, P. T., Tuliao, R. C., & Pastorfide, P. M. (2020). Inclinations of Engineering and Marketing Management Students to Engage in Online Learning Technology Amidst the COVID-19 Pandemic. *Technology Reports of Kansai University*, ISSN, 4532198.
- [24] Abel Jr, A. (2020). The phenomenon of learning at a distance through emergency remote teaching amidst the pandemic crisis. *Asian Journal of Distance Education*, 15(1), 127-143.
- [25] Acosta, M. (2016). Paradigm Shift in Open Education and E-Learning Resources as Teaching and Learning in Philippines. *Jurnal Ilmiah Peuradeun*, 4 (2), 161-172.
- [26] Usher, M., & Barak, M. (2020). Team diversity as a predictor of innovation in team projects of face-toface and online learners. *Computers & Education*, 144, 103702
- [27] Pokhrel, S., & Chhetri, R. (2021). A literature review on impact of COVID-19 pandemic on teaching and learning. *Higher Education for the Future*, 8(1), 133-141.
- [28] Baticulon, R. E., Alberto, N. R., Baron, M. B., Mabulay, R. E., Rizada, L. G., Sy, J. J., Tiu, C. J., Clarion, C. A. & Reyes, J. C. (2020). Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines. *medRxiv*. <https://doi.org/10.1101/2020.07.16.20155747>
- [29] Chang, C. L. & Fang, M. (2020). E-Learning and Online Instructions of Higher Education during the 2019 Novel Coronavirus Diseases (COVID-19) Epidemic. *Journal of Physics: Conference Series*, 1574, 1-5. <https://doi.org/10.1088/1742-6596/1574/1/012166>