The Effect of Covid-19 Pandemic on the Teaching-Learning Process: A Theoretical Overview

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The COVID-19 pandemic has affected the global educational standards of nearly 1.6 billion pupils in over 200 countries. For instance, face-to- face educational cancellations, social alienation and constrained mobility restrictions of students around the world have wreaked havoc on standard teaching approaches. Following the COVID-19 pandemic, various findings have been reported by a group of investigators on the teaching and learning process. At a wide range of educational institutions, face-to-face training has been tapered away where inclusive educational settings and evaluation techniques required urgent creativity and deployment. The role of faculty members has been transformed from the traditional lecturer-centric to student-centric model which serves the current new global situation. Therefore, this study aims to investigate the university staff perceptions, experiences and barriers, and focus on their e-learning challenges during the COVID-19 pandemic. Additionally, the study investigates the factors that have influenced the acceptance of e-learning as a teaching tool at the higher educational level that could assist in implementing e-learning for future endeavours.

Keywords: COVID-19 pandemic, e-learning, higher education, online academic performance, teaching-learning process

INTRODUCTION

COVID-19, a global public health crisis , was first identified as a novel coronavirus disease epidemic by the World Health Organization (WHO) in January 2020, and then as an pandemic in March 2020 (McIntosh, et al., 2020).

Due to the important global regulations on social distancing, numerous universities and educational institutions were forced to abandon face-to-face instruction due to the COVID-19 pandemic which had a

detrimental effect on academic operations. Consequently, educational institutions has established new approaches to deal with this challenging situation. The closure of universities and educational institutions has boosted the success of digital learning programmes, to ensure the non-disruption of the learning process. A previous study has provided a fruitful suggestion on how to effectively provide digital course materials, engage students, and conduct evaluations et al., 2020).

The pandemic has forced global organisations to adopt to many changes that suits the current technological modifications. The present circumstances in teaching experiences were challenging for the institutes of higher (Kaur, et al., 2020).

Online e-learning has been referred to the training programs employing various digital equipment (e.g., computers, laptops, smartphones, etc.) with internet connectivity in synchronizing or desynchronizing natural circumstances. Online e-learning has potentially assisted the teaching system to increase the student's innovation and adaptability (Singh & Thurman, 2019). However, online ordering of classes is cost-effective and inconvenient when providing curriculum to learners in remote rural areas. Particularly in poor countries, the United Nations (UN) and the World Health Organization (WHO) have implemented a useful instrument in e-learning to achieve academic goals. To counteract the challenges of the pandemic, universities have introduced various innovative techniques, including leveraging application (for example, Google Classroom, Zoom, and Microsoft online classes. Digital session of e-learning was established to increase the students' conviction and trust in the strategies of the faculties' during the COVID-19 pandemic, accomplish the curriculum, and keep regular communication with the scholars (Kaur et al., 2020).

In order to effectively adapt the current innovative education system used at universities, the introduction of e-learning has shifted the roles of students and instructors from classroom instruction to student-centric. As a result, the focus of this research is to assess the roles of academic staff and challenges of e-learning throughout the COVID-19 pandemic, to highlight individual views and to understand potential obstacles. Furthermore, we aim to study the characteristics that influence the adoption of e-learning as a teaching resource at the that would aid subsequent efforts to implement e-learning at the university's educational system in both pandemic and non-pandemic circumstances.

BENEFITS AND DRAWBACKS OF E-LEARNING

Utilizing e-learning as the sole mode of education and learning throughout the COVID-19 pandemic offered benefits and revealed drawbacks that have been examined in numerous research papers. Amongst the most prominent effectiveness of e-learning is its adaptability of location and time (Arkorful & Abaidoo, 2015). For instance, e-learning allows lecturers to present the same resources including all pupils, ensuring that all learners receive the same level of education. According to Guri-Rosenblit (2018), a primary benefit of e-learning, is the removal of institutional obstacles, which is accomplished by decreasing boundaries, creating more opportunities, and introducing a strong sort of interaction between students and professors.

Considering these benefits; there are also drawbacks of using e-learning. For example, learners are progressively incapable of keeping themselves inspired due to a shortage of social connection (Karmakar & Behera, 2015). In addition, Arkorful and Abaidoo (2015) reviewed the drawbacks of e-learning that have been observed in certain aspects, such as the absence of face-to-face communication, the complexity of employing efficient e-learning approaches, and the complexity of preventing cheat in examinations. Furthermore, budgetary worries of maintaining, managing, and expanding the e-learning infrastructure could be considered drawbacks. It was also discovered that lecturers in developing countries have difficulties in adopting online courses due to technical issues. In summary, in order to improve the e-learning experience, it is required to identify the benefits and drawbacks of e-learning.

UNIVERSITY TEACHING STAFF STRATEGIES AND COVID-19 PANDEMIC MANAGEMENT

Academic staff can employ standardized tactics in digital training, including bloggings that offer training for using cooperative learning techniques or story-making digital publishing tools such as word processing, spreadsheets, etc. Teaching staff ought to be inventive, imaginative, and adaptable in providing the availability of chances for students to obtain experience. In addition, they should be aware that the students might not exist in regular locations and times, through discussion boards, digital evaluation and monitoring toolkits, concept maps, including the use of engaging graphs and charts, across correspondence courses, and in disaster, catastrophes, and outbreaks. Furthermore, they ought to provide chances for students to increase their understanding and knowledge that may not be suitable and available regular times and circumstances. (Al-Rabiaah et al., 2020)

The learners have gained from the insightful benefits of the academic lecturers and staff by applying effective innovation and offering quick advice on how to improve learning outcomes. In fact, This is particularly obvious in virtual learning environments where educators are unable to make similar comments as they offer a traditional classroom settings (Silverman et al., 2020).

It is worth mentioning that digital training does not necessitate the use of digital technologies or communications. As per Oklahoma State Department of Education (OSDE's), The Technological Capacity Survey showed that more than a quarter of Oklahoma districts shall guarantee instruction, for the most portion, by the distribution of printed packets of educational resources to pupils. OSDE has assisted by providing an online training tools platform that includes the states complete support in order to meet the demands of their learners. Furthermore, OSDE has teamed with OETA TV to produce quality teaching materials and provide educational experiences at homes on daily basis. During the lack of technical tools for online instruction, the lecturer may consider solutions using social networking sites or old media, such as government or corporate media, to attain ethical, values, and mental process in moments of crisis and pandemic (Ossiannilsson, 2021).

According to Hamedani, Haghani, and Kelishadi (2019), lifelong learning, particularly among students, seems to be the greatest approach to change their behaviours. Managing and enhancing variables that affect the life style may assist the educational system to become more successful, particularly during crises (Hamedani et al., 2019). Similarly, according to Noor and Jaidin (2017), the majority of lecturers chose to utilise teaching-centered teaching techniques, and just a handful lecturers expressed a desire to incorporate student-centered teaching methods into their courses. They also found that learners were also more engaged in courses which offered opportunity to gain experiences and cooperative learning. The outcomes of this study can help lecturers, academics, and politicians make better decisions in pandemic scenarios (Noor & Jaidin, 2017).

Al-Rabiaah et al. (2020) highlighted Coronavirus 2 (SARS-CoV-2) related pulmonary disease in the Middle East, specifically the condition in Saudi Arabia. They concluded that pandemic might have a significant impact on pupils' academic performance and psychological health. Mostly in a similar vein, Asaad et al. (2019) have performed a cross-sectional survey in the Kingdom of Saudi Arabia to investigate the perceptions of Corona Virus (MERs-COV) amongst healthcare personnel.

REQUIREMENTS FOR SUCCESSFUL DIGITAL TRAINING

According to Al-Hosan and Oyaid (2012), to obtain the optimum method for instructional practices in a modern simulated environment, many of the the following elements are necessary but not limited to:

1- Updating the learners with the location of urgent assistance in the program and early notification of all required strategies.
2- Preparing the weekly e-course materials that assist learners throughout the classroom sessions in navigating the content knowledge.
3- Describing methods for learners that can be used by the academic university's services to enable them in using the online class resources.

4- Supplying learners with the necessary information about to the preservation of their individual privacy and confidentiality through the program by improving the technology or solutions.
5- Utilizing curriculum technologies to enhance students' involvement for effective teaching.
6- Obtaining the appropriate licences for the tools of the e-course.
7- Providing specific guidance and direction in an electronic format for the e-learning atmosphere, including a definitive message of the systems possess as well as what the learner needs do to get started correctly.
8- Informing learners about any major shifts of program rules.
9- Clarifying how learners can gain educational information, funds, and supportive services from a distance
10- Providing instructions as well as a grading system for learners.
11- Interacting with learners by utilizing brief learning materials.

In comparison with unexperienced classroom lecturers, it was also noticed that exceptional teaching staff with extensive classroom experience have provided a more diverse and comprehensive variety of notions and preconceptions regarding teaching quality, along with opinions regarding effective education and training tools and methodologies. Excellent lecturers have also been confident about their significant impact on their pupils' education and self-evaluation. Furthermore, they have adopted methodical systems to receive information from participants and make greater use of that evaluation, along with the comments from co-workers, specialists, and supervisors (Avidov-Ungar & Forkosh-Baruch, 2018).

Lastly, professional educators seemed to enjoy teaching better, and they have placed a higher value on learners and their academics than rookie lecturers. Exceptional professors used to delegate greater responsibilities to pupils and have paid more attention to the setting of the lesson than beginner lecturers. Furthermore, professional educators have enforced composure and attentiveness by maintaining eye contact with pupils and paying closer attention to their attitude. They are capable of recognizing areas of instruction that need to be enhanced. Their excellence has been demonstrated in the effective use of their substantial educational knowledge in the classroom. Exceptional lecturers, according to Hativa and Gooyear 2016, use a pedagogical principle, which includes the three characteristics listed below:

1. The professor's excellent ability to establish a humanistic interaction with his or her learners, to transmit to them a signal of capacity to comprehend even difficult subject, to motivate students while simultaneously placing high standards on them. Exceptional lecturers are more likely to be organised, well prepared, offer concrete objectives in their education, and achieved appropriate expectations for their students while assuming credit for the academic achievement. Lecturers who use a range of instruments to push students academically, raise class engagement, and create a good environment that employ a variety of resources. They like educating, are excited about the research subject, and take the opportunity to engage their students by asking inquiries and holding discussions.
2. Instructing morality and ethics dedications through education and to ensure that learners understand well.
3. Having thorough understanding of both material and fundamental pedagogy, along with sharing knowledge to a non-English speaking audience. Furthermore, has the capacity to educate only the most fundamental and key information, as well as to reduce, arrange, and gives a detailed analysis to learners utilising a variety of methods. Such a professor ties new content to already learnt content and clearly clarifies the links so the learners' previous information of incorrect conceptions can be replaced with correct knowledge characterizations (Hativa & Goodyear, 2002).

CHALLENGES AND BARRIERS FACING TEACHING STAFF AND THEIR PROFESSIONAL SELF-EFFICACY

Assessment of the Learners' Accomplishments

Distance learning can be problematic for lecturers, particularly when they lack the assessing instruments the students need for their accomplishments. Consequently, upon completion of the assessments –viaexams, ICT projects, etc. – the lecturers usually question the dependability of the outputs and how well these can represent the learners' true talents and comprehension (Avidov-Ungar et al., 2018). As a result, there is a huge problem in this area.

Moreover, generating new interactive streams with learners (the transformation to digital learning, especially once encompassing e-teaching) offers new opportunities for individual communication with individuals from the conventional teaching, who were unobservable by the lecturer or did not obtain other requirements due to class volume or other factors (Oliveira et al., 2019)

Lecturer Identity Progress and the Need for Support

Lecturers are always in need for support and sometimes feel overwhelmed and unsure from where to begin or how to generate the suitable question. Lecturers have their routines set and they intervene smoothly in their classrooms. So, once they are faced with obstacles and challenges, they always need an upper hand to support them. According to a previous study, about half of the lecturers involved stated that they had obtained career growth on the issue of distant classroom instruction in the previous two years, however, most of the lecturers (almost 80%) stated that they would be willing to take part in future professional growth (Blau et al., 2016)

Eliminating the Classroom Door as a Barrier

Both documented and immersive virtual communications — have established new venue of accessibility for the instructional and academic behaviour among lecturers and learners. Previous researchers suggested that this venue might be a significant challenge for parents , especially when it is accessible for inspection through other components including such co-workers, precepts, superintendents, district education executives, and many others (Tang et al., 2016).

With e-learning, the era of mysterious events have come to an end. The administrator and/or director could assess the lecturer's performance by monitoring multiple classes with the support of other professional aspects, instead of relying on a one-time unusual physical presence for a lesson. Monitoring virtual classrooms provides increased instruments for all those concerned, including lecturers, parents, administrators, as well as other administrative components, to cope with negative treatment on the one side and requests for advancement and higher pay on the other (Amram & Davidovitch, 2021).

Strengthening Academic Independence

For several generations, governmental entities have been producing technological tools for virtual and face to face education. In spite of their hard work and commitment, the instruments they have created lack the daily inalienable part of the process of the academic teaching service. As a result, when the overall structure switched to remote teaching and learning, administrators had to "learn on the fly" in order to keep up with the latest demands (König et al., 2018).

Institutions must come up with the most independent acceptable ways for their pupils. This reality resulted in a variety of strategies, teaching materials, and new instructional techniques for every set of learners. In practise, several institutions developed a collection of resources and aides for online instruction. This data collected can assist in introducing groups of professors from the same degree level who share knowledge and intelligence for the benefit of their learners and to enhance their own technical talents (Martin et al., 2019).

Lecturers' Pedagogical Knowledge and Tools for Conducting Distance Teaching

According to Amram and Davidovitch (2021), the faculty members declared that they had learning activities and instructional modules, electronic educational resources, educational monitoring tools, and an understanding of how to use ICT systems. Nonetheless, other recipient lecturers who stated fewer high-quality resources and lecturers of all stages of education have complained about the need to create or acquire necessary tools and added that they would welcome additional high-quality media files.

COVID-19 PANDEMIC AND E-LEARNING INTERFACES

The abundance of electronic academic materials, according to UNESCO, has placed new demands on academic organizations and structures, including the introduction of advanced teaching methods, appropriate learning pathways, and inventive subjective instructional approaches, that can be facilitated virtually, distributed learning, and brief abilities classes. The organisation has created a set of programmes to assist with correspondence courses, such as the "Black Board" implementation(a programme that relies on providing instruction, homework, and activities) prepare and correct examinations, and interact with learners through a simulated environment and mobile applications (Rubio, 2021).

The "Edmodo" website is another tool which is a free public platform that allows staff and students to communicate and collaborate while sharing instructional information and digital apps, as well as assignments, marks, and conversations (Boshra et al., 2020). The "Adrak" platform, that aims to teach Arabic electronically, and the Google Classroom software and allows staff and students to communicate both within and outside of the university, are electronic apps that permits recording and sharing of the teaching materials with the teaching staff, parents, university friends. These facilities have enriched the capabilities of the students in practising and learning arithmetic (Asaad et al., 2019).

Numerous e-learning apps are accessible on the Internet, which are mostly free, while visual display sites including YouTube can be utilised as e-learning venues by transforming courses into movies which can be accessed globally by any learner. Specialised e-learning systems seem to be apart due to their ability to provide directly and indirectly interaction between both the learner and the lecturer in a manner that enhances the basic components of instructional experience without causing any disturbance. This has resulted in the inability to completely fulfil the education or tutoring equipment (Berlinger et al., 2020).

There are several well-known e-learning channels, including Moodle that is the most well-known as the tool of global digital education. This tool has provided many techniques for the lecturer, university, and educator, to enforce the learning process in a coordinated system. Moodle is a free software and could be assembled easily in any domain controller. It is accessible in a variety of accents, particularly Arabic, to give a pragmatic and fast option for an instant conversion of the learning environment to a computerized format. Definitely, there are several innovative technical remedies in online classroom and lifelong learning modes. These modes should only be enacted by the academics of educational technologies. That is, the academics must incorporate comprehension of the various educational mechanisms, obviously be conscious of the constituents of those structures with awareness of this innovation and its techniques and abilities in order to adapt those functionalities. (Noor et al., 2017).

Any misunderstanding between these two parties would then inevitably interrupt the teaching experience, leading to disruption of the e-learning or online higher education. As a result, it is important to rely on reputable experienced organizations in e-learning processes to oversee the instructions of lecturers and learners, as well as those in control of the teaching curriculum, to transit from academic learning or the immediate structure to virtual classrooms in a detailed and analytical manner. During the emergency times and the expansion of pandemics, turning into intergovernmental organizations in the areas of ordinary and digital training is the optimal option for universities, authorities, and politicians who are seeking to purchase in advanced technological transformation to digital learning in order to conquer those catastrophes without interrupting the learning environment (Hamedani et al., 2019).

DISCUSSION

As a consequence of the COVID-19 outbreak, higher education institutions were decided to shut and digital learning has emerged. Several lecturers viewed distant learning as a supportive learning; other lecturers had negative thoughts regarding online classes, and a few lecturers' feelings did not adequately represent online tutoring. Digital learning is a distinct sort of learning that should not be mistaken with regular face-to-face instruction. It is possible that the lecturers' first deployment of online courses, of the lack of skill and understanding in online classes, and the encountered technical challenges might have affected their opinions about distant learning (Erfani et al., 2020).

Furthermore, low learner's engagement, lecturers' assumptions, limitations, and obstacles in producing and ability to add a value in their professions, and previous experience with face-to-face learning might also have influenced their impressions of distant learning. In order to conduct out the distant educational curriculum successfully and properly, it is necessary to specify lecturer perspectives (Dooley & Murphrey, 2000). Numerous published studies recommended that teaching staff lacked accurate guidance regarding online classes. For instance, the component of understanding what the lecturers have possessed about online classes, such as an insufficient training, prior history, and variables including sound, picture, and access troubles, as well as interaction quality, have all influenced teaching staff' viewpoints on online classes. In this way, the value of remote learning influences their impressions of it, which in turn influences the procedure and degree of achievement (Baltaci&Akpinar,2011)

Our research emphasized the importance of university teaching staff during COVID-19 pandemic and administration was underlined. It also highlighted the suggested requirements for successful E-learning methods. From the authors point of view, it is critical to assess lecturers' preparation for online teaching since it's critical to effectively offer online education for now and the future.

Learners, lecturers, and organizational characteristics were proposed as potential elements that influenced lecturers' comfort in higher education settings. It could be linked to the economic factors of the learners. The absence of appropriate technology and management is referred to the socio-economic grade. According to Johnson (2008), learners' lack of familiarity with the new teaching strategy and the requisite abilities for e-learning, had a significant impact on their involvement and achievement. This hypothesis is in line with Johnson's observations (Bolliger & Wasilik, 2009).

Our findings highlight the confidence and self-confidence of faculty members and how to digitally encourage innovative instructional techniques, and e-learning frameworks employed during the COVID-19 pandemic disaster. Many staff teaching members used pre-packaged resources to improve learning, while a few lecturers created existing parts, according to the lecturers' expressions regarding teaching methods for a successful transaction. According to Tuncer (2007), lecturers in remote learning have faced challenges in preparing high-quality resources and creating an efficient teaching atmosphere.

Lecturers had to perform spadework since they applied unique instructional strategies. The fact that teaching staff members preserved old instructional strategies has led to negative scenarios (Kologlu,Kantar&Dogan, 2016) Additional survey suggests that adopting unsuitable approaches in course materials and construction development had an impact on remote learning successful process. Lecturers were dissatisfied to implement innovative programs because of a shortage of teaching expertise in digital learning and a shift in their customary responsibilities. For more successful distant academic programmes, technological, pedagogical, and administrative assistance should be provided to lecturers. Teaching staff efficiency can be improved with educational and logistical support (Lloyd et al., 2012) by improving the educational components' adequacy that may reduce lecturers' unfavourable feelings. A further factor for not producing imaginative and unique resources might be the specialization of lecturers. Teaching staff in mathematical courses stated that their disciplines found it challenging for them to develop a successful instructional atmosphere (Seaman, 2009).

CONCLUSION

The COVID-19 pandemic seems to have had a profound influence on higher education around the world, affecting nearly every element of its operation and hastening the revolution that was already underway. Particularly, when it came to online research and education, the pandemic changed the way people learned and how they researched, as well as highlighting the value of university and university community participation. The pandemic had a powerful effect on university management (campus shutdown and the transition to digital training) and administration, with management personnel having to make a variety of urgent judgments and provide for more adaptability in many parts of the teaching operation.

Relying on a compilation of information arising from accelerated studies and reports conducted since the pandemic's breakout, this analytical theoretical review has concentrated on the impact of COVID-19 on higher education university staff members. More specifically, this analysis focused on three theme topics (e-learning; the performance of teaching staff during the COVID-19 pandemic; and the criteria of effective online learning according to the teaching staff).

REFERENCES

Al-Hosan, A., & Oyaid, A. (2012). Towards identifying quality assurance standards in virtual learning environments for science education. *Pertanika Journal of Social Sciences & Humanities*, *20*(3), 797–828.

Al-Rabiaah, A., Temsah, M.H., Al-Eyadhy, A.A., Hasan, G.M., Al-Zamil, F., Al-Subaie, S., . . . Somily, A.M. (2020). Middle East Respiratory Syndrome-Corona Virus (MERS-CoV) associated stress among medical students at a university teaching hospital in Saudi Arabia. *Journal of Infection and Public Health*, *13*(5), 687–691.

Amram, M.B., & Davidovitch, N. (2021). Teachers' attitudes towards e-teaching during COVID-19. *Laplage Em Revista*, *7*(2), 13–32.

Arkorful, V., & Abaidoo, N. (2015). The role of e-learning, advantages and disadvantages of its adoption in higher education. *International Journal of Instructional Technology and Distance Learning*, *12*(1), 29–42.

Asaad, A.M., El-Sokkary, R.H., Aedh, A.I., Alzamanan, M.A.A., & Khalil, F.O. (2019). Exploring knowledge and attitude toward middle east respiratory syndrome-coronavirus (MERS-CoV) among university health colleges' students, Saudi Arabia: A cross-sectional study. American *Journal of Infectious Diseases*, *15*(1), 37–43. doi:10.3844/ajidsp.2019.37.43

Avidov-Ungar, O., & Forkosh-Baruch, A. (2018). Professional identity of teacher educators in the digital era in light of demands of pedagogical innovation. *Teaching and Teacher Education*, *73*, 183–191.

Baltaci, M., & Akpinar, B. (2011). Web tabanli öğretimin öğrencilerin akademik başarisina etkisi. *Fırat Üniversitesi Sosyal Bilimler Dergisi*, *21*(1).

Berlinger, N., Wynia, M., Powell, T., Hester, D.M., Milliken, A., Fabi, R., & Jenks, N.P. (2020). Ethical framework for health care institutions responding to novel Coronavirus SARS-CoV-2 (COVID-19) guidelines for institutional ethics services responding to COVID-19. *The Hastings Center*, *12*.

Blau, I., Peled, Y., & Nusan, A. (2016). Technological, pedagogical and content knowledge in one-to-one classroom: Teachers developing "digital wisdom". *Interactive Learning Environments*, *24*(6), 1215–1230.

Bolliger, D.U., & Wasilik, O. (2009). Factors influencing faculty satisfaction with online teaching and learning in higher education. *Distance Education*, *30*(1), 103–116.

Boshra, A.A., Al-Dabbagh, Z.S., Al Eid, N.A., Al Eid, M.A., Al-Musaibeh, S.S., Al-Miqtiq, M.N., . . . Al-Zeyad, G.M. (2020). The effects of corona virus (COVID-19) outbreak on the individuals' mental health and on the decision makers: A comparative epidemiological study. *International Journal of Medical Research & Health Sciences*, *9*(3), 26–47.

Dooley, K.E., & Murphrey, T.P. (2000). How the perspectives of administrators, faculty, and support units impact the rate of distance education adoption. *Online Journal of Distance Learning Administration*, *3*(4), 1–12.

Erfani, A., Shahriarirad, R., Ranjbar, K., Mirahmadizadeh, A., & Moghadami, M. (2020). Knowledge, attitude and practice toward the novel coronavirus (COVID-19) outbreak: A population-based survey in Iran. *Bull World Health Organ*, *30*(10.2471), 10–2471.

Guri-Rosenblit, S. (2018). La enseñanza electrónica (e-teaching) en la educación superior: Un prerrequisito esencial para el aprendizaje electrónico (e-learning) / E-teaching in higher education: An essential prerequisite for e-learning. *Journal of New Approaches in Educational Research*, *7*(2), 100–105. DOI: 10.7821/naer.2018.7.298

Hamedani, Z., Haghani, F., & Kelishadi, R. (2019). Strategies to non communicable diseases prevention improvement from the viewpoints of students in Isfahan: A qualitative research. *Journal of Education and Health Promotion*, *8*, 1–-9. DOI: 10.4103/jehp.jehp_218_19

Hativa, N., & Goodyear, P. (2002). Research on teacher thinking, beliefs, and knowledge in higher education: Foundations, status and prospects. In *Teacher thinking, beliefs and knowledge in higher education* (pp. 335–359). Springer, Dordrecht.

Karmakar, B., & Behera, S.K. (2015). The attitude of higher secondary school teachers towards e-learning in Purulia district of West Bengal, India. *ATIKAN*, *5*(1).

Kaur, N., Dwivedi, D., Arora, J., & Gandhi, A. (2020). Study of the effectiveness of e-learning to conventional teaching in medical undergraduates amid COVID-19 pandemic. *National Journal of Physiology, Pharmacy and Pharmacology*, *10*(7), 563–563.

Koloğlu, T.F., Kantar, M., & Doğan, M. (2016). Öğretim elemanlarının uzaktan eğitimde hazırbulunuşluklarının önemi. *Açıköğretim Uygulamaları ve Araştırmaları Dergisi*, *2*(1), 52–70.

König, R., Seifert, A., & Doh, M. (2018). Internet use among older Europeans: An analysis based on SHARE data. *Universal Access in the Information Society*, *17*(3), 621–633.

Lloyd, S.A., Byrne, M.M., & McCoy, T.S. (2012). Faculty-perceived barriers of online education. *Journal of Online Learning and Teaching*, *8*(1).

Martin, F., Budhrani, K., Kumar, S., & Ritzhaupt, A. (2019). Award-winning faculty online teaching practices: Roles and competencies. *Online Learning*, *23*(1), 184–205.

McIntosh, K., Hirsch, M.S., & Bloom, A. (2020). Coronavirus disease 2019 (COVID-19). *UpToDate Hirsch MS Bloom*, *5*(1), 1–27.

Mukhtar, K., Javed, K., Arooj, M., & Sethi, A. (2020). Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era. *Pakistan Journal of Medical Sciences*, *36*(COVID19–S4), S27–S31. doi: https://doi.org/10.12669/pjms.36.COVID19-S4.2785

Noor, N.A.H.M., & Jaidin, J.H. (2017). Teaching strategies to raise awareness of non-communicable diseases in secondary schools in Brunei Darussalam. In *Proceedings of 3rd International Conference on Education 2017 (ICEDU-2017)* (Vol. 3, pp. 77–90).

Oliveira, A., Feyzi Behnagh, R., Ni, L., Mohsinah, A.A., Burgess, K.J., & Guo, L. (2019). Emerging technologies as pedagogical tools for teaching and learning science: A literature review. *Human Behavior and Emerging Technologies*, *1*(2), 149–160.

Ossiannilsson, E. (2021). Some challenges for universities, in a post crisis, as Covid-19. In *Radical Solutions for Education in a Crisis Context* (pp. 99–112). Springer, Singapore.

Rubio, R.D.C. (2021). Visión holística de la bioética en la pandemia COVID-19. *Acta Colombiana de Cuidado Intensivo*, pp. 1–14. https://doi.org/10.1016/j.acci.2021.03.003

Seaman, J. (2009). *Online Learning as a Strategic Asset. Volume II: The Paradox of Faculty Voices--Views and Experiences with Online Learning*. Results of a National Faculty Survey, Part of the Online Education Benchmarking Study Conducted by the APLU-Sloan National Commission on Online Learning. Association of Public and Land-Grant Universities.

Silverman, M., Sibbald, R., & Stranges, S. (2020). Ethics of COVID-19-related school closures. *Canadian Journal of Public Health*, *111*(4), 462–465.

Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). *American Journal of Distance Education, 33*(4), 289–306.

Tang, H., Wang, S., Qian, Y., & Peck, K.L. (2016). Students' Perceptions of the Online Instructors' Roles in a Massive Open Online Course. In *Creating teacher immediacy in online learning environments* (pp. 273–289). IGI Global.

Tuncer, M. (2007). *Elektronik devreler dersinin sanal ortamda proje tabanlı öğrenme yöntemine göre sunulmasının öğrenci başarısı ve görüşlerine etkisi/The effect of electronic circuits lesson on virtual environment on the success of the students and their views according to the presentation of the project based learning method*. PhD Thesis, University of Firat, Elazığ, Turkey.