

# Digital Education: A Movement to Future-proof Teaching and Learning in Higher Education

Jing Shi<sup>1,2,\*</sup>, Jarrent Tayag<sup>1</sup>

<sup>1</sup> Graduate School, Angeles University Foundation, Angeles City, Philippines

<sup>2</sup> Shandong Institute of Commerce and Technology, Shandong Province, China

\* Corresponding author: Jing Shi (Email: shi.jing@edu.auf.ph)

**Abstract:** In the context of the COVID-19 pandemic, schools around the world have implemented online teaching reforms based on digital technology, and remarkable results have been achieved. This paper discusses the literature and expounds the theoretical basis of digital teaching. Through a literature survey of existing research databases, this paper introduces the situation of digital teaching reform after the COVID-19 pandemic. The digital education reform during the COVID-19 pandemic has provided the development direction for the future of digital education reform. how digital education can be used to future-proof teaching and learning in higher education, Research on this problem is an important solution to cope with possible future changes. This paper gives some suggestions for future research.

**Keywords:** Digital Education; Proof Teaching and Learning; Quality of Education.

## 1. Introduction

Now in the era of Industry 4.0, society has fully entered the new era of digitalization. Digital technology also has a great impact on education, and the digitalization of education can be said to be a new path of education reform in the world. The COVID-19 has severely affected teaching and learning in schools. Many schools must change to be able to teach in the view of the COVID-19. The COVID-19 made a large number of school closures. This forced many schools had to change to adapt to the reality of school closures in the background of the COVID-19 pandemic, shifting from the usual face-to-face classes to online teaching. In response to school closures, UNESCO recommends the use of distance learning programmes and open education applications and platforms. To guarantee the quality of online teaching, many schools had carry out online teaching reform. Australia's online education response to COVID-19 is doing a very good job, which is closely related to Australia's well-prepared online education. In the past two decades, The functionality of the Australian online teaching platform had been greatly improved and is fully prepared for online teaching. (K et al, 2021)[1].

Issues: At the beginning of the epidemic, the research on digital education started more from the introduction of experience at the implementation level. The epidemic has lasted more than 3 years, and the research on digital education has gradually shifted to focusing on the digital education model. It has a great significance to study the current situation of digital education reform, which can help us find out the problems in digital education reform in time, so as to carry out better educational reform reform in the future. Some researchers studied the reform of educational reform in Chinese primary and secondary schools about Online teaching platform, online teaching organization, etc. (Zhou, Longjun et al.2020) [2]. Paliwal, Manisha, Singh, Archana conducted a study on educational reform in Indian higher education institutions and proposed that Teachers need to have a higher level of curriculum design ability in terms of curriculum content, methods, innovative forms of student participation in the classroom, curriculum design and subject

assessment.

The COVID-19 pandemic is still exist, but as the epidemic has eased and countries around the world have gradually opened up, teaching has shifted from fully online to fully offline, It can be said that the current society has fully entered the post-epidemic era.so what are possible ways to learn about the situation in the future? Howarth, Mike (2021) proposed a method to promote students' online Learning by improving teacher training -- 45°Learning[3].

For a specific school, how should the digital education reform effectively ensure the quality of teaching? Du(2021) taking K Middle School as an example, discussed the organization and implementation of "Internet + education" in K Middle School through the method of case study[4].

Research Objectives: Describe the digital education reform in schools in the face of Covid-19. Through in-depth analysis, Predictably describe how digital education can be used to future-proof teaching and learning in higher education. And through a comprehensive analysis of the literature, can Determine how digital education reformations may be adapted into a certain school in view of the existence of Covid-19.

Contribution: The research of this paper can better rationalize the current implementation of digital education reform in schools, provide reference for predicting the future possible learning methods, and provide reference for the implementation of digital education reform in specific schools.

## 2. Literature Review

### 2.1. Teaching Reforms After the Covid-19 Pandemic

The COVID-19 pandemic is the most severe public health crisis the world has faced since 2020, with a huge impact on the social economy and people's lives in all countries. As an important field of training talents, spreading knowledge and promoting innovation, higher education has also been impacted and challenged unprecedentedly.

The traditional offline teaching mode has been seriously

challenged. In order to ensure the health and safety of teachers and students, universities in various countries have changed the face-to-face teaching mode, adopted digital education means to carry out online teaching mode, and used network platforms, video conferences, online courses and other means to provide distance teaching services for students, and achieved good results.

Australia is one of the countries that has successfully responded to COVID-19. Two Sydney-based universities, which rapidly shifted their units online when COVID-19 appeared. Identifying student motivation and retention as a key challenge, they shared their experiences about online teaching in the background of the COVID-19, the application of digital tools to solve the challenge of motivation and engagement (Smith, 2021)[1]. In the reform of online teaching in Indian higher education institutions, it is found that online teaching preparation largely depends on the teacher's ability and the teacher's ability to adapt to the teaching method and the new role, and a higher education institution teachers' readiness to deal with online problems is proposed based on the online teaching readiness assessment model. It is proposed that teachers need to have more comprehensive curriculum design capabilities in terms of curriculum content, online teaching methods, innovative student participation activities, comprehensive action plans from curriculum planning to subject assessment (Paliwal, 2021)[5]. English Language teachers at a university in Thailand conducted a hybrid teaching practice - simultaneous online and on-site teaching, with online students connected through an online platform and on-site students attending classes on site (Al-Balas Mdengren et al., 2020)[6]. In view of the COVID-19, Chinese institutions of higher learning have also carried out teaching model reforms, including online teaching model and hybrid teaching model organically combining traditional teaching model and online teaching model (Han, 2022)[7].

The use of online teaching platform is very important for the reform of school's online teaching. Survey analysis found that Google Classroom is a good way for online course teaching or learning (Sheelavant, 2020)[8]. Based on a summary of the using of Google classroom in India, it was suggested that Google Classroom can be used to improve the quality of teaching and learning in view of the COVID-19 (Sharda et al., 2021)[9]. The study found many benefits of using online platforms, such as the availability of lecturers, Convenient data storage and share, the freedom to ask questions of lecturers, and beneficial home learning. Some challenges were also described, such as the need to study a large amount of material available, the number of messages received during the lecture, eye strain, Internet problems. These have a very positive significance for the selection and use of online teaching platform in the further development of reform in schools (Aduba, 2022)[10].

## 2.2. Future-Proofing Education: Lessons from The Pandemic

The impact of the COVID-19 pandemic on education is direct and huge, but it has also spawned innovation and change in higher education, providing new opportunities and impetus for the development of higher education. The teaching reform carried out in various countries in the context of COVID-19 is actually the online teaching reform carried out by various digital technological means, that is, the reform of digital teaching.

There may still be a crisis of one kind or another in the future, causing higher education to have to change the offline teaching model of face-to-face teaching. So, the author thinks, how digital education can be used to future-proof teaching and learning in higher education, the study of this problem is an important solution to cope with possible future changes.

Now COVID-19 remains a pandemic. Online learning is set to become a "new normal" for organizations in the future. If COVID-19 persists in the future, what are the possible ways to learn about it in the future? There are a lot of people doing useful exploration and try, and innovation put forward some new learning methods. To predict the possible learning ways in the future, that is very important to first know the problems existing in the current online teaching, to put forward the possible effective learning methods in the future. Therefore, many people have conducted research on the schools' implementation of online teaching reform, hoping to find out the problems which exist in the reform of online teaching and make preparations for predicting the possible learning methods in the future.

Some people find the problems in the reform of online teaching from the perspective of the investigation and research of the reform of online teaching implement. Survey results showed that teachers generally felt that curriculum quality is same as before, but the engagement and performance of students is not good during the pandemic, and the satisfaction was not high (Sims, 2021)[11]. From the teacher's perspective. The survey results showed that teachers showed mastery in self-managed learning, but low levels of motivation and preparation in EOL, and "missing" in interaction with others (Gormaz-Lobos, 2022)[12] surveyed students in 40 UK medical schools about their views on online teaching from the perspective of students. The survey results show that the biggest benefits of online learning platforms include their flexibility. Common questions to using online learning platforms include distractions at home (26.76%) and Network failure (21.53%). Based on this, possible teaching methods to deal with the epidemic in the future are predicted, and it is recommended that medical schools adopt team/question teaching forms (Dost, 2020)[13].

Through the perspective of literature analysis, some people examine the problems existing in the reform of teaching online, and put forward some suggestions to deal with the challenges. According to the literature analysis, the problems in online teaching are mainly concentrated in the aspects of network inaccessibility, lack of social interaction and student participation, lack of technical resources or equipment and/or poor network infrastructure, lack of training, technical knowledge and online teaching ability. New technologies such as learning conferences and intelligent tools can be used to solve the problems about online teaching. Online teaching can also be addressed through new teaching strategies such as incorporating authentic assessments and personalized learning resources into online courses (Ballena, 2021)[14].

On the basis of fully understanding the problems existing in online teaching reform, it can predict the possible learning methods in the future through practice verification. Challenging the assumption that class-based pedagogy is appropriate for online Learning, some researchers have proposed an alternative solution to stress and confusion during the pandemic -- 45° Learning . 45° Learning is a way to promote student learning online by improving teacher training. In 45° Learning, 'Show Not Tell' teachers are using online conversations Instead of presenting lectures.

(Howarth, 2021) [3]. Researchers have proposed a new learning model -- Contextual Based E-learning (CBE). This model is appropriate and effective for learning objectives (Renaldi, 2022) [15].

### 2.3. Implementing Educational Reforms

With the rapid development of information technology, the application of digital education and artificial intelligence in the field of education has become a global trend, and the digital transformation of education has become the direction of education reform and development in many countries. The development of a new generation of digital technologies has gradually enhanced the availability of education, which is reshaping the traditional education process and creating a new future education. Digital education not only provides a wider range of learning opportunities and resources, but also provides students with more personalized and efficient teaching methods.

At present, many countries and schools in the world have begun to study and practice future-oriented education. In 1996, the United States proposed the Future Education Plan, and in 2006 established the world's first school named after the "Future School", namely the Philadelphia Future School. There is no paper, pen or textbook in this school, students use the Internet and mobile devices to study anytime, anywhere, and the school allows each student to learn at a different pace. There are also the Future School project in Russia, the "Smart Fruit 2015" project in Singapore, the "FINNABLE2020" project in Finland, the "Super High School" program in Japan, and the "MINT Friendly School" in Germany.

There are also schools in China that carry out research and practice on future-oriented education. The Luohu Future School in Shenzhen, China has made innovations in the classroom concept and teaching mode, and has also created physical samples - Luohu Future School and Luohu Future Education Research Institute. This school integrates intelligent IoT, big data, hologram and other high-tech means and intelligent elements into the school in a harmonious way, which is convenient for the school to carry out science, exploration, small research and other courses, and cultivate students' practice and exploration spirit.

In the process of carrying out the actual online teaching reform, because the actual teaching conditions and teaching environment of each school are not exactly the same, how to carry out the online teaching reform in a specific school is the content that needs special attention.

A number of researchers have studied one aspect of online teaching reform using a university as an example. For example, Shen (2022) took Shanghai Jiao Tong University as an example, analyzed the selection of online teaching methods and platforms during the period of "continuous school suspension", introduced the quality control and feedback of online teaching in the school, and reflected on the reform of online teaching after the epidemic, and discussed how to keep the technological advantages of online teaching and how to use information technology to change teaching methods Innovation and teaching model [16]. Another example is Li (2020), who introduced that Ya'an Vocational and Technical College adopts "three stages" to promote the construction of online courses. "Dual-platform" promotes the implementation of cloud-based blended teaching; The "2+1" supervision mechanism is established, and the three-stage supervision mode of "inspection before class, monitoring during class and diagnosis after class" is adopted to ensure the

teaching quality. Relying on the platform data diagnosis and improve the online teaching implementation and management mode, explore and practice the real-time and efficient online teaching mode [17].

Liaoning Ecological Engineering Vocational College summarized the problems and shortcomings encountered in the implementation of online teaching under the support of AI technology, and analyzed the reasons for the problems. Zhou puts forward some countermeasures for the development of online teaching in higher vocational colleges from the aspects of strengthening curriculum ideology and politics, forming "online + offline" mixed teaching mode, doing a good job in flipped classroom curriculum design, demonstrating typical cases and transforming teaching mode (Zhou, 2024) [18].

Some researchers have taken an in-depth look at how online education reform works in a particular school. They summarized the core elements of "Internet + Education" based on massive online teaching in view of the COVID on the basis of the analysis of relevant research literature. The dilemma and causes of "Internet+ education" in view of COVID are analyzed. With this as the premise, through the method of case study, this paper studies how to carry out online teaching reform under the premise of the existence of Covid-19 and adapt to the actual situation of K Middle School (Du, 2021) [4].

### 2.4. Theoretical Support for Educational Reforms

SAMR Model. This is a model of the impact of technology on teaching and learning. It shows four phases: substitution, enhancement, modification, and redefinition.

In the substitution stage, for example, the appearance of PPT replaced the original blackboard writing in class, and the presentation of teaching content was transferred from the blackboard to the PPT. At the beginning, there was no functional change.

Enhancement stage: for example, the further application of PPT, people began to insert pictures, links, music, video and other materials in PPT, teaching content presentation more diversified.

Revision stage: With the development of technology, curriculum design and learning outcomes have actually changed, rather than simply replacing the original form or further strengthening it. For example, the emergence of online teaching platforms makes online learning become a reality.

Redefine the stage: This level requires the teacher to think about learning activities that were previously inconceivable without the use of technology. For example, students can realize the synchronization of video and voice through the online teaching platform, and students can communicate and learn with each other even though they are far away from each other.

According to this model, we should pay more attention to the use of learning technologies in the teaching process, such as the comprehensive use of online teaching platform, online learning game website (<https://kahoot.it/>) and PPT in the classroom.

Research on Digital Teaching Quality of Chinese Higher Vocational Education: A Post-Pandemic Perspective, In fact, it is a study on the impact of technology on teaching and learning to promote teaching reform and improve teaching quality. Therefore, The author thinks SAMR model can guide our understanding of digital education.

The SAMR model, which stands for Replacement,

Enhancement, Modification and redefinition, provides a useful framework for the integration of analytical techniques with teaching and learning. In the research field of digital teaching quality in China's higher vocational education, this model provides a theoretical model for different degrees of technology integration and its potential to improve educational outcomes.

At the substitution level, technology is mainly used to replace traditional teaching methods. For example, digital platforms can be used to deliver online lectures or assignments that mimic traditional teaching methods. This form of technology integration is relatively simple, but does not necessarily significantly improve the quality of teaching.

Enhancement involves the use of technology to enhance existing teaching practices. In higher vocational education in China, that could mean complementing classroom instruction with digital tools, such as interactive whiteboards or online simulations. These tools can help students better understand complex concepts or processes by providing additional visual AIDS or interactive experiences.

Revision represents a deeper integration, the use of technology to fundamentally change teaching and learning. In this sense, digital tools are not only complementary to traditional methods, but also the creation of new approaches to education. For example, higher vocational education can adopt project-based learning or collaborative online environments that foster critical thinking and problem solving skills.

Finally, at the level of redefinition, technology is being used to create entirely new teaching models. This requires rethinking the entire educational process from the ground up, harnessing the unique capabilities of digital tools to create innovative and effective learning experiences. In China's higher vocational education, there is a phenomenon of neural synchronization among team members in the process of network learning, which can be used to promote team collaborative problem solving and build a collaborative learning model for college students.

The application of SAMR model to the study of digital teaching quality in China's higher vocational education can further understand how to use technology to promote teaching reform and improve teaching quality. This analysis can help educators identify areas for further integration of technology that can lead to greater improvements in student learning outcomes. In addition, it can serve as a guiding framework for developing new digital teaching strategies and practices to adapt to the changing needs of the post-pandemic era.

**TPACK Model.** In the author's opinion, TPACK is a model of how teaching content, pedagogy and technology are combined to carry out teaching. The framework further emphasizes the types of knowledge at the intersection of three main forms: teaching content knowledge (PCK), technology content knowledge (TCK), technology teaching knowledge (TPK) and technology teaching content knowledge (TPACK). According to this model, our teaching is not only the teaching content, but also the combination of teaching methods and the latest teaching technology. In the actual teaching, we can apply this model to construct our teaching framework. We need to choose the appropriate teaching content and choose the appropriate teaching method according to the teaching content. In the process of teaching, teachers need to use the latest teaching technology, such as online teaching platforms, applications, and so on to carry out teaching.

In essence, the TPACK model is a framework that Outlines

how teachers can effectively integrate technology into their teaching practices to improve learning outcomes. TPACK model can be understood as a model of how to combine teaching content with technology after the influence of digital technology on teaching. As digital technologies continue to reshape the education landscape, it is becoming increasingly important for teachers to understand how to leverage these tools to improve the quality of instruction. In the context of higher vocational education in China, which emphasizes practical skills and job preparation, the integration of technology has become more important.

The combination of teaching content and technology is an important aspect that affects the digital teaching quality of China's higher vocational education. Therefore, the author believes that TPACK model can be used as a theoretical model to guide the research of digital teaching quality in China's higher vocational education. Through interviews, observations, and surveys, we collect rich data on teachers' experiences, challenges, and strategies in technology integration. Through data analysis, we can gain an in-depth understanding of how TPACK guides teachers' professional development, and finally find the key factors to improve the quality of digital teaching in China's higher vocational education.

### 3. Gaps in Literature

Through the analysis of articles related to school teaching reform in the context of COVID-19 in the past two years, it is found that schools in many countries have carried out online teaching reform in response to the COVID-19 pandemic, and have achieved remarkable results. However, there are some inevitable problems in online teaching reform, such as the decrease of student satisfaction. Many researchers have carried out research and practice on the problems in online teaching reform and predicted some possible Learning methods in response to the ongoing COVID-19 epidemic in the future, such as 45° Learning and Contextual Based E-learning (CBE). With the gradual remission of the epidemic, society has entered a post-epidemic era. In the post-epidemic era, how to improve China's higher vocational education in the post-epidemic era is a problem that needs to be solved urgently.

The main shortcoming of this paper is that all analyses are obtained by analyzing the results of previous research literature, which may be different from the actual information obtained through surveys and interviews. After comprehensive analysis of the existing literature content, it is found that there are some research gaps, which include:

**Results not being consistent:** Many people generally think that the effect of teaching online is worse than face-to-face, but in fact, a survey has been conducted and found that many students are quite satisfied with online teaching (Han.DOI:10.16871/j.cnki.kjwh.2022.14.017) [7]. Hu conducted online teaching data of 57 colleges and universities in China and Fujian and Shandong provinces. According to the data of the course platform, 90.2% of the students are satisfied with the online teaching. However, despite the initial concerns and adjustments that had to be made, it appears that online teaching has not only survived but thrived during this pandemic. The data collected by Hu indicates that a majority of students are content with this new mode of learning. This satisfaction might stem from the flexibility and accessibility that online teaching offers. Students can now learn at their own pace, from anywhere, and without the constraints of a

traditional classroom[7]. Sims (2021) investigated and studied the problems existing in online teaching reform from the perspective of teachers. Survey results showed that many teachers felt that student engagement and performance declined and student satisfaction was low during the pandemic, while curriculum quality remained the same. Moreover, Sims' study highlights the need for teachers to reevaluate their teaching methods in the online environment. Although teachers may have initially felt that student engagement and satisfaction were low, the data suggests that with the right approach, online teaching can be as effective as traditional classroom teaching. The key lies in finding a balance between traditional teaching methods and the unique opportunities presented by online learning. This might involve the use of interactive tools, engaging content, and regular feedback mechanisms to ensure student engagement and satisfaction[7].

**Population Gap:** There are more studies on online teaching in primary and secondary schools in China in view of the epidemic (Zhou.2020) Although there have been some studies on online teaching in higher vocational schools, the number of such studies is still relatively small compared to that of primary and secondary schools. But few studies on higher vocational schools, and there are no paper which studies online teaching of the author's school [2].

Given the dearth of research on digital education in higher vocational schools, it is imperative to conduct more studies in this area. Such studies can provide valuable insights into the effective implementation of digital education in higher vocational schools, identify the challenges and opportunities associated with it, and suggest possible solutions to address these issues.

In particular, it would be beneficial to conduct a study on the online teaching practices at the author's school. The findings of such a study can inform the development of more effective digital education practices at the author's school and potentially contribute to the body of knowledge on digital education in higher vocational schools in China. It can also serve as a valuable reference for other educational institutions seeking to improve their digital education practices in similar contexts.

**Theoretical Gap:** No studies have been found linking Edgar Dale's the Cone of Experience to online learning in view of COVID-19.

However, given the current pandemic situation and the widespread adoption of online learning, it is pertinent to explore the relevance of Edgar Dale's Cone of Experience in this context. Dale's theory emphasizes the importance of hands-on, experiential learning, suggesting that people learn best through direct experience, followed by observation of others, reading, and listening.

In the realm of online learning, the Cone of Experience provides a valuable framework for enhancing educational effectiveness. While traditional classrooms offer ample opportunities for hands-on experiences and observation, online learning can sometimes limit these opportunities. Therefore, it becomes crucial for educators to incorporate innovative methods that make up for these limitations and create meaningful learning experiences for students.

For instance, educators can leverage interactive tools and simulations to replicate hands-on experiences online. These tools allow students to engage directly with content, make observations, and draw conclusions based on their experiences. Additionally, online discussions and

collaborations can serve as virtual observation platforms, enabling students to learn from each other's perspectives and experiences.

Moreover, Dale's Cone of Experience underscores the importance of active learning, where students are encouraged to participate actively in the learning process. In online settings, this can be achieved through active learning strategies such as problem-solving activities, case studies, and project-based learning. These strategies promote critical thinking, analysis, and synthesis of information, enabling students to apply their knowledge in real-world contexts.

In conclusion, while no direct studies have linked Edgar Dale's Cone of Experience to online learning during COVID-19, the theory's principles remain relevant and applicable in this context. By incorporating hands-on experiences, virtual observations, and active learning strategies, educators can create engaging and effective online learning environments that foster deep understanding and long-lasting learning.

## 4. Conclusion

Digital teaching is a teaching activity in which teachers and learners follow modern education theories and laws in the digital teaching environment, use digital teaching resources, and use digital teaching mode to train composite talents with innovative consciousness and innovative ability to meet the needs of the new century. In the context of the COVID-19 pandemic, schools around the world have implemented online teaching reforms based on digital technology, and remarkable results have been achieved.

In the early stage of the epidemic, the research on digital teaching began more from the empirical research at the implementation level. The epidemic has lasted for more than three years, and the research of network teaching has gradually shifted to focus on the digital teaching model. However, in the study of digital education, whether the quality of digital education is good or not, different researchers have different opinions. There are few studies on digital teaching in China's higher vocational education, and in light of COVID-19, no studies have found links between Edgar Dyer's Cone of Experience and online learning.

Therefore, the author believes that the future research focus should be concentrated in the following three aspects. Firstly, the real data effect of digital education is investigated by means of questionnaire survey and interview. Second, how to implement the existing research results of digital education reform to specific schools; Thirdly, the author introduces Edgar Dale's "The Cone of Experience in Digital Education" to study the online teaching model.

## References

- [1] Smith, Erika K & Kaya, Ece.(2021). Online University Teaching at the Time of COVID-19 (2020): An Australian Perspective.IAFOR Journal of Education.v9 n2. p183-200 2021.18 pp. <http://dx.doi.org/10.1108/ITSE-07-2020-0118>.
- [2] Zhou Longjun & Li Fangmei.(2020).A Review of the Largest Online Teaching in China for Elementary and Middle School Students during the COVID-19 Pandemic.Best Evidence in Chinese Education.v5 n1 p549-567 2020. 19 pp.
- [3] Howarth & Mike. (2021). 45° Learning: A Guide to Organising Teaching Online in the COVID Pandemic, Including Peer Observation Revision.Work Based Learning e-Journal International.v10 n1 p86-138 2021. (EJ1305227). Database: ERIC.

- [4] Du Peng.,(2021).A Case Study of ""Internet +Education" "in K Middle School under COVID-19.China National Knowledge Network master thesis database.P1-86, DOI:10.27459/ d.cnki.gnfc. 2021.001055.
- [5] Paliwal, Manisha, Singh & Archana. (2021).Teacher Readiness for Online Teaching-Learning during COVID-19 Outbreak: A Study of Indian Institutions of Higher Education. *Interactive Technology and Smart Education*.v18 n3 p403-421 2021. 19 pp.
- [6] Al-Balas M, Al-Balas HI, Jaber HM, Obeidat K, Al-Balas H, Aborajoo EA & Al-Taher R, (2020) .Al-Balas B.(2020). Distance learning in clinical medical education amid COVID-19 pandemic in Jordan: current situation, challenges, and perspectives. *BMC medical education [BMC Med Educ]*.ISSN: 1472-6920, 2020 Oct 02.Vol. 20 (1). pp. 341.
- [7] Han JinHong.(2022).The reform of teaching mode in Chinese universities under the background of COVID-19.Science and Education Literature. 2022,(14). DOI:10.16871/ j.cnki. kjwh. 2022. 14.017.
- [8] Sheelavant, Santosh.(2020).Google Classroom - An Effective Tool for Online Teaching and Learning in this COVID era. *Indian Journal of Forensic Medicine & Toxicology*. Oct-Dec2020, Vol. 14 Issue 4. p494-500. 7p.
- [9] Sharda, Preeti, Bajpai, & Maneesh Kumar.(2021). Online Learning and Teaching using Google Classroom during the COVID-19 Pandemic. *DESIDOC Journal of Library & Information Technology*. Sep2021. Vol. 41 Issue 5.p352-357. 6p..
- [10] Aduba. Doris Emetarom. Mayowa-Adebara & Okeoghene. (2022). Online Platforms Used for Teaching and Learning during the COVID-19 Era: The Case of LIS Students in Delta State University, Abraka. *International Information & Library Review*. Jan2022. Vol. 54 Issue 1. p17-31. 15p.
- [11] Sims, Shantia Kerr, Baker & David M.(2021).Faculty Perceptions of Teaching Online during the COVID-19 University Transition of Courses to an Online Format. *Journal of Teaching and Learning with Technology*. v10 p337-353 Apr 2021. 17 pp.<https://eric.ed.gov/?id=EJ1294734>.
- [12] Gormaz-Lobos, Diego, Galarce-Miranda, Claudia, Kersten, Steffen, Hortsch & Hanno. (2022). Attitudes and Perceptions of Teaching Staff About the Online Learning During the COVID19 Pandemic: A Case Study of Engineering Education. *International Journal of Engineering Pedagogy*.2022. Vol. 12 Issue 3.p38-49. 12p.
- [13] Dost S, Hossain A, Shehab M, Abdelwahed A & Al-Nusair L.(2020).Perceptions of medical students towards online teaching during the COVID-19 pandemic: a national cross-sectional survey of 2721 UK medical students. *BMJ open [BMJ Open]*. ISSN: 2044-6055, 2020 Nov 05, Vol. 10 (11). pp. e042378, Publisher: BMJ Publishing Group Ltd, PMID: 33154063, Database: MEDLINE Complete.
- [14] Ballena, Constantino Terrenal, Feranil & Bernard S. (2021). Remote learning amid a global crisis: a literature review.*Journal of Institutional Research South East Asia*. Nov/Dec2021. Vol. 19 Issue 2.p21-42. 22p. Database: Education Research Complete.
- [15] Renaldi, Reno,Abidin, Aldiga Rienarti, Irawan, Yuda, Hamid, Abdurrahman, Wulansari & Rizky Ema.(2022).Contextual Based E-learning (CBE): A New Model for Online Teaching in Public Health Department for Learning During the Covid-19 Pandemic. *International Journal of Interactive Mobile Technologies*. 2022. Vol. 16 Issue 11. p39-50. 12p.
- [16] Shen Hongxing, Hao Dakui, Jiang Jingjing (2020), Online Teaching Practice in the period of "No classes suspended" and Reflection on online teaching reform after the epidemic -- A case study of Shanghai Jiao Tong University, *Modern Educational Technology*.20,30(05), [DOI] 10.3969/j.issn.1009-8097.2020.05.002.
- [17] Li Xiao-Mei, Feng Liang-Liang & Xiong Yi-Hong.2020) Implementation and management practice of cloud-based blended teaching in higher vocational colleges during the epidemic -- A case study of Ya 'an Vocational and Technical College, *Vocational Education (next issue)*. 2020,19(04)DOI: 10.13565 / j.carol carroll nki issn2095-4530.2020.04.007.
- [18] ZHOU Xingben; WANG Yao;ZHAO Jingfen(2024);The Countermeasures of Online Teaching in Higher Vocational Colleges Supported by AI Technology,Shipbuilding Vocational Education. 2024, (01).