Learning Beyond Boundaries: A Comparative Analysis of Diverse Learning Resources in Higher Education in the United States and China

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ABSTRACT: The digital transformation of higher education has unleashed unprecedented possibilities, characterized notably by diverse learning resources that transcend geographical and temporal boundaries. This study conducts a comparative analysis of the development strategies, experiences, and impacts of diverse learning resources in the higher education systems of the United States and China. The aim is to gain insights into how these two educational powerhouses navigate the complexities of digital transformation to create enriched learning environments.

In an interconnected world, the paradigm of "beyond boundaries of learning" has emerged, centered on the integration of technology with education. This comparative analysis elucidates how higher education institutions in the United States and China harness technology to transcend traditional educational limits, offering students a wealth of digital tools, platforms, and resources.

The study addresses key research questions concerning the nature and impact of diverse learning resources in the contexts of higher education in the United States and China. It reveals the factors shaping the design, implementation, and effectiveness of diverse learning resources. By contrasting the different approaches in the United States and China, this study identifies common trends, differences, and insights into the influence of digitalization on the learning experience.

The findings of this study contribute to broader discussions on the digital transformation of higher education, offering valuable insights into the effectiveness of diverse learning resources for educators, policymakers, and stakeholders. The analysis reveals how these resources impact student engagement and learning outcomes. Furthermore, the research provides a deeper understanding of how institutional, cultural, and policy factors influence the adoption and impact of technology-mediated learning in higher education in both the United States and China.

I. RESEARCH BACKGROUND:

As information technology rapidly advances, higher education is undergoing an unprecedented transformation. Digital transformation is not only altering traditional teaching and learning models but also giving rise to entirely new educational approaches and learning resources [1]. One prominent feature of this transformation is the diversity of learning resources, which can transcend geographical and temporal limitations, creating more personalized and flexible learning experiences for learners [2]. In this article, the United States and China, as two major leaders in the global higher education arena, each present unique experiences and challenges in the realm of digital transformation.

In the field of digital transformation, higher education in the United States has been at the forefront [3]. Over the years, American universities and research institutions have actively promoted the integration of technology and education, continually innovating teaching methods, and expanding learning resources. The widespread use of diverse learning resources such as open online courses, digital libraries, interactive learning platforms, and more has enabled students to choose learning paths according to their needs, sparking their interest in learning, and enhancing learning effectiveness [4].

Simultaneously, higher education in China is also rapidly advancing digital transformation. With the proliferation of technology and ongoing educational reforms, Chinese universities have begun exploring the integration of information technology into teaching and actively promoting digital teaching

practices, including online courses and virtual laboratories [5]. However, China still faces challenges in the development of diverse learning resources, including insufficient resource development and teacher training needs.

In the face of educational transformations brought about by the digital age, both American and Chinese higher education have achieved certain accomplishments in the development and application of diverse learning resources, but they also encounter different constraints and issues. Therefore, in-depth comparative analysis is necessary to better understand the practices, experiences, and outcomes in both countries, drawing valuable insights to propel the digital transformation of higher education to new heights. This study aims to explore this topic, providing valuable insights and recommendations for the development of higher education in the digital era.

II. RESEARCH PURPOSE, RESEARCH QUESTIONS, AND RESEARCH METHODOLOGY

2.1. Primary Research Purpose:

The primary research purpose of this paper is to explore the development, application, and impact of diverse learning resources in the digital transformation of higher education in the United States and China. It aims to conduct a comparative analysis of the policies, experiences, and challenges in these two countries to provide valuable insights and recommendations for optimizing the use of digital education.

2.2. Primary Research Questions:

Based on the research purpose outlined above, the primary research questions for this study include:

What are the trends and significance of digital transformation in higher education in the United States and China?

What is the status of the development of diverse learning resources in higher education in the United States, and what impact and outcomes do these resources have on education?

What is the current situation and challenges in the development of diverse learning resources in the digital transformation of higher education in China?

How do the policies and support measures for digital transformation in higher education differ or align between the United States and China, and what influence do these policies have on the development of diverse learning resources?

How can the experiences from both the United States and China be leveraged to optimize the application of diverse learning resources in Chinese higher education, promoting sustained digital transformation and enhancing educational quality?

2.3. Research Methodology:

Research methodology plays a crucial role in the design and execution of a study, ensuring the credibility and effectiveness of the research [6]. To thoroughly investigate the application and impact of digital transformation in higher education and the development of diverse learning resources in the United States and China, this study employs a mixed research method, combining literature analysis method and case analysis.

The literature analysis method serves as one of the primary methods in this study, used to review and analyze relevant literature concerning digital transformation in higher education and diverse learning resources. This process aids in establishing the theoretical framework for the research, understanding existing research outcomes and realities, and determining the theoretical foundation of the study. The literature review also helps in identifying various resources and provides background information for case analysis.

Case analysis is another significant method in this research, aiming to gain in-depth insights into the practical application and impact of diverse learning resources in the digital transformation of higher education in the United States and China. By selecting representative university cases, we can thoroughly examine their strategies for digital transformation, policy support, resource development, teacher training, and student engagement. This in-depth case study approach contributes rich empirical data and validates theoretical viewpoints presented in the literature review.

The combination of these two methods allows for a multidimensional analysis of the issues related to digital transformation in higher education and diverse learning resources. The literature analysis method provides the research with a theoretical framework and background knowledge, while case analysis offers profound insights into real-world contexts. By integrating qualitative and quantitative data, we will be able to comprehensively address the research questions and provide robust recommendations for policies and practices in the digital transformation of higher education. This mixed research approach ensures the scientific rigor and practical applicability of this study's results.

III. LITERATURE REVIEW

3.1. Trends and Significance of Digital Transformation in Higher Education:

Currently, the field of higher education is undergoing a wave of digital transformation, reshaping education fundamentally [7]. This trend is not only impactful in the present but holds profound implications for the future of education. Digital transformation injects new vitality into higher education, creating unprecedented opportunities and possibilities for learning and teaching [8]. This transformation is redefining educational models, expanding learning resources, and optimizing management methods, making it a focal point for schools and educational institutions worldwide [9].

Within this transformation, diverse learning resources emerge as a vital component of digital transformation. Scholars and educators in the field of education are increasingly focusing on diverse learning resources, recognizing them as a key driver of educational reform [10]. These resources, with their diversity and flexibility, aim to meet the evolving needs and learning styles of students. From e-textbooks and online courses to instructional videos and virtual experiments, diverse learning resources expand the boundaries of learning, stimulate curiosity, and enhance motivation and effectiveness in students' learning [11]. In this article, the concept of diverse learning resources and their importance in education becomes even more significant.

Therefore, the digital transformation in higher education and the introduction of diverse learning resources have become powerful engines driving educational progress [12]. This transformation is not only a pressing need of the present but also a revolutionary attempt to shape future educational models. Through continuous exploration, innovation, and optimization, higher education can better adapt to the challenges and opportunities of the digital age, achieving greater development and progress in education [13].

3.2. Concept and Importance of Diverse Learning Resources:

The introduction of diverse learning resources underscores the importance of imparting diversity and flexibility to educational content [14]. This concept aims to cater to the needs and varied learning styles of different learners. These resources encompass a wide range of forms, including e-textbooks, online courses, instructional videos, simulated experiments, and more, providing students with a broader and more diverse array of learning choices and pathways [15].

E-textbooks offer digital educational materials that bring flexibility and convenience to students [16]. Online courses enable students to select courses globally that suit their needs, regardless of time and location. Instructional videos present knowledge to students through visual and auditory means, enhancing the vividness and interactivity of teaching [17]. Simulated experiments provide students with opportunities to experiment and explore in virtual environments, allowing them to experience experiences similar to traditional experiments [18].

This diversity of learning resources has a positive impact on student's learning experiences and outcomes. Students can choose the learning resources that best suit their interests, learning styles, and schedules, enabling them to better grasp knowledge and skills. This personalized learning approach ignites students' interest in learning and enhances their motivation, leading to improved academic achievements and skill development.

Therefore, the diversity and flexibility of diverse learning resources bring new possibilities to education. Through the introduction of these resources, educators can better meet the needs of students, improve teaching effectiveness, and cultivate students' comprehensive abilities, preparing them better for their future [19].

3.3. Current State and Challenges of Diverse Learning Resources in the Digital Transformation of Higher Education in China:

However, in China, despite the initial steps taken in the digital transformation of higher education, the development of diverse learning resources still faces a series of challenges [20]. These challenges encompass various aspects, including resource quality, teacher training, technical support, among others, and require comprehensive solutions during the digital transformation process [21]. These challenges include but are not limited to:

Resource Quality Issues: The quality of diverse learning resources is crucial for enhancing learning effectiveness. However, in the process of introducing a large volume of digital learning resources, there may be instability in the quality and reliability of these resources [22]. Ensuring the accuracy, authority, and alignment of resource content with course objectives presents a significant challenge.

Teacher Training and Education: Teachers play a pivotal role in the digital transformation, but many educators may lack sufficient training and skills in digital education [23]. Training teachers to adapt to new teaching methods and tools and effectively incorporate diverse learning resources remains an urgent issue.

Technical Support and Infrastructure: Effective utilization of diverse learning resources requires stable technical support and advanced

infrastructure [24]. However, in some regions and schools, issues such as unstable internet connectivity and insufficient devices may hinder students from fully utilizing diverse resources for learning [25].

Educational System and Cultural Factors: China's educational system and cultural factors can also influence the pace of digital transformation. Traditional educational models and teaching methods may conflict with the introduction of diverse learning resources. Balancing the continuity of traditional education with emerging resources in the digital transformation process requires careful consideration [26].

Digital Divide: During digital transformation, there exists a digital divide where some students may not fully benefit from digital education due to reasons such as family backgrounds or geographic locations. Measures need to be taken to address this inequality and promote digital equity [27].

Therefore, in the process of promoting the digital transformation of higher education in China, it is essential to seriously consider and actively address these challenges. By improving resource quality, enhancing teacher training, perfecting technical support, advancing educational reforms, and promoting digital equity, China can gradually overcome these challenges, facilitating the better application and development of diverse learning resources in education.

In summary, the concept and practice of diverse learning resources in the digital transformation of higher education hold significant importance. By drawing lessons from countries like the United States, China can better develop and utilize diverse learning resources in the digital transformation, enhancing education quality and students' comprehensive skills. However, it is equally crucial to address the challenges and progressively refine the digital education system to achieve greater development and progress in higher education.

IV. COMPARISON OF CHARACTERISTICS AND DEVELOPMENT OF DIVERSE LEARNING RESOURCES IN THE UNITED STATES AND CHINA

Diverse learning resources emphasize the diversity and flexibility of educational content to meet the needs and learning styles of different learners. These resources can include but are not limited to online courses, Open Educational Resources (OER), virtual experiments, multimedia materials, and more. Their development aims at personalized learning, self-directed learning, and interactivity, with the goal of creating a richer and more flexible learning environment.

Diverse Learning Resources in U.S. Higher Education: In the United States, diverse learning resources have witnessed widespread development. Online courses, especially Massive Open Online Courses (MOOCs), offer students a wide range of course options beyond geographical constraints [28]. The promotion of Open Educational Resources (OER) has facilitated the digitization and sharing of textbooks, providing students with free or low-cost textbook options. Innovative resources like multimedia materials and virtual experiments offer more diversified ways of learning [29].

Diverse Learning Resources in Chinese Higher Education: In China, the development of diverse learning resources is still in its infancy. While digital transformation is gaining momentum, issues such as unstable resource quality, inadequate teacher training, and limited technical support persist [30]. Some universities have made progress in promoting online courses, open educational resources, and multimedia materials. However, overall, compared to the United States, China's diverse learning resources still require further refinement.

Through a comparative analysis of the development of diverse learning resources in higher education in the United States and China, several key points emerge:

In terms of resource development strategies and investments, the United States has mature strategic planning and substantial investments, particularly in online courses and open educational resources. In contrast, China's digital transformation is just beginning and requires stronger strategic planning and resource investments.

The influence of educational systems and culture on diverse learning resources differs. The U.S. education system is more flexible, conducive to the introduction of innovative resources, while China's education system is relatively centralized, requiring a balance between traditional and innovative resource integration [31].

Regarding technical support and infrastructure, the United States has advanced information technology infrastructure, while China is experiencing rapid growth in digital technology but still faces some infrastructure challenges [32].

Teacher training and preparedness are crucial factors. U.S. teachers receive more training in digital education, while China needs to further enhance teachers' digital transformation capabilities.

Common challenges include resource quality control, learning outcome assessment, and the digital divide. However, China can draw valuable insights

and recommendations from the U.S. experience in resource development, educational innovation, and online education platforms, among other aspects [33].

These comparative analyses help provide a comprehensive understanding of the similarities and differences in the development of diverse learning resources in both countries. They also offer tailored guidance for China's digital transformation in higher education.

V. COMPARISON OF PRACTICAL APPLICATIONS OF LEARNING RESOURCES IN THE UNITED STATES AND CHINA

5.1. Comparison of Contents:

Massive Open Online Courses (MOOCs):

United States: In the United States, MOOCs have become a highlight of digital transformation. Prominent online education platforms like Coursera, edX, and Udacity offer free or low-cost courses from top universities worldwide [34]. This open learning approach not only eliminates geographical constraints but also provides a variety of courses in different fields, allowing students to learn based on their personal interests.

China: Some Chinese universities are actively developing MOOCs, but their scale and impact are relatively small. Chinese MOOCs are typically offered by domestic universities, so they are not as well-known globally as those from the United States [35]. However, the Chinese government and universities are striving to improve the quality and accessibility of MOOCs to promote digital transformation.

Virtual Laboratories:

United States: Virtual laboratories are widely used in higher education in the United States. These virtual labs allow students to conduct experiments in a digital environment, addressing issues of time, resources, and safety associated with traditional labs [36]. This is particularly crucial for experimental courses in fields like science and engineering.

China: Virtual laboratories are also applied in higher education in China, but there is room for increased adoption and improved quality [37]. Some Chinese universities are actively developing more virtual lab resources to meet students' experimental needs.

Personalized Learning Systems:

United States: U.S. higher education extensively employs personalized learning systems. These systems provide customized teaching content and pathways based on students' learning performance and needs [38]. This personalized learning experience helps improve students' understanding and absorption of knowledge.

China: Chinese universities are also promoting personalized learning systems, but their adoption is lower. This might be related to the large-scale nature of education in China [39]. However, universities are making efforts to enhance the quality and adoption of personalized learning as part of their digital transformation.

Open Educational Resources (OER):

United States: U.S. universities actively encourage teachers to share educational resources, fostering the development of Open Educational Resources (OER) [40]. These resources include textbooks, course outlines, instructional videos, and more, helping to reduce the cost of learning.

China: Chinese universities are also beginning to focus on the development of OER but are somewhat behind. The Chinese government encourages teachers to develop and share educational resources to improve the accessibility and quality of education [41].

Interdisciplinary Courses and Intercollegiate Collaboration:

United States: Digital transformation has prompted U.S. universities to offer interdisciplinary courses and provide opportunities for intercollegiate collaboration through online platforms [42]. This enriches students' learning experiences and fosters interdisciplinary thinking.

China: Chinese universities are also promoting interdisciplinary courses and intercollegiate collaboration, but progress is slower compared to the United States. This is partly due to China's education system and cultural traditions, which are gradually adjusting to accommodate digital transformation [43].

In summary, the United States has made significant achievements in the practical application of diverse learning resources in digital transformation and has played a leading role globally. China has also made progress in this regard but still faces some challenges. Comparing these two countries' cases helps us better understand the experiences and lessons learned in higher education digital transformation, as well as how to enhance the quality and effectiveness of digital education.

5.2. Comparative Analysis:

Student Experience: In both the United States and China, diverse learning resources provide students with personalized and self-directed learning experiences. Students can learn at their chosen time

and place, enhancing the flexibility of learning.

Teaching Quality: Both the United States and China have made significant strides in improving teaching quality. Online platforms and multimedia resources enrich teaching content and enhance classroom interaction and teaching effectiveness.

Real-World Application: The United States' online course platforms are relatively mature and offer more resources for student choice. China's online education platforms are also rapidly developing but still need to strengthen the quality and quantity of resources.

By comparing practical application cases in both countries, it is evident that diverse learning resources play a crucial role in enhancing student learning experiences and teaching quality, providing strong support for the success of digital transformation.

VI. SUSTAINED DEVELOPMENT AND FUTURE PROSPECTS

Trends and Future Development Directions in the Digital Transformation of Higher Education in the United States: The digital transformation of higher education in the United States will continue to progress, with trends including more personalized learning experiences, enhanced online interaction, and deep integration of virtual experiments. Adaptive learning systems and artificial intelligence will further provide personalized learning pathways and teaching content. Virtual and augmented reality technologies are expected to create more immersive learning environments for students. Additionally, with the development of big data analytics and assessment technologies, monitoring and improvement of educational quality will become more finely tuned.

Prospects and Challenges in the Digital Transformation of Higher Education in China: The digital transformation of higher education in China holds tremendous potential and prospects. With the widespread adoption of digital technologies and strengthened policy support, the development and application of diverse learning resources will have a broader scope. However, China faces challenges such as uneven resource distribution, teacher training, and technology infrastructure. Addressing these issues and optimizing digital transformation strategies will contribute to greater achievements in Chinese higher education.

Insights Based on Comparative Analysis: How to Optimize the Application of Diverse Learning Resources in China:

Integrate Resources and Optimize Allocation: Drawing from the experience of the United States, China can establish collaborative networks across universities to facilitate the sharing and optimal allocation of educational resources. The government and universities should collaborate to promote the integration and co-construction of high-quality resources, thereby enhancing the quality and quantity of diverse learning resources.

Strengthen Teacher Training: Teachers play a crucial role in digital transformation. China can enhance teacher training to improve their abilities in digital education technology and resource utilization. Training programs should encompass the design and use of diverse learning resources.

Develop Clear Policy Guidance: The government can create clearer policy guidance to encourage universities to develop and apply diverse learning resources. Policies should focus on addressing issues like uneven resource distribution, ensuring that every student benefits from the advantages of digital education.

Drive Industry Innovation: China can promote innovation in the digital education industry and encourage businesses to participate in the development of diverse learning resources. The government can provide support to propel digital education companies to offer more innovative solutions.

Enhance International Collaboration: Taking inspiration from international experiences, China can actively collaborate with universities and educational institutions from other countries to jointly develop and share diverse learning resources. International collaboration helps enrich resource content and improve teaching quality.

By continuously optimizing the application of diverse learning resources, Chinese higher education can achieve a more comprehensive digital transformation, providing students with richer learning experiences and higher education quality.

VII. CONCLUSION AND RECOMMENDATIONS

Through a comparative analysis of diverse learning resources in the digital transformation of higher education in the United States and China, this study has summarized a series of key findings and put forward recommendations and insights for the digital transformation of higher education in both countries. The aim is to facilitate educational reform and improve educational quality, providing valuable reference points.

Key Findings: Digital Transformation Impact: Digital transformation is causing profound changes in higher education worldwide. Diverse learning resources, as a core component of digital

transformation, offer students a wealth of learning choices and pathways, enhancing teaching quality and learning experiences.

US Achievements: The United States has made significant achievements in the digital transformation of higher education. The widespread application of diverse learning resources has promoted teaching innovation and improved learning outcomes.

China's Progress and Challenges: China has made initial progress in the digital transformation of higher education but faces challenges in resource integration, teacher training, and policy implementation. Government and universities need to work together to optimize digital transformation strategies.

Recommendations and Insights:

Policy Support and Resource Integration: Government Support: Governments should enact policies encouraging interdisciplinary learning, elective courses, and complementary majors to provide students with more opportunities to explore different fields. Additionally, governments can establish funds to subsidize the development and sharing of diverse learning resources.

Resource Integration: Universities can establish resource-sharing platforms to facilitate the sharing of high-quality teaching materials, course designs, and teaching methods, thereby enhancing overall educational quality.

Teacher Training and Support: Teacher Training: Universities can organize teacher training programs to enhance teachers' proficiency in digital education technology, helping them better utilize diverse learning resources.

Teacher Team Collaboration: Encourage teacher team collaboration to jointly design and develop interdisciplinary courses, providing students with richer learning experiences.

Innovation and Industry Development: Digital Education Platforms: Universities can collaborate with or draw inspiration from digital education platforms to provide students with online courses, virtual laboratories, and other resources, promoting independent learning and exploration.

Industry Collaboration: Encourage universities to collaborate with technology companies to jointly develop innovative learning tools and applications to meet evolving learning needs.

International Collaboration and Experience Sharing: International Exchange Programs: Universities can actively participate in international exchange programs, giving students the opportunity to learn and interact with peers from other countries, broadening their horizons.

Experience Sharing: Learn from successful practices in diverse learning resources from other countries, studying their experiences and lessons to better promote the development of higher education domestically.

Through comprehensive comparative analysis, we recognize the importance and potential of digital transformation in higher education and also acknowledge the challenges in its practical implementation. By drawing on the experiences and lessons of other countries, valuable guidance and insights can be provided for the ongoing development of digital transformation in Chinese higher education.

REFERENCES

[1]. DeKeseredy, W.S. (2021) 'Bringing feminist sociological analyses of patriarchy back to the forefront of the study of woman abuse', Violence against women, 27(5), pp. 621–638.

[2]. Volungeviciene, A., Tereseviciene, M. and Ehlers, U.D., 2020. When Is Open and Online Learning Relevant for Curriculum Change in Higher Education? Digital and Network Society Perspective. Electronic journal of e-Learning, 18(1), pp.88-101.

[3]. DeKeseredy, W.S., 2021. Bringing feminist sociological analyses of patriarchy back to the forefront of the study of woman abuse. Violence against women, 27(5), pp.621-638.

[4]. Khan, A., 2023. A study of the factors that influence MOOCs (Massive Open Online Courses), along with their impact and comparison with on-campus education in Finland (Master's thesis, Itä-Suomen yliopisto).

[5]. Cui, Y., Ma, Z., Wang, L., Yang, A., Liu, Q., Kong, S. and Wang, H., 2023. A survey on big data-enabled innovative online education systems during the COVID-19 pandemic. Journal of Innovation & Knowledge, 8(1), p.100295.

[6]. Charan, K., Karthikeya, N., Narasimharao, P.B., Devi, S.A., Abhilash, V. and Srinivas, P.V.V.S., 2023, July. Effective Code Testing Strategies in DevOps: A Comprehensive Study of Techniques and Tools for Ensuring Code Quality and Reliability. In 2023 4th International Conference on Electronics and Sustainable Communication Systems (ICESC) (pp. 302-309). IEEE.

[7]. Bennett, E.E. and McWhorter, R.R., 2021.

Virtual HRD's role in crisis and the post Covid-19 professional lifeworld: Accelerating skills for digital transformation. Advances in Developing Human Resources, 23(1), pp.5-25.

[8]. Sun, J., Gan, W., Chao, H.C. and Yu, P.S., 2022. Metaverse: Survey, applications, security, and opportunities. arXiv preprint arXiv:2210.07990.

[9]. Alenezi, M., 2023. Digital learning and digital institution in higher education. Education Sciences, 13(1), p.88.

[10]. Akour, M. and Alenezi, M., 2022. Higher education future in the era of digital transformation. Education Sciences, 12(11), p.784.

[11]. Kisiel, M., 2020. Elementary Music Education in the Era of Remote Teaching–Constraints and Prospects for Development. International Journal of Research in E-learning, 6(2), pp.1-14.

[12]. Kaputa, V., Loučanová, E. and Tejerina-Gaite, F.A., 2022. Digital transformation in higher education institutions as a driver of social oriented innovations. Social innovation in higher education, 61, pp.81-85.

[13]. Rof, A., Bikfalvi, A. and Marquès, P., 2020. Digital transformation for business model innovation in higher education: Overcoming the tensions. Sustainability, 12(12), p.4980.

[14]. Fahmi, M., Sarilita, E. and Wilar, G., 2023. Building Resilient Communities: Rapid Response to a Crisis through Nusantara Module's Character Education and Social Contribution Initiative. Sustainability, 15(18), p.13300.

[15]. Feijoo, J.M., Brotons, F.B., Galao, O. and Alberti, M.G., 2020. On student perceptions about e-textbooks and digital resources for online teaching: Lessons learned from confinement. In ICERI2020 Proceedings (pp. 3642-3647). IATED.

[16]. Kh, N.N. and Kurbanova, M.F., 2023. FEATURES OF DIGITAL EDUCATION AND DIGITAL LEARNING RESOURCES IN HIGHER EDUCATION. Open Access Repository, 9(4), pp.129-132.

[17]. Themelis, C. and Sime, J.A., 2020. From video-conferencing to holoportation and haptics: How emerging technologies can enhance presence in online education. Emerging technologies and pedagogies in the curriculum, pp.261-276.

[18]. Holly, M., Pirker, J., Resch, S., Brettschuh, S. and Gütl, C., 2021. Designing VR experiences–expectations for teaching and learning in VR. Educational Technology & Society, 24(2), pp.107-119.

[19]. Haleem, A., Javaid, M., Qadri, M.A. and Suman, R., 2022. Understanding the role of digital technologies in education: A review. Sustainable Operations and Computers, 3, pp.275-285.

[20]. Zhang, W., Wang, Y., Yang, L. and Wang, C., 2020. Suspending classes without stopping learning: China's education emergency management policy in the COVID-19 outbreak. Journal of Risk and financial management, 13(3), p.55.

[21]. Oliveira, K.K.D.S. and de SOUZA, R.A., 2022. Digital transformation towards education 4.0. Informatics in Education, 21(2), pp.283-309.

[22]. Li, F., Lu, H., Hou, M., Cui, K. and Darbandi, M., 2021. Customer satisfaction with bank services: The role of cloud services, security, e-learning and service quality. Technology in Society, 64, p.101487.

[23]. Luo, W., Berson, I.R., Berson, M.J. and Li, H., 2021. Are early childhood teachers ready for digital transformation of instruction in Mainland China? A systematic literature review. Children and Youth Services Review, 120, p.105718.

[24]. Bojović, Ž., Bojović, P.D., Vujošević, D. and Šuh, J., 2020. Education in times of crisis: Rapid transition to distance learning. Computer Applications in Engineering Education, 28(6), pp.1467-1489.

[25]. Nartiningrum, N. and Nugroho, A., 2020. Online learning amidst global pandemic: EFL students' challenges, suggestions, and needed materials. ENGLISH FRANCA: Academic journal of English language and education, 4(2), pp.115-140.

[26]. Hedling, E. and Bremberg, N., 2021. Practice approaches to the digital transformations of diplomacy: toward a new research agenda. International Studies Review, 23(4), pp.1595-1618.

[27]. Mathrani, A., Sarvesh, T. and Umer, R., 2022. Digital divide framework: online learning in developing countries during the COVID-19 lockdown. Globalisation, Societies and Education, 20(5), pp.625-640.

[28]. Irwanto, I., Wahyudiati, D., Saputro, A.D. and Lukman, I.R., 2023. Massive open online courses (MOOCs) in higher education: A bibliometric analysis (2012-2022). IJIET: International Journal of Information and Education Technology, 13(2), pp.223-231.

[29]. Torres, C.R., 2021. Digital Didactic Materials:

An Innovative Resource for Teaching in the 21st Century. Journal of Higher Education Theory & Practice, 21(7).

[30]. Mishra, L., Gupta, T. and Shree, A., 2020. Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. International journal of educational research open, 1, p.100012.

[31]. Hu, C., Yang, H. and Yin, S., 2022. Insight into the Balancing Effect of a Digital Green Innovation (DGI) Network to Improve the Performance of DGI for Industry 5.0: Roles of Digital Empowerment and Green Organization Flexibility. Systems, 10(4), p.97.

[32]. Liu, Z., Deng, Z., He, G., Wang, H., Zhang, X., Lin, J., Qi, Y. and Liang, X., 2022. Challenges and opportunities for carbon neutrality in China. Nature Reviews Earth & Environment, 3(2), pp.141-155.

[33]. Haq, M.Z.U., Gu, M. and Huo, B., 2021. Enhancing supply chain learning and innovation performance through human resource management. Journal of Business & Industrial Marketing, 36(3), pp.552-568.

[34]. Cornejo-Velazquez, E., Clavel-Maqueda, M., Perez-Lopez-Portillo, H. and Lyubimova, E., 2020. Business Model of Learning Platforms in Sharing Economy. Electronic Journal of e-Learning, 18(1), pp.102-113.

[35]. King, I. and Lee, W.I., 2022. Global MOOC Landscape. In A Decade of MOOCs and Beyond: Platforms, Policies, Pedagogy, Technology, and Ecosystems with an Emphasis on Greater China (pp. 17-40). Cham: Springer International Publishing.

[36]. Kapilan, N., Vidhya, P. and Gao, X.Z., 2021. Virtual laboratory: A boon to the mechanical engineering education during covid-19 pandemic. Higher Education for the Future, 8(1), pp.31-46.

[37]. Kapilan, N., Vidhya, P. and Gao, X.Z., 2021. Virtual laboratory: A boon to the mechanical engineering education during covid-19 pandemic. Higher Education for the Future, 8(1), pp.31-46.

[38]. Aljawarneh, S.A., 2020. Reviewing and exploring innovative ubiquitous learning tools in higher education. Journal of computing in higher education, 32, pp.57-73.

[39]. Li, K.C. and Wong, B.T.M., 2021. Features and trends of personalised learning: A review of journal publications from 2001 to 2018. Interactive Learning Environments, 29(2), pp.182-195.

[40]. Nascimbeni, F. and Burgos, D., 2019. Unveiling the relationship between the use of open educational resources and the adoption of open teaching practices in higher education. Sustainability, 11(20), p.5637.

[41]. Xue, E., Li, J., Li, T. and Shang, W., 2021. China's education response to COVID-19: A perspective of policy analysis. Educational Philosophy and Theory, 53(9), pp.881-893.

[42]. Cantú-Ortiz, F.J., Galeano Sánchez, N., Garrido, L., Terashima-Marin, H. and Brena, R.F., 2020. An artificial intelligence educational strategy for the digital transformation. International Journal on Interactive Design and Manufacturing (IJIDeM), 14, pp.1195-1209.

[43]. De Graaff, N., Ten Brink, T. and Parmar, I., 2020. China's rise in a liberal world order in transition–introduction to the FORUM. Review of International Political Economy, 27(2), pp.191-207.