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Personalized Education for All: The Future of Open Universities

INNOVATIVE PRACTICE ARTICLE

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ABSTRACT

This paper charts a forward-looking roadmap for open universities, drawing upon their historical evolution and current practices. It advocates a shift toward a universally accessible, personalized education system. At the heart of this proposed advancement lies the customization of learning paths and experiences, where individualized advising and mentorship, and a variety of learning content, resources, and environments are essential. The study underscores the importance of integrating advanced technologies such as artificial intelligence and blockchain into the open and distance education system. Within the discourse, the paper delineates three primary areas for open universities to address: system transformation, expansion of openness, and integration of digital innovation. The concluding part of the paper offers possible strategic recommendations for policymakers and researchers of open universities. The essence of these recommendations is advocating for a universally personalized educational paradigm while making a strong case for addressing the digital divide, fostering strong partnerships at both global and community levels, and supporting the use of the latest technology to its fullest potential. By navigating this transformative journey, open universities are not just participating in the evolution of educational models but also poised to lead a revolution in the broader landscape of higher education.

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INTRODUCTION

This article aims to critically examine and propose a transformation in the model of Open Universities (OUs) toward personalized education for all. While the existing system of OUs has been instrumental in democratizing education through mass access, it now faces the imperative of evolving further. This need for transformation arises from both internal attributes within the OUs and external pressures from the broader educational landscape.

Initially, the establishment of OUs, exemplified by the pioneering UK Open University (UKOU) in 1969, signaled a transformative era in higher education (Crooks, 1976; Weinbren, 2014). Before this pivotal change, higher education had often been characterized by exclusivity, predominantly catering to an elite segment of society, thereby rendering it inaccessible to the broader population. The emergence of OUs, however, disrupted this conventional model of elite higher education. These institutions brought forth the concept of mass higher education, fostering a flexible learning system characterized by inclusivity, adaptability, and broader accessibility. However, it is crucial to note that OUs' flexible learning system is not synonymous with the personalized education concept proposed in this paper. While OUs have incorporated certain aspects of personalization, such as self-paced study and learner autonomy, their current model predominantly adheres to a one-size-fits-all approach, particularly in critical areas like curriculum and assessment, under the banner of mass education. For instance, a significant number of OUs deliver identical content to hundreds or even thousands of students with varying levels of prior knowledge, academic interests, and diverse backgrounds. This practice poses significant challenges, including readiness versus curriculum difficulty, a misalignment with career objectives, and, consequently, issues related to motivation and retention.

As time has passed and the educational landscape has continuously evolved, OUs have encountered numerous challenges from outside. As noted by Guri-Rosenblit (2019), the rapid pace at which traditional universities have embraced online learning, especially since the COVID-19 pandemic, coupled with sweeping technological developments, reductions in public funding, and other shifting socio-economic dynamics, has put OUs in a precarious position. OUs are now faced with increased competition from a wide range of alternative online education providers, including traditional universities that have expanded into the online arena, MOOC platforms, and newly founded cyber or virtual universities (Daniel, 2019). This competition has been compounded by a significant decline in enrollment figures, particularly in countries of the Global North, prompting these OUs to thoroughly reevaluate and, where necessary, enhance their core values, goals, and organizational structures. Indeed, the challenges currently faced by OUs are not exclusive to them but are shared with the entire higher education sector. However, due to their unique mission and pedagogical characteristics, these challenges have a distinct impact on OUs, as will be elaborated in subsequent sections. The shift toward a personalized education-for-all model is not merely a reaction to these challenges but also a proactive endeavor to redefine the mission and effectiveness of OUs in an ever-evolving educational landscape.

Before delving further, it is essential to establish a common understanding of personalized education. While there may be variations in the definitions of personalized education, the most common characteristics typically include (e.g., Butler et al., 2015; Lee et al., 2018; Mancuso, 2001; Tetzlaff et al., 2021; Waldeck, 2006): 1) a strong emphasis on customized learning plans, especially in the areas of curriculum and assessment, thus supporting each student's learning journey by allowing them to follow their paths through a competency-based progression, rather than a time-bound system; 2) the value placed on one-on-one advising and mentorship, so students have access to dedicated advisors or mentors who guide course selection, career planning, and other academic matters; and 3) the provision of flexible learning environments that deploy space, time, and personnel creatively, including small seminar-style classes, hands-on labs, research opportunities, internships, and collaborative projects. While personalized education has not been fully implemented, its various forms have been progressively adopted across higher education institutions. Small liberal arts colleges, for instance, prioritize one-on-one advising, mentorship, and intimate seminar classes. In contrast, OUs provide flexible learning pathways that accommodate diverse paces and methodologies. However, the holistic integration of these three critical elements of personalized education has yet to be achieved on a large scale. This shortfall continues despite a growing demand for more customized

educational experiences among an increasingly diverse student population. This paper posits that OUs, with their accumulated expertise and experiences, are well-positioned to lead the charge in bridging this gap, thereby offering a truly personalized education to all students

The paper begins with a brief explanation of the evolution of OUs, navigating through their historical roots and their contemporary position in the modern higher educational landscape. Drawing from an understanding of the past and current state of OUs within the larger trajectory of higher education, this paper proposes a forward-thinking perspective. At the heart of this perspective lies a compelling argument for a transformative shift toward 'personalized higher education for all' while upholding the principles of affordability and flexibility that have been integral to the mass education model of OUs. This proposed shift represents an extension beyond the prevailing mass education model advocated by OUs, aiming for a genuinely personalized educational approach across all facets of open and distance education (ODE). It is tailored to meet the unique needs, goals, and aspirations of each student, even on a large scale. The rise of cutting-edge technologies, such as Artificial Intelligence (AI) and blockchain, makes this new vision for OUs – personalized higher education for all – not just a possibility but likely on the horizon (Ambele et al., 2022). The paper concludes by highlighting the essential changes that OUs must implement to realize this vision for the future.

THE PAST: DISRUPTING THE ELITE PARADIGM

In the historical landscape of education, conventional higher education was characterized by a rigid hierarchy of elite institutions, often reliant on selective admission criteria, standardized tests, and strict academic prerequisites. As scholars such as Trow (1973) and Cooperman (2014) pointed out, these institutions were synonymous with prestige and academic excellence, typically serving a limited number of students in an intimate campus environment. Such exclusivity, while emphasizing an elite academic reputation, inadvertently increased socioeconomic differences by limiting access to higher education for a wider and more diverse group of people (Thiele et al., 2017).

The establishment of OUs marked a significant divergence from the traditional model. The University of South Africa (UNISA) is widely recognized as the first open university, initiating its distance education program for students of diverse racial backgrounds as early as 1946 amidst the apartheid era. Since the establishment of UKOU in 1969, several OUs have been founded in the 1970s and 1980s across regions. Examples include the Korean National Open University (KNOU) and the Universidad Nacional de Educación a Distancia (UNED) in Spain in 1972, FernUniversität in Germany in 1973, the Open University of Israel and Allama Iqbal Open University (AIOU) in Pakistan in 1974, Sukhothai Thammathirat Open University (STOU) in Thailand, Athabasca University in Canada, and the Open University of Sri Lanka in 1978, Anadolu University in Turkey in 1982, Universitas Terbuka Indonesia in 1984, and Indira Gandhi National Open University (IGNOU) in 1985.

These OUs challenged the traditional elitist model by disrupting deep-rooted norms in higher education, breaking down entry barriers, and embracing open admission policies (Guri-Rosenblit, 2019; Jeong, 2019). This shift, supported by robust governmental policies and initiatives, democratized higher education, making it more inclusive and accessible to a wider demographic. Amidst this backdrop of transformative change, Wedemeyer's reflections (1981) on ODE resonate profoundly. He praised this innovative approach as "a single great new development in education" (p. 60), a sentiment echoed in subsequent analyses, including those by Diehl (2012). It was emphasized that this change was more than just a small step; it signaled the beginning of a brand-new era in higher education, one that promoted mass higher education and advanced toward universal accessibility. Students who had been previously marginalized or excluded from traditional institutions now had opportunities to pursue higher education (Daniel-Gittens, 2016; Tait, 2018).

OUs also became pioneers in reimagining pedagogy by adeptly incorporating distance education techniques and leveraging advanced technologies to overcome geographical and temporal limitations (Rumble & Keegan, 1982). By utilizing a wide variety of resources and media—from traditional print materials to radio/TV broadcasts and the adoption of digital platforms—OUs cultivated a learning environment that supported self-paced study. This pedagogical

innovation has facilitated the creation of more flexible learning pathways, acknowledged and valued prior learning experiences, and actively encouraged the pursuit of lifelong education. Consequently, the prevailing focus transitioned away from the traditional, inflexible credit-hour-based systems of conventional universities to more open and adaptable educational models. These models supported student autonomy, allowing learners the flexibility to progress at a pace suited to their circumstances (Conrad, 2023; Keegan, 1996; Shale, 1987). However, while these OUs offered aspects of personalization, such as self-directed study, flexible pacing, and acknowledgment of prior learning, their focus was predominantly on mass education accessibility. The OU model, while more flexible than traditional universities, did not fully embrace the depth of personalization seen in contemporary educational approaches. For instance, it did not embrace a competency-based learning approach that allows students to progress based on their mastery of a subject, rather than on time spent. And it did not use learning technologies in such a way that technology adapts to a student's learning progress, providing customized content, resources, and activities to address specific needs.

While the OU approach was transformative, providing opportunities for students who were previously marginalized or excluded from conventional education systems, this innovative approach to higher education was not immediately embraced with enthusiasm. Critics initially depreciated it as 'learning at the back door,' a term coined by Wedemeyer in 1981, reflecting perhaps the skepticism surrounding the legitimacy and academic rigor of these novel educational pathways. In response to these criticisms, serious efforts have been made to define and establish quality assurance (QA) mechanisms for ODE that are compatible with those of traditional, campus-based higher education (Jung, 2023). Examples of such QA frameworks are varied and globally identified. In India, the Distance Education Bureau under the University Grants Commission sets the benchmark with its publication, 'Recognition of Open and Distance Learning Institutions.' Similarly, in Malaysia, the Malaysian Qualifications Agency outlines its expectations through the 'Code of Practice for Programme Accreditation in Open and Distance Learning.' In the United States, the Commission on Higher Education provides a set of 'Best Practices for Electronically Offered Degree and Certificate Programs,' serving as a guide for institutions to maintain high standards in their online offerings. In addition, Quality Matters (QM) offers a detailed tool, 'QM Higher Education Rubric Standards' which serves as a benchmark for online course design and delivery. International and regional QA frameworks are also in place, with the International Council for Open and Distance Education (ICDE) presenting a repository of quality resources to support global best practices. The Asian Association of Open Universities (AAOU) contributes with its 'Quality Assurance Framework,' and the European Association of Distance Teaching Universities (EADTU) provides the 'E-xcellence' manual and tool, both of which are instrumental in managing the quality of ODE across regions. These QA mechanisms collectively address the essential components of ODE such as the design and development of course materials, the integration of technology, the robustness of assessment methods, the availability of learner support, the dynamic nature of learning activities and interactions, and the effectiveness of institutional leadership. In many countries, OUs have had to comply with regulations, suggestions, and best practices imposed by these national, regional, and/or international QA agencies, as well as other professional and academic organizations (Latchem, 2016).

The developments discussed above highlight the evolving nature of OUs from their origins in mass education toward integrating more personalized learning approaches. This shift moves beyond simply highlighting the unique aspects of ODE to actively adhering to stringent QA standards. While OUs' initial model represented a significant evolution from traditional university models in terms of flexibility, accessibility, and inclusivity, the need for further expanded personalization has been indicated in several studies, including those by Aberra and Davids (2022), Eliasquevici et al. (2017), Gunduz and Karaman (2020), Muljana and Luo (2019), and Lee et al. (2023). The expanded perspective of personalized education, to be discussed further, aims to contextualize the historical approaches of OUs within the broader landscape of higher education. This includes addressing the growing necessity for OUs to evolve by enhancing their personalization strategies to meet the diverse and evolving needs of adult learners and adapt to technological innovations.

THE PRESENT: EXPANDING HORIZONS IN HIGHER EDUCATION

The 21st century has witnessed a remarkable expansion of open and online universities and programs and their influence on higher education worldwide. These institutions have not

only expanded in number but also significantly influenced educational access and delivery on a global scale. With their commitment to inclusivity, these institutions have championed the cause of universal access to higher education, a concept that resonates with UNESCO's vision of ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all (UNESCO, 2015), and United Nations' commitment to 'universal access to quality higher education' as one of the Sustainable Development Goals (United Nations, n.d.).

A central element in this transformative journey of open and online universities and programs has been the integration of digital technology to meet the needs of a diverse student population. Among the various innovations, the emergence of MOOCs marked one of the most significant developments. As discussed by Daniel (2012), MOOCs have redefined the educational landscape by offering unrestricted access to quality courses across numerous disciplines, thus breaking down the traditional barriers posed by geography and socio-economic status. A 2022 report by Class Central (Shah, 2023) highlighted a surge in online educational offerings, with millions of students worldwide enrolling in MOOCs once exclusive to campus-based education. Along with traditional and online universities, OUs have also played a role in creating and offering MOOCs, thereby enhancing access to higher education and promoting lifelong learning. Examples include UKOU's over 1,000 MOOCs via FutureLearn, IGNOU's around 270 MOOCs predominantly on India's MOOC platform, Swayam, STOU's 40 MOOCs mostly on the ThaiMOOC platform, and KNOU's MOOCs via the K-MOOC platform. Yet, some view MOOCs as a competitive force to OUs.

Through investments in robust online platforms combined with effective and efficient management models, OUs have enhanced their ability to offer not only more interactive and flexible but also easily scalable. A content analysis of journals on ODE by Bozkurt et al. (2015) illustrates how OUs have utilized ODE technologies to overcome geographical, economic, and socio-cultural barriers in education, highlighting the significance of a strong technology infrastructure in facilitating this progress. Furthermore, several OUs, including KNOU, Virtual University Pakistan, UKOU, and Anadolu University, are incorporating AI into their curriculum (Kanwar & Mishra, 2023). Integral to these technological advancements is the employment of learning analytics (Prinsloo, 2023). By analyzing data on student performance and engagement, OUs have laid the groundwork for further personalizing the learning experience and adapting it in real time to meet the individual needs of students.

In addition, OUs have strategically restructured traditional educational programs into more manageable and flexible modular formats. These bite-sized learning units, commonly known as micro-credentials, enable students to acquire skills that align with their career aspirations and personal interests without committing to a full degree program (European Commission, 2020). A notable initiative is the Microcredentials program launched by UKOU through the MOOC platform FutureLearn, which is designed to provide students with credit-backed, stackable credentials that offer a pathway to career development. Similarly, Open Universities Australia has increased its microcredential offerings, particularly in high-demand sectors, and the University of the Philippines Open University is in the process of introducing microcredentials to enhance working professionals' career progression and employability.

The flexibility in OUs is further enhanced by adopting the system of Recognition of Prior Learning (RPL). RPL is an advanced academic procedure that acknowledges learning achieved through formal education at other higher education institutions, as well as informal/non-formal education and work experiences (Conrad, 2023). Several OUs, including the Botswana Open University, UKOU, KNOU, and the Open University in China, to name a few, assess the knowledge and skills applicants have gained outside the classroom. They may assign academic credit for relevant prior courses or experiences, an important component for personalizing the learning journey. This approach offers the possibility not only to save time but also to significantly reduce the financial burden on students, enabling efficient progression through academic programs.

The pandemic necessitated a sudden shift in education, requiring institutions worldwide to adopt remote teaching practices. Crawford et al. (2020) discussed how the pandemic accelerated the adoption of online learning in conventional higher education and highlighted its vital role in ensuring educational continuity amid disruptions. The events of the COVID-19 crisis underscored ODE's significant role in the broader landscape of higher education, emphasizing that ODE is not just an alternative but a main component of modern education systems.

Since the COVID-19 crisis, universities – both traditional and open – have grown more confident in using technology effectively and efficiently. For perhaps the first time, the idea of personalized education at the higher education level seems attainable for all (Maghsudi et al., 2021). In recent years, universities have been experimenting with ways to transform their pedagogical models under the label of personalized education or personalized learning. Central to these advancements is the strategic use of technology, particularly AI, to cater more specifically to individual student needs, as well documented by Chen et al. (2020) and Zawacki-Richter et al. (2019). Furthermore, studies such as those by Lu et al. (2018) highlight the potential of AI to reshape education through the analysis of learning behaviors and academic performance, thereby assisting educators in effectively tailoring teaching strategies.

The principles of personalized education, although ideal for smaller, traditional academic settings, present significant challenges when applied to the expansive and varied student body of OUs. This diverse group of students in OUs reports a range of difficulties related to their individual characteristics, lack of prior knowledge and technical skills, work and life environments, unsuitable course requirements, and inadequate tutor support (Kara et al., 2019). While OUs have strived to address this wide range of difficulties of their students, their students still report a mismatch between levels of their academic readiness and curriculum difficulty (Muljana & Luo, 2019), a mismatch between personal career objectives and curriculum (Gunduz & Karaman, 2020), lack of motivation and engagement in the learning process (Eliasquevici et al., 2017), dissatisfaction with insufficient and nontailored support services (Aberra & Davids, 2022), and new challenges faced by disadvantaged students (Lee et al., 2023), all resulting in low rates of retention and completion in ODE (Gunduz & Karaman, 2020; Xavier & Meneses, 2021). Several studies (e.g., Eliasquevici et al., 2017; Martínez-Carrascal et al., 2023; Nichols, 2010; Stewart et al., 2013) reveal that customized learning trajectories coming with individualized support and attention and considering learners' unique demographics and needs are the answer to address the above-reported difficulties of ODE students, which are all features of personalized education. Without addressing these student challenges as early as possible and at any cost, OUs may find it difficult to successfully compete with today's technology-enhanced traditional universities and cyber universities that could offer more personalized services to their smaller number of students.

Fortunately, as discussed above, OUs have laid the groundwork for personalized education through several advancements. They have harnessed digital technologies and resources that can be used to offer tailored content for diverse learners beyond traditional barriers. The rise of micro-credentials and the RPL system has emphasized flexibility and individualization, allowing students to shape their educational journeys (Conrad, 2023). Moreover, through learning analytics, these institutions have been able to dynamically tailor content, even though at a limited scale, ensuring education meets each student's unique needs, solidifying their role as innovators in a customized higher education framework. The future of OUs seems to hinge on their ability to utilize these accumulated experiences and knowledge and pivot toward 'personalized higher education for all', which represents a significant shift from both the elite and mass education models, representing a paradigm advancement. This shift toward 'personalized higher education for all' in OUs should be framed not as a departure from their mass education model but rather as an evolution of it, incorporating personalized learning components of the elite model.

THE FUTURE: LEADING THE CHARGE IN PERSONALIZED HIGHER EDUCATION FOR ALL

As highlighted earlier, OUs possess the fundamental understanding and competencies necessary to facilitate personally customized learning paths and experiences. However, the challenge lies in effectively scaling such personalized education to accommodate a diverse, widespread student body with varying educational needs. Such an endeavor requires a systemic and systematic transformation of existing academic frameworks and methodologies of OUs. To extend personalized higher education universally, it is imperative to consider three fundamental pillars: system transformation, openness expansion, and adaptable technology integration.

TRANSFORMING THE SYSTEM

Embracing a learner-centric, personalized education approach requires reassessing the institutional values of OUs and enriching traditional mass education models with tailored learning experiences (Kara, 2022). This refinement involves enhancing their longstanding values and educational models to accommodate personalized learning experiences beyond their current framework. This is not about overhauling OUs' longstanding values or mission statements but integrating genuinely personalized education more explicitly into their core culture. Commonly stated existing values and goals of OUs include providing equal access to flexible, quality education, and producing qualified human resources for the country. They also emphasize lifelong learning opportunities through open, distance, and flexible education, making higher education accessible to all. I argue that the vision for personalized education for all should enrich OUs' existing values and goals. As suggested by Eckel (2002), the transformation and enrichment of these values and goals will serve as a compelling rationale and provide direction for change.

Moreover, realizing personalized education on a large scale requires restructuring work processes to foster cross-functional synergies between various workforces within the educational system. The collective team can more efficiently address complex instructional design problems for a learner-centric, tailored curriculum and achieve the goals of personalized learning, as demonstrated in corporate settings (McDonough, 2000). For instance, faculty, instructional designers, learning analytics professionals, and AI experts need to form collaborative units to weave personalized elements into curriculum design, delivery, and assessment.

Finally, to effectively embrace personalized education at a large scale, it is essential to realign policies to emphasize greater flexibility than currently provided. This change empowers students to customize their educational journeys. This strategy entails advocating policies that promote a variety of learning options, enabling learners to select paths that best suit their needs. Rather than relying on a single OU to provide all learning options, it would be more efficient and effective to foster academic-industrial collaborations along with other local and international alliances. Such partnerships can offer a wider range of experiential learning opportunities. They also support experimental models for teaching, learning, and research models that move beyond traditional approaches, aligning more closely with the evolving demands of the future era (Chambers, 2006; González et al., 2013; Reiffenrath & Thielsch, 2023).

EXPANDING OPENNESS

In addition to the openness to people, methods, and ideas as specified by UKOU, OUs need to expand openness to collaborations. Building global and regional consortia with like-minded institutions can significantly amplify the benefits of resource sharing and foster both virtual and real exchange programs to cater to diverse learning needs. The European Association of Distance Teaching Universities (EADTU) stands as evidence of the transformative power of such collaborations, advocating cooperative digital learning and virtual mobility across borders (Henderikx & Ubachs, 2019; Reiffenrath & Thielsch, 2023).

OUs also need to broaden their openness to different types of education. While OUs have historically recognized prior learning, there is still room for growth in this area. Expanding recognition of informal and non-formal education and integrating these experiences more comprehensively into the OU system can further personalize the learning journey for each student. This expansion means not just acknowledging these forms of education but actively incorporating them into curriculum development and credit allocation. Leveraging innovative, technology-driven solutions like blockchain, they can validate and assign academic credits to learners' diverse experiences and previous learning (Issaro & Areepong, 2022).

Furthermore, there is a need to expand openness to pedagogies as pedagogical innovation is key for OUs to fully implement personalized education for all (Carey et al., 2015). To achieve this, OUs need to move beyond existing distance teaching methods and adopt more adaptive learning strategies and innovative pedagogies. This approach should particularly focus on customizing curriculum and assessment design, as well as providing individualized academic support. Such an evolution in pedagogical methods will better address individual academic

needs, accommodate diverse learning readiness levels and paces, and leverage the potential of digital resources and modular course designs.

INTEGRATING DIGITAL INNOVATIONS

To fully actualize the vision of personalized education for all in OUs, the incorporation of adaptive AI technologies becomes a crucial element. The utilization of AI in ODE has already shown considerable promise, with a range of sophisticated applications emerging in the field. Intelligent tutoring systems, adaptive learning platforms, personalized education strategies, and now generative AI stand at the forefront of this technological integration, transforming the way students engage with educational material (Bozkurt, 2023; Göçmez & Okur, 2023; Zawacki-Richter et al., 2019). Beyond these, AI's capability extends to assessment and evaluation, providing ODE educators with deeper insights into student performance and strategies for customizing student learning pathways (Cope et al., 2021). AI-enhanced profiling and predictive analytics further enrich the learning experience by anticipating student needs and tailoring content accordingly. Moreover, AI's role in affect recognition and emotion-sensitive learning adds a new dimension to interactive education, one that responds to the emotional states of learners, thereby creating a more empathetic digital learning environment. Virtual learning environments have also evolved, becoming increasingly immersive and interactive due to AI's growing sophistication (Göçmez & Okur, 2023). Recently, advancements in generative AI, exemplified by technologies like ChatGPT, have demonstrated their potential in higher education by assisting students in discovering and generating content, responding to inquiries, fostering educational discussions, providing personalized assistance, and delivering prompt feedback (Lo, 2023; Santandreu et al., 2023; Van Wyk et al., 2023). Although concerns such as content authenticity and copyright infringement exist, these innovative capabilities of generative AI can be strategically harnessed by OUs to offer large-scale, personalized content and support.

Looking to the future, the potential applications of AI in education, particularly in ODE, are bound to expand, becoming more refined and deeply integrated into the very core of educational practices as argued in Bozkurt (2023). This evolution promises not only to enhance existing methodologies but also to innovate new paradigms that will redefine the open and distance learning experience, highlighting AI's transformative potential in contributing to the future of personalized education for all. By leveraging AI-powered learning platforms and other AI solutions, educational institutions can utilize data-driven insights to create a more personalized learning journey for each of their students. For instance, AI can analyze student performance data to identify learning gaps, subsequently adapting course material in real time to better fit individual learning styles and paces, as detailed by Churi et al. (2022). Moreover, the use of Chatbots for student inquiries and assistance can add a personalized support layer, providing instant, tailored responses and tracking student progress, which not only lessens the administrative burden on faculty but also enhances learner engagement and performance as shown in studies by Essel et al. (2022), Ait Baha et al. (2023) and Santandreu et al. (2023).

The integration of blockchain and Distributed Ledger Technology (DLT) into credentialing is another critical step for OUs aiming to scale personalized education. As the digital landscape evolves, there is an increasing need for secure, immutable records of academic achievement. Blockchain technology and DLT offer unprecedented security and transparency in credentialing, significantly benefiting open and online universities by making student records tamper-evident and verifiable (Alam, 2022; Grech & Camilleri, 2017).

For enhancing personalized learning, the integration of augmented reality (AR) and virtual reality (VR) comes highly advantageous. The potential of AR and VR stretches far beyond entertainment, offering benefits in education, particularly for OUs. These technologies can support the way certain subjects are taught. Courses that rely heavily on practical understanding, such as those in science, engineering, or teacher training, can particularly benefit from immersive AR and VR technologies. As examined by Bacca et al. (2014) and Liu et al. (2019), these technologies not only make learning more interactive but also prepare individual students for real-world scenarios, a challenge often faced in the context of OUs.

In summary, the future of personalized education in OUs lies in carefully balancing their foundational principles of openness and accessibility with innovative approaches to learning

that cater to individual student needs. This balanced approach involves enhancing existing systems with the thoughtful integration of new technologies and pedagogies, expanding the recognition of diverse educational experiences, and fostering collaborations that enrich the learning experience while staying true to the core mission of OUs.

CONCLUSION

In concluding this paper, several critical recommendations are suggested, aiming to encourage decisive actions among policymakers and researchers associated with OUs. These recommendations highlight the urgency of strategic shifts and focused research, crucial for positioning OUs as leaders in disrupting and improving the current mass higher education system and advancing personalized education for all.

First, it is important to acknowledge 'Personalized Education for All' as the cornerstone of OUs' further development. Policymakers are urged to initiate a profound reassessment and enrichment of existing educational visions, policies, and infrastructures to accommodate the diverse needs of learners in ODE. Key to this transformation is the prioritization of equitable access to cutting-edge technological resources and robust digital infrastructures, requiring targeted strategies particularly designed for marginalized communities (Noreen & Malik, 2020; Rosenblit, 2009). Concurrently, researchers are tasked with investigating innovative personalized learning frameworks and models that encapsulate customized learning pathways with individualized learner support, and adaptable content delivery methods. Additionally, researchers need to explore solutions for mitigating the digital divide, advocating for universal inclusivity for truly personalized education.

Second, the principle of 'Personalized Education for All' demands a holistic transformation, enhancing the prevailing mass education model. Realizing this vision of personalized education on a universal scale calls for substantial support, potentially sourced from governmental or public sectors. OUs, being repositories of expertise in ODE and technological integration, are uniquely positioned to conceptualize and actualize scalable personalized education systems as implied in Holmes et al. (2018). Policymakers must support experimental pilots, iterative development, and ultimately, the large-scale implementation of personalized learning initiatives. In parallel, there is a call for researchers to explore alternative educational theories and pedagogies that support the expansion of personalized learning (Kanwar & Mishra, 2023).

Lastly, it is vital to recognize that this transformation cannot be accomplished in isolation; it requires a serious focus on collaboration and internationalization. Policymakers should encourage strategic partnerships across educational institutions, industrial sectors, and more, encompassing both local and international spheres (Borgos et al., 2023; Guri-Rosenblit, 2019). This involves promoting inter-institutional sharing of digital resources and pedagogical applications, thus enhancing the quality and reach of education. Researchers, for their part, must strive to identify effective collaborative models, facilitating the internationalization of OUs, and thereby enriching the open education systems through a dynamic exchange of global knowledge.

Historically, higher education was viewed as a symbol of 'status' or 'privilege', reserved within an elite paradigm, and accessible to only a select few. This perception underwent a profound transformation, evolving into a 'right' or 'welfare' during the shift toward mass and universal education. Such an expansion broadened access, diluting the exclusivity that once defined higher education. Now, in the emerging era of personalized education for all, higher education is increasingly reconceptualized as a tool for 'empowerment' or a means to unlock 'creative value' for each individual student. It is a paradigm shift that sees education not just as a social equalizer but also as a personal growth engine that nurtures individual talents, fostering innovative thinking and equipping students with the skills to navigate and contribute to the future in a more open and dynamic way.

In this evolving educational landscape, OUs have an unprecedented opportunity to lead a transformative movement in higher education, steering the shift toward a 'personalized education for all' paradigm. By embracing systemic and systematic transformations, they can broaden the horizons of openness and harness the potential of seamlessly integrated adaptive technologies, in collaboration with traditional and other types of universities. Such an

approach positions OUs uniquely, enabling them to empower each student to forge their own unique learning paths. This progression toward personalized education, while presenting its challenges, also sets the stage for OUs to redefine, disrupt, and enhance the conventional mass education approach. In doing so, OUs can not only thrive but also lead extensive, impactful transformations within the wider sphere of higher education, contributing to the creation of a more dynamic, responsive, and student-centered educational environment at a large scale. This reinvention aligns with the needs of a diverse global student body, calling for educational models that reflect the uniqueness of each learner's journey.

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The author is solely responsible for the content and writing of this article, including Conceptualization, Investigation, Resources, Writing – original draft, Writing – review & editing.

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