Enhancing Nurse Empowerment Through Dynamic xMOOCs using the 4D Developmental Model

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ABSTRAK

Artikel ini memperkenalkan pendekatan baru dalam pendidikan kejururawatan melalui Kursus Dalam Talian Terbuka Besar yang Diperluaskan (xMOOCs), yang direka khusus untuk jururawat berdaftar (RN). Kajian ini adalah berdasarkan model pembangunan 4D yang dibangunkan oleh S. Menurut Thiagarajan dan Semmel pada tahun 1974 yang merangkumi empat fasa iaitu definisi, reka bentuk, pembangunan dan penyebaran. Model berstruktur ini memudahkan penciptaan pengalaman pembelajaran dalam talian yang dinamik, menarik dan produktif serta meningkatkan pembangunan profesional jururawat. xMOOCs menyediakan jururawat dengan kemahiran yang diperlukan untuk pembelajaran sepanjang hayat, menggabungkan modul interaktif dan alat multimedia yang diperkaya dengan teknologi pembelajaran adaptif. Pendekatan ini menyumbang kepada peningkatan penjagaan pesakit dengan membangunkan kompetensi kejururawatan. xMOOCs mengandungi modul pembelajaran interaktif, kajian kes dan simulasi, memberikan jururawat pengalaman pembelajaran praktikal dalam persekitaran maya. Kursus ini menggalakkan pembelajaran aktif dan meningkatkan kemahiran berfikir kritikal serta pembuatan keputusan yang penting dalam penjagaan kesihatan. Selain itu, xMOOCs memenuhi keperluan profesional kejururawatan dengan menyediakan laluan pembelajaran yang disesuaikan, membolehkan pelajar memberi tumpuan kepada bidang yang memerlukan peningkatan. Keupayaan untuk menyesuaikan diri ini membolehkan jururawat menyeimbangkan tanggungjawab profesional mereka dengan pendidikan lanjut. Secara keseluruhan, xMOOCs mewakili kemajuan yang signifikan dalam pendidikan kejururawatan, membekalkan RN dengan peluang pembelajaran yang mudah diakses, boleh diperluas dan fleksibel untuk menyokong pembangunan profesional serta akhirnya, meningkatkan hasil penjagaan pesakit.

Kata kunci: Model pembangunan 4D; pembangunan profesional; pemberdayaan jururawat; xMOOC

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ABSTRACT

This article presented a novel approach to nursing education through extended Massive Open Online Courses (xMOOCs) designed specifically for registered nurses (RNs). The framework is based on the 4D developmental model established by S. Thiagarajan and Semmel in 1974, which encompasses four phases i.e. define, design, develop and disseminate. This structured model facilitates the creation of dynamic, engaging and productive online learning experiences, enhancing nurses' professional development. xMOOCs prepare nurses with the skills necessary for lifelong learning, integrating interactive modules and multimedia tools enhanced by adaptive learning technology. This approach contributes to quality patient care by developing the competencies of nursing. xMOOCs include interactive learning modules, case studies and simulations, providing nurses with practical experiential learning in a virtual environment. These courses foster active learning and improve critical thinking and decision-making skills that are essential in healthcare. Furthermore, xMOOCs address the needs of nursing professionals by offering customised learning pathways, enabling learners to focus on areas for improvement. This adaptability allows nurses to balance their professional responsibilities with further education. In summary, xMOOCs represent a significant advancement in nursing education, equipping RNs with accessible, scalable, and flexible learning opportunities that enhance professional development and, consequently, patient outcomes.

Keywords: 4D developmental model; nurse empowerment; professional development; xMOOC

INTRODUCTION

Continuous professional development (CPD) is essential for Registered Nurses (RNs) to maintain their competencies and adapt to the evolving demands of healthcare (Vázquez-Calatayud et al. 2020). The importance of CPD in the rapidly changing healthcare landscape is critical (Mlambo et al. 2021). Traditional CPD approaches struggle to keep pace with the rapid advancements in medical science, technology and evidence-based practice (Ngenzi et al. 2020).

To address these challenges, modern educational technologies and methodologies must be employed to create flexible and engaging learning environments. Massive Open Online Courses (MOOCs) offer unrestricted access to educational materials and the emergence of extended MOOCs (xMOOCs) has revolutionised CPD in nursing. These scalable and accessible courses provide customisable learning options, tailored experiences and interactive multimedia resources (Bendezu-Quispe et al. 2020; Dwyer et al. 2022).

xMOOCs facilitate nurses in establishing connections with global colleagues, collaborating and improving their professional practices, thereby promoting the progression of the nursing profession and enhancing patient care (Pozzi et al. 2023; Williamson et al. 2020). Through xMOOCs, nurses can cultivate a culture of lifelong learning, stay abreast of evidence-based clinical practices, and adapt to healthcare innovations to maintain high standards of care (Aung et al. 2022; Bendezu-Quispe et al. 2020; Blum et al. 2020).

This article introduced an innovative approach to CPD through the development of xMOOCs employing Thiagarajan's 4D model. The aim was to provide scalable, adaptive, and interactive training experiences for nurses

worldwide, thus revolutionising nursing education.

Innovation in Nursing Education: The Rise of xMOOCs

The emergence of MOOCs has revolutionised the educational landscape by granting learners worldwide access to superior educational resources. A specific category of MOOCs, referred to as xMOOCs, has profoundly influenced nursing education. xMOOCs provide scalable, interactive and accessible platforms for CPD (Gleason et al. 2021).

xMOOCs enable RNs to learn independently, engage with peers globally and implement novel strategies for their professional advancement. The objective of xMOOCs is to democratise education by improving accessibility and flexibility, employing the 4D instructional design approach created by Thiagarajan and Semmel (1974). They aim to enhance pedagogical efficacy by delivering structured, engaging and outcome-orientated instructional material. xMOOCs facilitate lifelong learning due to their versatility and varied course offerings (Hollands & Tirthali 2014; Liyanagunawardena et al. 2013).

xMOOCs have transformed education by providing a flexible, scalable platform that fosters collaboration and peer learning which are crucial elements for professional development in nursing. In contrast to conventional learning approaches, xMOOCs allow nurses to interact with colleagues from various geographical regions and healthcare systems, promoting a global exchange of ideas, knowledge and experiences (Sezgin & Cirak 2021).

xMOOCs promote peer learning primarily through interactive discussion boards, enabling learners to engage in debates, exchange insights and collaboratively address challenges. This approach enhances participants' comprehension of intricate subjects while presenting them with diverse viewpoints and therapeutic methodologies. These interactions emulate authentic interdisciplinary teamwork, an essential competency in contemporary healthcare settings. Furthermore, peer feedback systems in xMOOCs enable learners to evaluate one another's work, fostering critical thinking and reflection, both vital for professional growth (Padilha et al. 2020).

Moreover, xMOOCs facilitate ongoing professional development by providing self-directed learning opportunities, allowing nurses to stay informed about the latest evidence-based practices while fulfilling their clinical responsibilities. Interacting with colleagues in this manner enables nurses to exchange resources, address obstacles, and offer reciprocal support, cultivating a sense of community and accountability that bolsters motivation and perseverance (Voudoukis & Pagiatakis 2022).

Global collaboration allows nurses to acquire knowledge of developing trends and innovative healthcare solutions from diverse regions worldwide. This enhanced knowledge base can increase their responsiveness to new technologies, therapies and regimens. Networking opportunities facilitate future partnerships, mentorships, and professional growth, enabling nurses to assume leadership roles and improve patient care outcomes (Pozzi et al. 2023).

In summary, xMOOCs offer nurses the flexibility to learn at their own pace while promoting a collaborative atmosphere that enhances peer learning and professional development, resulting in a more knowledgeable and empowered workforce.

The 4D Developmental Model: A Framework for Effective Learning in Nursing Education

Thiagarajan's 4D developmental model (Maydiantoro 2021) provides a structured approach to instructional design, focusing on four key phases: Define, Design, Develop and Disseminate. Applying this model to nursing education, particularly in the development of xMOOCs for CPD, creates a systematic, scalable, and flexible learning experience.

(i) Define stage

In the Define phase, the objectives of the xMOOC are established, focusing on the specific educational needs of nurses. This phase involves identifying core competencies, knowledge gaps and areas requiring skill enhancement. For instance, if the goal is to improve evidence-based practice in patient care, the course content must address the latest clinical guidelines, interventions and technologies. Collaborating with nursing educators, clinical experts, and institutions ensures that the course meets regulatory and professional standards.

(ii) Design stage

This phase encompasses the creation of the course blueprint which includes structuring the curriculum, selecting instructional methods, and integrating multimedia elements. In nursing xMOOCs, the design should incorporate diverse learning activities, such as case studies, simulations and interactive quizzes, to engage learners. Additionally, providing opportunities for collaborative learning, such as discussion forums or peer reviews, will enable nurses to exchange insights with their peers globally. The design must also consider accessibility and flexibility, allowing nurses to learn at their own pace.

(iii) Develop stage

This phase involves the actual creation of content and materials which includes video lectures, reading materials, assessments and interactive activities. In nursing education, this phase must emphasise evidence-based content that reflects current clinical practices and research. Engaging multimedia resources, such as virtual labs or simulation exercises, can replicate real-world nursing scenarios. Furthermore, the course should include self-assessment tools to enable nurses to track their progress and apply their learning directly to their practice.

(iv) Disseminate stage

This phase involves delivering the xMOOC to the target audience. Nursing xMOOCs should be widely accessible through online platforms, ensuring that nurses from various geographic regions can participate. This phase also includes ongoing evaluation and feedback collection to ensure the course remains relevant and effective. Learner feedback, as well as updates in clinical practices, should inform iterative improvements to the course.

In essence, applying the 4D Model in nursing education through xMOOCs offers scalable and flexible Continuing Professional Development (CPD) opportunities for nurses. By following this model, course developers can create targeted, high-quality learning experiences that directly address current healthcare challenges. Furthermore, these courses promote a culture of lifelong learning, enabling nurses to continuously enhance their skills and knowledge in response to the evolving demands of the healthcare sector

(Kasch et al. 2021). The systematic approach of the 4D Model ensures that CPD content is not only current but also delivered in an engaging and accessible format, contributing to both professional development and improved patient outcomes.

Benefits of the xMOOC Approach for Nursing Education

The implementation of the 4D model in xMOOC development has introduced several unique methodologies that substantially enhance nursing education. The advantages can be categorised under three primary themes i.e. personalisation and flexibility; interactive and collaborative learning; and scalability and accessibility.

(i) Personalisation and adaptability

xMOOCs provide a tailored educational experience that addresses the specific requirements of individual nurses. They enhance the learning process by enabling learners to focus on particular areas for development, thereby increasing efficiency and precision. Data-driven analytics allow xMOOCs to customise content according to a nurse's progress and performance, providing suitable challenges and support (Abhishek et al. 2023; Cleveland-Innes et al. 2024). This flexibility is particularly beneficial for nurses who must balance education with demanding clinical schedules, allowing them to learn at their own pace and at convenient times. The autonomous structure of xMOOCs enables nurses to manage their professional growth and ensures that education is ongoing and continuous (Cant & Levett-Jones 2020; Froehlich 2023).

(ii) Interactive and collaborative learning

The incorporation of interactive multimedia elements in xMOOCs such as virtual patient scenarios and case studies which transform passive learning into an active and engaging experience. Nurses can apply theoretical knowledge in simulated environments that replicate real clinical situations, thereby enhancing critical thinking and decision-making skills (Voudoukis & Pagiatakis 2022). Additionally, xMOOCs foster a collaborative learning environment where nurses from diverse areas and healthcare contexts can share ideas, discuss best practices and learn collectively. Online forums, collaborative projects and peer evaluations help learners establish a professional network that promotes both personal and communal development (Sezgin & Cirak 2021). This integration of interactive and collaborative learning enhances nurses' clinical competence and broadens their understanding of global healthcare trends.

(iii) Scalability and accessibility

xMOOCs are designed to support large populations of learners while maintaining educational quality. Cloud-based platforms and content delivery networks ensure that these courses are accessible to nurses, regardless of geographic location or available resources (Iniesto et al. 2021; Padilha et al. 2020). This scalability enables universities to provide CPD opportunities to nurses in rural or under-resourced areas, thereby improving the accessibility of professional development programs. Furthermore, the application of the 4D model ensures that xMOOCs maintain high quality throughout all stages of course development, from establishing learning objectives to delivering content (Elizondo-

García & Gallardo 2020; Kasch et al. 2021; Usman & Ibrahim 2023). This guarantees that as participation increases, each student receives a well-organised and engaging educational experience.

Challenges and Considerations

Although the 4D model in xMOOC development offers certain benefits, it also faces challenges that must be addressed to ensure the efficacy and sustainability of these courses. The primary issues can be categorised into three areas: quality assurance, learner engagement and technical infrastructure.

(i) Quality assurance

Ensuring the quality of course content and assessments on a large scale can be challenging. As the number of learners increases, it becomes increasingly difficult to ensure that all materials are current, evidence-based, and relevant to various clinical environments (Panigrahi et al. 2018). Peer review techniques and standardised assessment instruments must be meticulously executed to accurately evaluate learning outcomes. In the absence of these processes, there is a risk that educational content may become inconsistent or misaligned with professional norms (Alzahrani 2022). Ongoing assessment and feedback mechanisms are essential for maintaining the high quality of xMOOCs.

(ii) Learner engagement

Engaging learners in a large-scale online setting presents considerable challenges, particularly due to the self-directed nature of xMOOCs. Maintaining consistent engagement and motivation can be difficult for learners outside a structured classroom environment (Irawan et al. 2018). xMOOCs must integrate interactive activities, such as quizzes, simulations and discussion boards, to foster active participation. Additionally, prompt feedback from educators and peers can help to sustain learners' engagement and motivation. Nevertheless, despite these measures, some learners may struggle to maintain focus or complete the course due to competing personal and professional obligations.

(iii) Technical infrastructure

The effectiveness of xMOOCs rely on a robust technical infrastructure that can accommodate numerous participants simultaneously. Content delivery networks and scalable learning management systems are critical for providing a seamless learning experience; however, these technologies require substantial investment and maintenance (Wang & Wu 2019). Furthermore, technical challenges, such as inadequate internet connectivity or limited access to devices in resource-constrained environments, may hinder participation and learning. Ensuring the accessibility of xMOOCs for all learners, regardless of their technical circumstances, is a crucial priority for institutions developing these courses.

In general, xMOOCs represent a transformative approach to nursing education, offering personalisation, engagement, collaboration, scalability and accessibility. Nevertheless, challenges related to quality assurance, learner engagement, and technical infrastructure must be carefully addressed to ensure the success of these programs. By addressing these issues and employing the 4D model in the development of xMOOCs, the empowerment of nurses and the advancement of professional development on a global scale can be significantly enhanced.

CONCLUSION

The integration of the 4D developmental model into xMOOCs represents a significant advancement in nursing education. This innovative approach enables nurses to continually enhance their skills and competencies, leading to improved patient care and career development. As healthcare evolves, the demand for creative educational solutions like xMOOCs will increase, resulting in better patient outcomes and enhanced professional practice in nursing. However, ongoing research and development are crucial to address challenges related to quality assurance, learner engagement and scalability. This will ensure that xMOOCs remain a vital resource in modern healthcare education.

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