



ประสิทธิผลของรายวิชาออนไลน์แบบเปิดขนาดใหญ่ด้านการพยาบาลเด็กสำหรับนักศึกษา พยาบาลระดับปริญญาตรี

Effectiveness of a Massive Open Online Course in Paediatric Nursing for Undergraduate Nursing Students

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บทคัดย่อขยาย

ความเป็นมาและวัตถุประสงค์ รายวิชาออนไลน์แบบเปิดขนาดใหญ่ (Massive Open Online Courses: MOOCs) เป็นรูปแบบการเรียนรู้ที่มีความยืดหยุ่นและเข้าถึงได้ง่าย โดยมุ่งเน้นผู้เรียนเป็นศูนย์กลาง ThaiMOOC เป็นแพลตฟอร์ม MOOC ระดับชาติของประเทศไทยที่ให้บริการหลักสูตรออนไลน์แบบเปิดสำหรับการศึกษาระดับอุดมศึกษาและการเรียนรู้ตลอดชีวิต การวิจัยนี้มีวัตถุประสงค์เพื่อประเมินประสิทธิผลของรายวิชาออนไลน์แบบเปิดขนาดใหญ่ด้านการพยาบาลเด็กในการเสริมสร้างความรู้ พฤติกรรมการเรียนรู้ และความพึงพอใจของนักศึกษาพยาบาลระดับปริญญาตรีจากสถาบันเครือข่าย

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วิธีการวิจัย การวิจัยนี้เป็นการวิจัยกึ่งทดลอง (quasi-experimental research) แบบกลุ่มเดียว วัดก่อนและหลังการทดลอง (one-group pretest-posttest design) กลุ่มตัวอย่างประกอบด้วยนักศึกษาพยาบาลจำนวน 210 คน จาก 5 สถาบัน รายวิชาประกอบด้วยบทเรียนทั้งหมด 14 บท ใช้ระยะเวลาในการเรียนรวม 9 ชั่วโมง ผ่านแพลตฟอร์มการเรียนรู้ออนไลน์ ThaiMOOC เครื่องมือวิจัยประกอบด้วยแบบสอบถามข้อมูลส่วนบุคคล แบบทดสอบวัดความรู้ แบบสอบถามพฤติกรรมการเรียนรู้ และแบบสอบถามความพึงพอใจ วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาและสถิติทดสอบที่แบบจับคู่ (paired t-test)

ผลการวิจัย ผลการศึกษาพบว่าคะแนนความรู้ของนักศึกษาพยาบาลหลังการเรียนสูงกว่าก่อนการเรียนอย่างมีนัยสำคัญทางสถิติ โดยคะแนนเฉลี่ยก่อนการเรียนเท่ากับ 22.06 (S.D. = 7.667) และหลังการเรียนเท่ากับ 36.12 (S.D. = 5.213) ที่ระดับนัยสำคัญทางสถิติ $p < .001$ พฤติกรรมการเรียนรู้ของนักศึกษาอยู่ในระดับ “บ่อยครั้ง” ($M = 4.12$, S.D. = 0.519) และความพึงพอใจต่อเนื้อหาวิชาและการออกแบบรายวิชาอยู่ในระดับ “มากที่สุด” ($M = 4.19$, S.D. = 0.272)

สรุปและข้อเสนอแนะ รายวิชาออนไลน์แบบเปิดขนาดใหญ่ด้านการพยาบาลเด็กมีความสัมพันธ์กับการเพิ่มขึ้นอย่างมีนัยสำคัญของความรู้ พฤติกรรมการเรียนรู้ และความพึงพอใจของนักศึกษาพยาบาล ซึ่งสะท้อนถึงคุณค่าของการจัดการเรียนการสอนแบบ MOOC ที่ออกแบบอย่างมีคุณภาพในการศึกษาพยาบาล โดยการจัดโครงสร้างการเรียนรู้เป็นหน่วยย่อยและการนำแนวทางการเรียนรู้ที่เน้นผู้เรียนเป็นศูนย์กลางมาใช้ สามารถส่งเสริมการเรียนรู้ที่ยืดหยุ่นและสนับสนุนความเท่าเทียมทางการศึกษาได้อย่างมีประสิทธิภาพ

คำสำคัญ: การพยาบาลเด็ก, หลักสูตรออนไลน์แบบเปิด, พฤติกรรมการเรียนรู้, ความพึงพอใจของนักศึกษา

Extended Abstract

Background and Objective Massive Open Online Courses (MOOCs) represent a flexible and accessible mode of learning, with a strong emphasis on learner-centered approaches. ThaiMOOC is Thailand's national MOOC platform that provides open online courses for higher education and lifelong learning. This study aimed to evaluate the effectiveness of the ThaiMOOC-based paediatric nursing course in enhancing knowledge, learning behaviours, and satisfaction among undergraduate nursing students from networked institutions.



Methods A quasi-experimental one-group pretest–posttest design was employed with a sample of 210 nursing students from five institutions. This course consisted of 14 modules with a total learning time of nine hours. The intervention was delivered through the ThaiMOOC online learning platform. The research instruments included a demographic questionnaire, a knowledge assessment test, a learning behavior questionnaire, and a satisfaction questionnaire. Data were analyzed using descriptive statistics and a paired t-test.

Result The finding revealed that students’ knowledge scores significantly increased from pretest ($M = 22.06$, $S.D. = 7.667$) to posttest ($M = 36.12$, $S.D. = 5.213$), $p < .001$. Learning behaviours were reported at a “frequent” level ($M = 4.12$, $S.D. = 0.519$), while satisfaction with both course content and course design was rated as “very high” ($M = 4.19$, $S.D. = 0.272$).

Conclusion and Recommendations The ThaiMOOC-based paediatric nursing course was associated with significant improvements in nursing students’ knowledge, learning behaviours, and satisfaction, demonstrating the value of well-designed MOOC instruction in nursing education. By structuring learning into smaller modules and adopting a learner-centred approach, it can effectively promote flexible learning and support educational equity.

Keywords: Paediatric nursing, ThaiMOOC, Learning behaviours, Student satisfaction

Introduction

The 21st century has brought about profound transformations in the global education landscape due to rapid advancements in economics, technology, and social structures (Sharmaa, 2025). These trends encompass the rapid proliferation of digital learning, the implementation of AI-driven personalised instruction, the promotion of global citizenship education, and the adoption of inclusive learning practices (Brown, 2025). Collectively, these developments are redefining the processes of student learning, teacher instruction, and the pursuit of equity and relevance within education systems in an increasingly dynamic and complex world (Zou et al., 2025).

Undergraduate nursing curricula have likewise been transformed to align with the rapid shifts occurring in educational practices. The rapid transition to online and home-based learning has fundamentally transformed undergraduate nursing education (Asgari Tapeh & Darvishpour, 2024; Daniel et al., 2023) Virtual lectures, digital skill demonstrations, and online tutorials have supplanted



traditional classroom instruction. This transition has enhanced flexibility and promoted greater self-directed learning among students. However, it has also introduced significant challenges, including technical difficulties, limited opportunities for hands-on practice, and decreased peer interaction (Hu et al., 2022). A study of nursing students and faculty across Southeast Asia found that online education was viewed as flexible but limited by psychological stress, reduced engagement, insufficient clinical skills practice, and technological disparities (Kunaviktiku et al., 2022). These challenges highlight the significant impact of the rapid shift to online learning and underscore the need for strengthened digital infrastructure and comprehensive pedagogical support to ensure effective learning outcomes in nursing education (Hu et al., 2022; Kunaviktikul et al., 2022).

Massive Open Online Courses (MOOCs) represent a new form of online learning that promotes self-directed study and allows an unlimited number of learners to participate regardless of gender, age, educational background, or location. Through digital platforms, learners can access instructional content delivered by experts from leading global institutions, engage in interactive learning activities, and complete assessments to support meaningful, flexible learning experiences. MOOCs serve as a transformative digital learning innovation that expands equitable access to quality education, supports lifelong learning, and fosters essential 21st-century skills by enabling flexible, self-paced online learning for diverse learners worldwide (Rodniyom, 2024). Despite the considerable potential of MOOCs to promote flexible and lifelong learning in higher education, development and implementation in Norway are hindered by fragmented institutional support, inconsistent digital infrastructure, and insufficient strategic alignment at both institutional and national levels (Langseth et al., 2021). MOOCs serve as valuable resources for fostering lifelong learning and facilitating professional development; however, empirical evidence regarding their effectiveness in nursing education remains limited (Wardhani et al., 2024).

In nursing education, the incorporation of MOOCs provides a valuable mechanism for expanding educational access and enriching students' knowledge beyond the constraints of traditional pedagogical methods. Online learning enhances knowledge retention and supports the development of professional competencies in nursing aligned with real-world clinical demands (Cunha et al., 2025). A prior investigation conducted in Thailand reveals that the incorporation of MOOCs into the curriculum of maternal, newborn, and midwifery nursing education leads to a marked improvement in



students' academic performance when compared to conventional classroom instruction (Chainakin et al., 2025). MOOCs function as effective tools for lifelong learning among healthcare professionals, as evidenced by high levels of perceived usefulness, ease of use, and intention for continued utilisation, alongside statistically significant improvements in knowledge retention following course completion (Padilha et al., 2025). Nurses exhibited a generally high level of preparedness for participating in MOOCs, particularly regarding their motivation, familiarity with technology, and positive perceptions of online learning environments (Aung et al., 2023). Persistent gaps in continuing nursing education, including limited digital literacy, inadequate self-regulated learning skills, unstable technological infrastructure, low course completion rates, and insufficient personalised feedback, remain evident (Aung et al., 2023; Wardhani et al., 2024). These challenges underscore the need for enhanced MOOC design and strengthened learner support mechanisms to improve learning effectiveness. Despite the increasing use of MOOCs in higher education, several research gaps remain. First, limited studies have examined MOOCs specifically designed for paediatric nursing education. Second, empirical evaluation of courses delivered through the ThaiMOOC platform remains scarce. Third, few studies have used quasi-experimental designs to examine the impact of MOOCs on nursing students' learning outcomes.

To address these challenges, the present study aims to evaluate an open-access paediatric nursing course delivered through the ThaiMOOC platform to promote flexible, equitable, and scalable access to learning. The instructional approach incorporates dialogic engagement and active listening strategies to foster meaningful learning and the acquisition of essential professional competencies. This study was grounded in an interactive and student-centred pedagogical framework. It aimed to develop a sustainable learning model that equips undergraduate nursing students from five nursing academic institutions across Thailand with the knowledge and skills necessary for effective practice in complex healthcare environments. The findings are expected to advance digital pedagogy in nursing education and support the broader integration of scalable e-learning models within national academic frameworks.



Objectives

To evaluate the effectiveness of an open-access paediatric nursing course delivered via the ThaiMOOC platform by examining students' knowledge improvement, learning behaviours, and satisfaction with the learning experience among undergraduate nursing students from networked institutions.

Conceptual Framework

This study is grounded in Kirkpatrick's Four-Level Evaluation Model (Kirkpatrick, 1979), which provides a systematic and widely accepted framework for assessing the effectiveness of educational and training programmes across diverse learning contexts, including digital and online learning environments. The model is particularly suitable for evaluating MOOCs in nursing education, as it enables comprehensive assessment of learners' immediate responses, learning outcomes, behavioural application, and broader educational impact. The framework comprises four interrelated levels:

Level 1: Reaction

This level examines learners' immediate responses to the paediatric nursing MOOC, focusing on satisfaction with course content, instructional strategies, platform usability, and overall learning experience. Measuring learners' perceptions at this stage is essential, as perceived relevance and engagement strongly influence motivation and subsequent learning transfer.

Level 2: Learning

At this level, learning outcomes are assessed in terms of knowledge acquisition and cognitive development resulting from course participation. In the present study, learning is evaluated by comparing pre- and post-test knowledge scores, reflecting the extent to which students have gained essential paediatric nursing knowledge through the ThaiMOOC course.

Level 3: Behaviour

This level evaluates the extent to which learners apply acquired knowledge and skills in their learning processes and academic practice. Learning behaviours such as lesson review, time management, active engagement, and application of knowledge to nursing situations are examined to determine how effectively learning transfers beyond content acquisition.



Level 4: Results

The final level focuses on the broader outcomes of educational intervention, including the development of professional competencies, academic performance, and readiness for future nursing practice. These outcomes typically require longitudinal evaluation and extend beyond the scope and duration of the present study. Therefore, although Level 4 was acknowledged as part of the conceptual framework, it was not directly measured in this study, which focused on short-term educational outcomes associated with MOOC implementation.

By applying Kirkpatrick's Model (Kirkpatrick, 1979), this study systematically evaluates nursing students' reactions, learning outcomes, behavioural engagement, and anticipated educational impact of the paediatric nursing ThaiMOOC. The framework offers a coherent structure for assessing the effectiveness of open-access online learning and supports evidence-based development of scalable digital pedagogies in nursing education. (Figure 1)

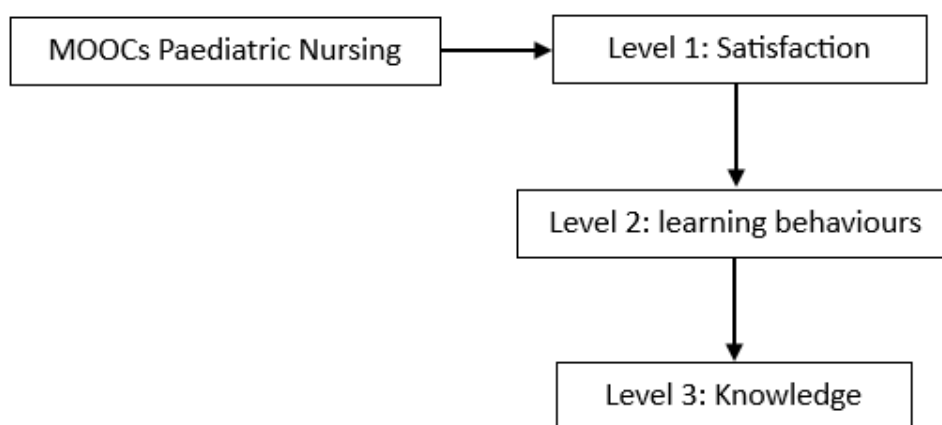


Figure1 Conceptual Framework

Methods

Design

This study employed a quasi-experimental design with a one-group pretest–posttest design



Participants and setting

The population consisted of undergraduate nursing students from twenty-five networked academic institutions in Thailand.

The sample consisted of third-year undergraduate nursing students from the five institutions: 1) Prince of Songkla University, Hatyai Campus; 2) Prince of Songkla University, Pattani Campus; 3) Boromarajonani College of Nursing, Yala; 4) Maejo University; and 5) University of Phayao, who had previously completed coursework in paediatric nursing. Participants were recruited using a purposive sampling technique, and only those who voluntarily consented to participate during the one-month recruitment period were included. A total of 210 students participated in the study. All participants completed the same pre-test and post-test assessments to evaluate changes in knowledge, learning Behaviour, and satisfaction following the intervention. The sample size was calculated using Yamane's formula (Yamane, 1973), with a significance level set at 0.05. Based on a total population of eligible students, the required sample size was 207 participants.

$$n = \frac{N}{1 + Ne^2}$$

The inclusion criteria were as follows: 1) being a nursing student from one of the five participating institutions who had completed at least one academic semester of paediatric nursing coursework, 2) holding Thai nationality and ethnicity with literacy in the Thai language, and 3) providing informed consent to voluntarily participate in the study.

Exclusion criteria included: 1) inability to participate in the study continuously throughout the data collection period, and 2) voluntary withdrawal from the study at any point

Intervention

The intervention implemented in this study was an online paediatric nursing course delivered through the ThaiMOOC platform. The course was structured around a comprehensive learning plan specifically designed for undergraduate nursing students and consisted of 14 instructional modules. Each module included clearly defined learning objectives, multimedia content, and interactive elements to support student engagement and comprehension. To assess learning outcomes and knowledge progression, students were required to complete a pre-test prior to beginning the course, followed by end-of-module quizzes, and a post-test upon course completion. The total estimated



online learning time for the course was nine hours. This structured and self-paced design aimed to promote active learning and knowledge retention in paediatric nursing through an accessible and flexible digital platform.

Research Instruments and Measures

Four Thai-language instruments were used for data collection in this study:

1. Demographic questionnaire: This form gathered demographic characteristics and educational background information of the participants.

2. Knowledge assessment test: A 40-item multiple-choice test was developed by the researchers based on the learning objectives of the paediatric nursing course to measure participants' knowledge related to paediatric nursing. The content validity of the test was evaluated by three experts in paediatric nursing and nursing education. The instrument was pilot tested with a group of nursing students who were not included in the main study to ensure clarity and reliability. The test was administered both before and after the intervention to assess changes in knowledge. The test was administered both prior to and following the intervention to assess changes in knowledge.

3. Learning behaviour questionnaire: This 18-item instrument, developed by the researchers based on a review of relevant literature, assessed students' learning behaviours in an open online nursing course. Responses were rated on a 5-point Likert scale, where 1 = Never, 2 = Very Rarely, 3 = Sometimes, 4 = Often, and 5 = Always. The interpretation of scores was classified into five levels: 4.21–5.00 (very frequent behaviour), 3.41–4.20 (frequent behaviour), 2.61–3.40 (occasional behaviour), 1.81–2.60 (rare behaviour), and 1.00–1.80 (very rare behaviour).

4. Satisfaction questionnaire: Developed by the researchers with reference to existing literature, this 21-item instrument measured students' satisfaction with the paediatric nursing course offered through the ThaiMOOC platform. The questionnaire consisted of two domains: course content (13 items) and course design (8 items). Responses were scored on a 5-point Likert scale (1 = very dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied, 5 = very satisfied). Satisfaction scores were interpreted as follows: 4.21–5.00 (very high), 3.41–4.20 (high), 2.61–3.40 (moderate), 1.81–2.60 (low), and 1.00–1.80 (very low).

The content validity of the learning behaviour and satisfaction questionnaires was evaluated by three experts, and the Content Validity Index (CVI) was calculated for each instrument. The CVI of



the learning behaviour questionnaire was 0.89, and the CVI of the satisfaction questionnaire was 0.95, indicating strong content validity (Polit & Beck, 2021). Cronbach's alpha coefficient of the learning behaviour questionnaire and the satisfaction questionnaire were 0.87 and 0.83, respectively.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of the Center for Social and Behavioural Sciences (#PSU IRB 2025-LL-Nur-001 internal). This study adhered to ethical standards for research involving human participants. Prior to data collection, the researcher introduced themselves to the participants and provided a thorough explanation of the research objectives, procedures, and activities involved throughout the study period. Participation in the study was entirely voluntary. Those who agreed to participate were asked to sign an informed consent form. Participants were informed of their right to withdraw from the study at any time without the need to provide a reason, and without penalty or impact on their academic standing. All data collected was kept confidential and securely stored for a period of two years, after which the data would be destroyed to ensure privacy protection.

Data Analysis

Data analysis was conducted using a statistical software package, with a significance level set at .05. Statistical analyses were performed using IBM SPSS Statistics version 26.0 (IBM Corp., 2019). Descriptive statistics were used to analyze demographic information, learning behaviour, and satisfaction with the paediatric nursing course delivered via the ThaiMOOC platform. Continuous variables with normal distributions were presented as mean and standard deviation (S.D.), whereas non-normally distributed variables were reported as median and interquartile range (IQR). Categorical variables were summarized using frequencies and percentages. To compare pretest and posttest knowledge scores, the paired *t*-test was employed. This parametric test was chosen due to the normal distribution of the data, as indicated by a prior normality test.

Results

The results revealed that the major demographic data of participants were female, third-year students, Buddhism, spending 91–120 minutes studying effectively in one sitting and 46–60 minutes



of continuous study before needing a break, and preferred studying in the late morning (9:01 a.m.–12:00 p.m.). (Table 1)

Table 1 Demographic Characteristics of Nursing Students (n = 210)

Demographic	n	%
Gender		
Female	202	96.20
Male	8	3.80
Religion		
Buddhism	184	87.60
Christianity	4	1.90
Islam	22	10.50
Year of Study		
Third-year student	122	58.10
Fourth-year student	88	41.90
Duration of effective learning time in each session		
Less than 30 minutes	6	2.86
30–60 minutes	48	22.86
61–90 minutes	62	29.52
91–120 minutes	64	30.48
More than 120 minutes	30	14.28
Duration of continuous learning before needing a break		
Less than 15 minutes	6	2.90
15–30 minutes	54	25.70
31–45 minutes	58	27.60
46–60 minutes	62	29.50
More than 60 minutes	30	14.30
Ability to allocate study time (times per day) (mean)	2.28 (1.049)	
Ability to allocate study time (times per week) (mean)	6.58 (6.27)	
Preferred learning time		
Morning (6:00 a.m.–9:00 a.m.)	44	21.00
Late morning (9:01 a.m.–12:00 a.m.)	98	46.70



Demographic	n	%
Afternoon (12:01 p.m.–3:00 p.m.)	48	22.80
Evening (3:01 p.m. - 6:00 p.m.)	8	3.70
Night (6:01 p.m.–9:00 p.m.)	10	4.80
Late night (9:01 p.m.–12:00 a.m.)	2	1.00

When comparing the nursing students' knowledge scores from partner institutions before and after completing the paediatric nursing course delivered as a MOOC via the ThaiMOOC platform, it was found that the post-test mean score (Mean = 36.12, S.D. = 5.213) was significantly higher than the pre-test mean score (Mean = 22.06, S.D. = 7.667). A paired t-test indicated a statistically significant difference between pretest and posttest scores ($p < .001$), as shown in Table 2.

Table 2 Compare nursing students' knowledge (n = 210)

Knowledge assessment	Pre-test		Post-test		P value
	Mean	S.D.	Mean	S.D.	
Total score	22.06	7.667	36.12	5.213	.000

Paired t-test; $p < .001$; significant: $P < .05$; 95% confidence interval.

Regarding the learning behaviours of nursing students enrolled in the paediatric nursing course offered on the ThaiMOOC platform, the findings revealed that participants reported an overall learning behaviour score at a frequent level, as presented in Table 3.

Table 3 Nursing students' learning behaviour (n = 210)

Nursing student's learning behaviour	Mean	S.D.
1. You regularly participate in online learning through the ThaiMOOC platform.	4.12	1.142
2. You complete all exercises or assignments assigned via the ThaiMOOC platform.	4.37	1.074
3. You consistently engage in online discussions or group conversations with other students.	3.52	1.110
4. You manage your study time effectively while learning through the ThaiMOOC platform.	4.35	.669
5. You are committed to understanding and mastering the content presented through the ThaiMOOC platform.	4.29	.767



Nursing student's learning behaviour	Mean	S.D.
6. You set learning goals for each lesson before starting the study session.	3.88	.832
7. You regularly review and adjust your personal learning plan.	3.85	.693
8. You employ strategies to manage stress arising from studying via the ThaiMOOC platform.	4.08	.855
9. You effectively handle obstacles encountered during online learning through the ThaiMOOC platform.	4.22	.812
10. You seek support or guidance from instructors when encountering difficulties with the course content.	3.67	1.269
11. You exchange ideas and offer support to your peers while studying through the ThaiMOOC platform.	3.43	1.379
12. You fully utilize tools and resources available on the ThaiMOOC platform to enhance your learning efficiency.	4.24	.855
13. You seek additional information or resources beyond those provided on the ThaiMOOC platform to deepen your understanding of the content.	4.28	.831
14. You apply the knowledge gained from studying through the ThaiMOOC platform to real-life situations or nursing practice.	4.46	.671
15. You periodically assess your own learning progress to ensure that you are meeting your personal learning goals.	4.10	.827
16. You use various learning techniques such as note-taking and content summarization to improve memory retention and comprehension.	4.16	.835
17. You review your learning outcomes after completing each lesson.	4.52	.694
18. You meet the assessment criteria for each topic with a score not lower than%.	4.64	.588
Total score	4.12	.519

Regarding satisfaction, nursing students who participated in the paediatric nursing course delivered via the ThaiMOOC platform reported a very high level of satisfaction, with an overall mean score of 4.19 (S.D. = 0.272). The highest satisfaction ratings were observed across both course content and course design dimensions, as presented in Table 4.

**Table 4** Nursing students' satisfaction (n = 210)

Nursing student's satisfaction Content Dimension	Mean	S.D.
1. The lesson content is clear and easy to understand.	4.40	.673
2. The explanation of the lesson content is detailed and covers all key topics.	4.38	.662
3. The content covers all essential topics required for learning in the course.	4.54	.580
4. The content is relevant and connected to real practice in the nursing profession.	4.65	.570
5. Examples or case studies are provided to help understand how to apply knowledge in real situations.	4.05	.868
6. The information is referenced from reliable and up-to-date sources.	4.54	.627
7. The content is sufficiently in-depth to promote analytical thinking and problem-solving skills.	4.33	.672
8. The presentation of content is engaging and stimulates learning interest.	4.23	.920
9. The use of supplementary media, such as videos, infographics, or illustrations, enhances content comprehension.	4.63	.548
10. The content is appropriate for the students' level of knowledge and skills in each academic year.	4.57	.609
11. The content enables students to study and review independently and effectively.	4.10	.818
12. The content is accessible anytime and anywhere without limitation.	4.69	.550
13. Activities or exercises are designed to promote interaction with the content.	4.32	.641
Total score of content dimension	4.42	.496
Design Dimension		
14. The webpage and interface design are visually appealing and engaging.	4.21	.832
15. The use of colors and illustrations on the platform is appropriate and visually attractive.	4.12	.824
16. Information and content are organized in a clear and systematic manner.	4.32	.794
17. The font style and size are easy to read and visually comfortable.	4.27	.724



Nursing student's satisfaction Content Dimension	Mean	S.D.
18. The platform is responsive and displays well across various devices, such as computers, mobile phones, and tablets.	4.54	.685
19. The platform design accommodates diverse learners in terms of language and technological ability.	4.49	.597
20. There are functions that support learners with special needs.	4.47	.650
21. The design allows for continuous and uninterrupted learning through the platform.	4.36	.752
Total score of design dimension	4.38	.544
Total score of satisfaction	4.19	.272

Discussion

This study evaluated the effectiveness of a paediatric nursing course delivered via the ThaiMOOC platform, focusing on three main aspects: students' knowledge acquisition, learning behaviours, and learning satisfaction. The findings demonstrated a statistically significant improvement in knowledge scores after completing the course, indicating that online learning through ThaiMOOC effectively enhanced nursing students' understanding of paediatric nursing content. The significant post-course improvement in knowledge scores is consistent with evidence showing positive associations between academic achievement, e-learning readiness, and academic self-efficacy ($p < .001$) (El-Gazar et al., 2024). These factors likely contributed to students' ability to engage effectively with the ThaiMOOC platform and successfully acquire paediatric nursing knowledge.

In the present study, most nursing students reported an effective study duration of 91 – 120 minutes per session, with sustained concentration lasting approximately 46 – 60 minutes per lesson before requiring a short break. This pattern is consistent with quasi-experimental evidence showing that chunking asynchronous lectures into shorter video units enhances sustained attention by promoting break-taking and reducing attention lapses (Harris et al., 2021). The reported need for breaks after 46–60 minutes may therefore reflect adaptive self-regulation, supporting the design of MOOC-based paediatric nursing content with structured segments and planned breaks. Therefore, ThaiMOOC in the field of Paediatrics, which uses an asynchronous teaching method, organizes the



content into shorter, smaller units to increase engagement and learning outcomes. Furthermore, this study found that students achieved the highest learning effectiveness during the late morning period, aligns with Muhammad et al. (2020), who found that undergraduate students performed better when classes were held in the morning or early afternoon compared to later in the day.

In terms of knowledge acquisition, the comparison of pre-test and post-test scores in the paediatric nursing subject revealed that post-test scores were significantly higher than pre-test scores ($p < .001$). This indicates that learning through ThaiMOOC effectively enhanced nursing students' knowledge. Similar results were reported by Cao et al. (2021), who found that blended learning using MOOCs was more effective than traditional face-to-face instruction in fundamental nursing courses. Likewise, evidence from Portugal demonstrates that well-designed MOOCs effectively promote online learning by enhancing engagement, satisfaction, and academic achievement through modular and flexible, learner-centred participation, even when course completion is partial (Padilha et al., 2025).

Regarding learning behaviours, the findings demonstrated a high level of positive learning behaviours ($M = 4.12$, $S.D. = 0.52$), particularly in achieving lesson outcomes, meeting assessment criteria, and applying knowledge to practice. These findings reflect higher levels of self-efficacy as described in Bandura (1991) social cognitive theory, which emphasizes that learners with higher self-efficacy are more likely to take initiative, persist through challenges, and apply learned knowledge effectively. This is also in line with a previous study that found that nursing students demonstrated high self-directed learning readiness alongside satisfactory time management skills, highlighting their capacity for autonomous and effective learning (Sadeghi et al., 2024). Such findings suggest that self-efficacy and self-directed learning are interrelated factors that enhance learners' ability to engage actively and independently in the learning process. Furthermore, contemporary literature conceptualizes e-learning as an integral component of 21st-century educational systems, emerging from the integration of pedagogy, digital technologies, and communication sciences, rather than viewing it merely as a technological delivery tool (Selwyn, 2024). E-learning platforms such as ThaiMOOC adopt learner-centred and flexible designs that promote autonomy, self-efficacy, and self-directed learning, thereby enhancing active engagement and effective knowledge application in professional education (Zhu & Bonk, 2019).



Learning satisfaction, students demonstrated a high level of overall satisfaction with learning through ThaiMOOC (Mean = 4.19, S.D. = 0.272), encompassing both course content and instructional design. Participants appreciated the flexibility of accessing the platform anytime and anywhere, as well as its compatibility across multiple devices. These findings are consistent with Abdull Mutalib et al. (2022) who reported moderate to high satisfaction, improved academic performance, and enhanced engagement among health sciences students engaged in online learning, largely attributed to the flexibility and accessibility of online platforms. Additionally, a study in India found that well-designed e-learning systems enhance learner engagement, satisfaction, and self-directed learning by providing flexible, accessible, and learner-centred learning environments (Kumar & Kumar, 2020). These features support sustained motivation and effective knowledge application in higher education.

The high satisfaction levels in this study further reinforce the effectiveness of ThaiMOOC's course design. Effective assessment methods were also found to mediate the relationship between course content and overall satisfaction, underscoring the importance of well-designed evaluation strategies in shaping learners' experiences (Si, 2022). Moreover, course structure has been shown to exert a strong direct influence on both student satisfaction and academic achievement (Kim & Kim, 2021), particularly by promoting learner engagement and self-directed learning among diverse student groups (Zhang et al., 2025). Furthermore, the flexible delivery of ThaiMOOC across institutions and geographical regions underscores its potential to reduce educational disparities and support national nursing curriculum reform. Consistent with previous studies, the present findings indicate that well-designed MOOC-based paediatric nursing courses, particularly those structured into modular, manageable learning units, effectively enhance knowledge acquisition, sustain learner engagement, and support self-regulated learning patterns (Padilha et al., 2025). These results also highlight the effectiveness of MOOCs in promoting knowledge retention and underscore the need for modular, interactive, collaborative, and immersive learning designs that meet the evolving needs of healthcare and nursing education in the digital era.

Limitations

While the findings provide valuable insights into MOOC-based learning in paediatric nursing, certain methodological aspects should be considered. The quasi-experimental one-group



pretest–posttest design without a control group limits causal interpretation and may be influenced by unmeasured confounding factors. In addition, the inclusion of nursing students from only five institutions may restrict the generalizability of the findings to wider nursing populations. Although self-reported measures provided important insights into learning behaviours and satisfaction, they are subject to potential response biases. Finally, the study did not examine long-term knowledge retention or clinical performance outcomes, which are important indicators of educational effectiveness in nursing education.

Conclusions

In conclusion, the paediatric nursing course delivered via the ThaiMOOC platform demonstrated effectiveness across multiple levels of Kirkpatrick’s evaluation framework. At the reaction level, students reported high satisfaction with both course content and instructional design, reflecting positive learning experiences in a flexible and accessible digital environment. At the learning level, significant improvements in post-test knowledge scores indicate successful knowledge acquisition through the MOOC. At the behaviour level, frequent self-directed learning behaviours, including effective time management, engagement with learning activities, and application of knowledge to practice, suggest meaningful transfer of learning. Collectively, these findings support the role of well-designed MOOC-based instruction characterized by modular content, interactive media, and appropriate assessment strategies in promoting learner autonomy, sustained engagement, and academic achievement. In response to ongoing educational transformation and the learning preferences of digital-native students, integrating technology-enhanced, learner-centred pedagogies such as ThaiMOOC into nursing curricula represents a viable and scalable approach to advancing educational quality and meeting contemporary healthcare education needs.

Implications and Recommendations

Implication of the Finding

The findings suggest that MOOC-based learning via ThaiMOOC can be effectively integrated into paediatric nursing curricula to enhance knowledge, promote self-directed learning behaviours, and increase student satisfaction. Designing courses with modular, learner-centred content, interactive



media, and aligned assessment strategies may further support sustained engagement and effective learning. At the institutional level, ThaiMOOC offers a scalable approach to expanding equitable access to nursing education and supporting national curriculum reform.

Recommendations for Future Research

Future studies should employ controlled or comparative designs to strengthen causal evidence and examine long-term outcomes such as knowledge retention and clinical performance. Further research is also needed to explore learner-related factors and learning experiences across diverse nursing contexts to inform the sustainable implementation of MOOC-based education.

Declaration of Generative AI Use

The authors used ChatGPT (OpenAI) to support language editing and improve the clarity of the manuscript. All text was reviewed and revised by the authors before submission. ChatGPT was not used to generate research data, analyse findings, or draw conclusions. The authors take full responsibility for the content of this manuscript.

Conflict of Interest

The authors declare that there are no conflicts of interest related to this work.

Author Contributions

S.V. and P.S. contributed to the conceptualisation and study design, methodology, course development, data interpretation, and manuscript preparation. S.V., P.S., and J.P. contributed to participant recruitment, data collection, and course implementation. K.Y. provided supervision and contributed to the conceptualisation, study design, and methodology. All authors contributed to the critical reviewed of the manuscript, approved the final version, and agreed to be accountable for the work.



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