

## Use of breakout rooms in synchronous online nurse education: A systematic review of the literature to identify implications for simulated practice learning

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### ABSTRACT

Most synchronous online education video conferencing platforms include a technological function to split the main session into multiple concurrent sessions, known as 'breakout rooms'. The technological features of breakout rooms may be suitable to support the increasing use of simulated practice learning in nursing education; however, lack of skill and confidence have previously been identified as significant barriers to breakout room use and training for new online learning platforms can focus on technical aspects of using software rather than the specific pedagogical needs of nurse education. This systematic review aimed to understand the current evidence base underpinning use of breakout rooms in synchronous online nurse education and identify implications for simulated practice learning. Papers were identified using the PRISMA 2020 flow diagram for new systematic reviews which include searches of databases and registers and subjected to critical appraisal to ensure quality. Five papers were included for review and were subjected to reflexive thematic analysis using the six stages of analysis model. Five themes were identified: preparation, safe environment, innovation, support, and group dynamics. Breakout rooms were utilised to support a diverse range of learning activities compatible with the contexts identified by the Nursing and Midwifery Council for simulated practice learning in nursing education. The technological features of breakout rooms may support simulated practice learning in synchronous online nurse education by providing an environment for authentic, contextualised, and supervised practice experiences. Active learning can be encouraged by nurse educator presence and communication within breakout rooms, as well as planned inclusion of social interactions intended to build a community of support for students.

**Keywords:** breakout rooms, synchronous online nurse education, simulated practice learning

### Introduction

Following the outbreak of the Covid-19 pandemic, the nursing workforce faced unprecedented circumstances. The sudden closure of higher education institutions disrupted teaching and learning for future registrants and in March 2020, the Nursing and Midwifery Council (NMC) produced Emergency Standards for nursing and midwifery education in the United Kingdom (Leigh et al., 2020).

Emergency Standard E6 stated: "Theoretical instruction can be replaced with distance learning, where appropriate to support student learning, which meets the required theoretical hours and learning outcomes" (NMC, 2020, p. 10). Higher education institution responses to the Emergency Standards for Nursing and Midwifery Education (NMC, 2020) instigated an almost overnight shift in learning design, taking nurse education away from face-to-face teaching and towards synchronous online learning (Garner et al., 2022).

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In the United Kingdom, the NMC removed all Emergency Standards on 30th September 2021; however, some Emergency Standards were retained as Recovery Standards (NMC, 2022). Recovery Standard RN5 allowed higher education institutions and practice learning partners to use alternative learning opportunities that use simulation, virtual, and digital learning approaches to replace direct contact in practice for a maximum of 300 hours of the overall 2300 practice learning hours required in pre-registration nursing programmes (NMC, 2022).

In 2023, following extensive review, the NMC recognised that, “simulated practice learning methods are becoming increasingly sophisticated, helping students to build their confidence and skills in a range of situations, including some they may not encounter frequently in practice” (NMC, 2023a, Para. 2). As such, Recovery Standard RN5 was made permanent in the re-published NMC Standards for Pre-Registration Nursing Programmes (2023b), advising that higher education institutions and practice learning partners must provide no less than 2300 practice learning hours, of which a maximum of 600 hours can be simulated practice learning. Simulation-related standards were moved to the Curriculum section of the Standards for Pre-Registration Nursing Programmes, directing higher education institutions to, “ensure technology and simulation opportunities are used effectively and proportionately across the curriculum to support supervision, learning and assessment” (NMC, 2023b, p. 12).

Simulated practice learning can include a range of technologies or methodologies and can take place within practice learning environments or higher education institutions, including online and virtual environments (NMC, 2023a). To support small group collaboration and discussion, most leading video conferencing platforms used by higher education institutions for synchronous online education, such as Microsoft Teams, Zoom, and Adobe Connect, include a technological function to split the main session into multiple concurrent sessions, commonly known as ‘breakout rooms’ (Naik & Govindu, 2022). Within breakout rooms, the session facilitator or ‘host’ can: control student placement and session times, enter and exit breakout rooms, and broadcast messages to all students in breakout rooms while remaining in the main session (Naik & Govindu, 2022).

## Background

Use of breakout rooms in medical education is multinational and predates the Covid-19 pandemic. In North America, Blackboard Collaborate breakout rooms, incorporating use of three-dimensional anatomical computer models, have been utilised to teach anatomy for medical students, reducing the necessity to rely on cadavers (Attardi et al., 2018). In Japan, the Zoom platform has been used for online team-based learning of renal physiology among second year medical students, where students observed an experiment via the main room and were then assigned to breakout rooms to discuss calculations related to the experiment and case-related assignments (Fujiwara et al., 2023).

In Canada, the Zoom breakout rooms feature was successfully utilised to facilitate the inaugural pan-Canadian ‘RADGames’, an extra-curricular radiology competition, designed to promote the radiology speciality to medical students (Bouthillier et al., 2022). Medical students participating in the competition alternated between a main session and four rounds of 15-minute breakout room events, in which teams were expected to discuss and collaboratively solve five radiology cases (Bouthillier et al., 2022). Feedback from the event was reported to be overwhelmingly positive, with 98% of respondents (n=46) reporting increased knowledge of medical imaging, and 77% of respondents (n=36) reporting improved confidence in basic imaging interpretation (Bouthillier et al., 2022).

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Within the United Kingdom, breakout rooms have been used to facilitate medical students to prepare for, and undertake, objective structured clinical examination (OSCE). As with the rotational rounds approach of the 'RADGames', Zoom was found to offer suitable functionality in mimicking a physical OSCE, using breakout rooms to represent different examination stations (Hannan et al., 2021). Feedback from medical student participants was reported to be positive, with comments including, "Zoom works very well, especially the breakout rooms" (Hannan et al., 2021, p. 654). Zoom breakout rooms have also been incorporated into a 'Respiration Station' OSCE revision session, designed and delivered by the medical student education organisation 'OSCEazy' (Peramuna Gamage et al., 2023). Use of the breakout room feature was reported to allow the students to receive more individualised attention from tutors and engage with peers in constructive discussion; however, no significant difference was found in participants' likelihood of asking questions in virtual OSCE teaching compared with a face-to-face equivalent (Peramuna Gamage et al., 2023).

Additionally, breakout rooms have been used in post-qualification medical education to teach ophthalmic surgical skills on an Ophthalmology Masters degree programme (Gupta et al., 2023). After watching a PowerPoint presentation describing suture materials, instruments, and suture handling in the main virtual teaching room, and watching pre-recorded videos on knot tying, ophthalmology students were assigned to breakout rooms to practise their skills on fruits under the direct supervision of an instructor (Gupta et al., 2023). Feedback received from students was positive, including the comment, "I liked that we had instructors with us in the breakout rooms to ask about steps we were unsure about" (Gupta et al., 2023, p. 292). Feedback from instructors was also positive, proposing instruction in breakout rooms was comparable to face-to-face environments and instructors in breakout rooms were more able to help students acquire skills on an individual basis (Gupta et al., 2023).

### Research problem

Under the *National Health Service Long Term Workforce Plan* (NHS England, 2023), the United Kingdom Government aims to increase adult nursing training places by 92% by 2031/2032; however, higher education institutions are reporting increasing difficulties securing enough placements for student nurses (Evans, 2023). To resolve the lack of practice learning opportunities, nurse educators are urged to seek creative solutions that maximise the 600 hours of simulated practice learning that can be approved for pre-registration nursing programmes by the NMC (2023b) (Evans, 2023).

Since the Covid-19 pandemic, simulation is recognised as having a "transformative role in revolutionising nursing education through diversifying and strengthening learning experiences" (Harrison et al., 2024, p. 2). However, despite the broad definition of simulation being, "an educational method which uses a variety of modalities to support students in developing their knowledge, behaviours and skills, with the opportunity for repetition feedback, evaluation and reflection to achieve their programme outcomes" (NMC, 2023b, p. 17), use of breakout rooms as a pedagogical approach to simulation-based nurse education or simulated practice learning appears to be overlooked at present. This is exemplified by the lack of inclusion of breakout rooms pedagogies in the *Simulation in Nursing Education: An Evidence Base for the Future* Council of Deans 2024 report (Harrison et al., 2024).

Following the reported successes of using breakout rooms in medical education, the technological features of breakout rooms may also provide an environment for authentic, contextualised, and supervised simulated practice learning in synchronous online nurse education (NMC, 2023a). Investigating the use of

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breakout room pedagogies in synchronous online nurse education could provide higher education institutions with increased options for utilising simulated practice learning to overcome decreasing placement learning opportunities. At present, published evidence discussing the effectiveness of breakout room pedagogies in nurse education is limited. To the best of the author's knowledge, a literature review focusing on the use of breakout rooms in synchronous online nurse education has not yet been published, indicating a gap in the evidence base. This literature review aims to understand the current evidence base surrounding the use of breakout rooms in synchronous online nurse education and identify implications for simulated practice learning.

## Method

The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 flow diagram for new systematic reviews which include searches of databases and registers was followed to identify papers (Page et al., 2021). A database search was performed in October 2023 using the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and Google Scholar. The search terms, Boolean operators and truncation symbols used included: 'breakout rooms', 'breakout sessions', 'digital group work', 'digital small group rooms', 'Zoom', 'Adobe Connect' AND 'nurs\* education'. No date or geographical restrictions were applied; however, only papers written in the English language were included. To gather multiple perspectives of use of breakout rooms in nurse education, there were no restrictions on academic level of education studied and papers included pre-registration student nurse participants and postgraduate nurse participants.

After duplicate records were removed, nine papers were identified. Reference lists of identified papers were also searched to identify earlier ancestral research, and database citation indexes were also searched to locate descendant research from the identified papers (Polit & Beck, 2017). A further three papers were identified using the ancestors and descendants search approach (Polit & Beck, 2017).

To ensure data focused on use of breakout rooms exclusively in synchronous online nurse education, multidisciplinary studies that combined findings from nursing students with students from non-nursing disciplines were excluded. Following exclusion, a final total of five papers were identified. Each paper was subjected to critical appraisal using PROMPT criteria: Presentation, Relevance, Objectivity, Method, Provenance and Timeliness (Open University, 2014). PROMPT evaluation is not designed to be scored, but rather to provide a structured approach and logical framework against which to assess quality of information or data and alert the reader to potential indicators of threats to trustworthiness (Open University, 2014). Critical appraisal of the papers using PROMPT revealed no substantial threats to trustworthiness and subsequently, no papers were excluded.

To determine how to analyse the data, the ontological and epistemological assumptions for the research were established (Polit & Beck, 2017). The research aims to understand the current evidence base surrounding the use of breakout rooms in synchronous online nurse education, which will be shaped by subjective behavioural factors, such as values, beliefs, and perceptions (Ingham-Broomfield, 2015). Though they may share similarities, it is unlikely that reported findings in the data will be uniform; therefore, the ontological assumption that reality is multiple and subjectively constructed by individuals was adopted (Polit & Beck, 2017). Epistemological assumptions clarify the definition and generation of knowledge, and the role of the researcher (Polit & Beck, 2017). As a nurse educator, the author was situated to interpret the data through the lens of that disciplinary position and have an active role in reflexively engaging with

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theory, data, and interpretation to uncover tacit knowledge and produce explicit knowledge to add to the knowledge base (Braun & Clarke, 2020).

The final five papers were subjected to reflexive thematic analysis using the six stages of analysis model (Braun & Clarke, 2006). Reflexive thematic analysis was selected as an approach that embraces the qualitative assumptions of the research, and the subjective skills the researcher brings to data analysis (Braun & Clarke, 2020). Stage one involved repeated reading of the literature, actively looking for meanings and patterns. Following familiarisation with the literature, stage two lead to the development of an initial list of codes, for example frequent references to feelings of safety to practise skills within breakout rooms was coded as ‘safe spaces’. Stage three involved analysing codes and considering how codes combined to form overarching themes. For example, the codes ‘breakout room allocation’, ‘group composition’, and ‘social introductions’ were grouped (with other codes) to form the theme ‘group dynamics’. Stage four was a review of the themes to see if they represented the data, at this stage a larger theme of ‘learning’ was broken down into ‘safe environment’, and ‘innovation’. Stage five involved the naming of the final five themes: preparation, safe environment, innovation, support, and group dynamics. Finally, stage six was producing this literature review.

**Findings**

Five themes were identified from reflexive thematic analysis of the literature: preparation, safe environment, innovation, support, and group dynamics (Table 1).

**Table 1** Themes and codes

Themes	Codes
Preparation	Educator motivation for utilising breakout rooms. Educator planning for breakout room use. Educator approaches to preparing students for breakout room use. Student preparation for breakout room activity. Breakout room activity feedback from students. Breakout room use feedback from educators.
Safe environment	Safe environment to address variations in practice. Student environment and comfort. Ability to try different roles and practise skills outside of clinical setting. Technology offering a safe space, monitors and screens reducing anxiety. Risk to patient participants.
Innovation	Inclusion in clinical hours. Mimic practice: case studies, worse case scenarios, and ‘pop-up’ patients. Developing skills: teamwork, communication, telehealth
Support	Absent, periodic, and immediate support. Support ‘safety nets’. Student evaluation.
Group dynamics	Breakout room allocation. Icebreakers, check-ins, and social introductions. Group size and composition. Team cohesion.



### Preparation

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Three studies cited Covid-19 restrictions for utilising breakout room pedagogies (Cantey et al., 2021; Liesveld et al., 2023; Sullivan, 2022). Only one setting used video conferencing technology prior to Covid-19, where students used handheld electronic devices and video conferencing tools on campus to communicate with patients off campus (Rickman Patrick & Butzlaff, 2021). This approach was modified following Covid-19 restrictions, in that students, patients and faculty used electronic devices to video conference remotely (Rickman Patrick & Butzlaff, 2021). Data from one Norwegian study was collected in August 2021 (Almendingen et al., 2023), when Norwegian university campuses were in gradual re-opening phases following Covid-19 restrictions (Grøslund et al., 2022).

Two studies that utilised breakout room pedagogies in response to Covid-19 restrictions provided insight into the process for transitioning existing in-person learning material into online synchronous education formats. Sullivan (2022) summarised the transition process as: develop student learning objectives, record lecture content, develop pre-class activities, develop in-class activities, develop weekly quizzes, introduce students to the flipped learning method, post materials on the online learning system, and facilitate class. Liesveld et al. (2023) did not describe their transition process; however, indicated a detailed process requiring 10 faculty planning group meetings.

Within the data, there was a lack of detailed discussion regarding how faculty prepared to utilise breakout room pedagogies. This is represented in an extract from Cantey et al. (2021, p. 388) where preparation was described as, “a steep learning curve for nurse educators which was heightened by the need for a rapid turnover of new educational content to keep students engaged throughout the virtual sessions”. Only one study included faculty feedback, which supported an acknowledged need for preparing faculty for breakout room pedagogies; Liesveld et al. (2023, p. 347) reported that 91% of faculty (n=11) agreed that planning for the learning event produced robust learning activities; however, only 64% of faculty agreed that they had adequate training prior to the learning event. To improve faculty preparation for future breakout room use, Liesveld et al. (2023) identified a need to provide faculty with definitions of roles, duties and expectations, and information pertaining to student numbers in each breakout room in relation to the planned learning activity.

Only one study undertook a pilot delivery utilising student involvement to inform planning and preparation for using breakout rooms. Revisions made following the pilot were: inclusion of less digital learning material to read ahead of the learning activity, and fewer tasks to be discussed during breakout room time (Almendingen et al., 2023).

Two studies identified utilising the ‘flipped learning’ approach, where learning content is introduced outside of synchronous learning time, reserving synchronous learning time to guide students in active learning exercises (Open University, 2013). Consistent with the flipped learning approach, faculty developed and provided student learning activities to be completed asynchronously (Almendingen et al. 2023; and Sullivan, 2022). Sullivan (2022, p. 41) described their asynchronous learning activities as “very similar to the pre-class activities previously assigned in the traditional lecture-based course”; these included guided reading, watching videos and screencasts, and formative quizzes uploaded weekly. Similarly, Almendingen et al. (2023) uploaded guided reading and individual tasks for students to complete. To achieve a higher prerequisite for their clinical studies and a higher learning outcome from the work in the breakout rooms, Almendingen et al. (2023, p. 4) commented that “students were encouraged to prepare themselves before meeting with peers in online breakout rooms”; however, the encouragement provided was not described.

### Safe environment

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A theme throughout the literature was the perception of breakout rooms providing a safe environment for skill development (Almendingen et al., 2023; Cantey et al., 2021; Liesveld et al., 2023; and Rickman Patrick & Butzlaff, 2021). Cantey et al., (2021, p. 387) highlighted a need to create a “safe and comfortable learning environment” consistent with best practice guidance from the International Nursing Association for Clinical Simulation and Learning Standards Committee (2016). The majority of faculty utilised case study and scenario-based pedagogical approaches to facilitate students to practise skills (Almendingen et al., 2023; Cantey et al., 2021; Liesveld et al., 2023), whereas Rickman Patrick and Butzlaff (2021) recruited patient participants willing to share their journeys with nursing students.

Breakout rooms were viewed as a safe option to learn about topics associated with danger and to explore worse-case scenarios (Almendingen et al., 2023). One study utilised breakout rooms as a platform to gather and present anonymous student responses to a malnutrition risk assessment tool, allowing students to discuss variations in understanding and subsequent variations in practice that can compromise patient safety (Almendingen et al., 2023). In the context of teaching disaster preparedness to pre-registration student nurses, students regarded using breakout rooms as “safe” and particularly valued exposure to new leadership roles (Liesveld et al., 2023, p. 346). Although not dangerous, discussing matters of sexuality at initial assessment is considered challenging for healthcare professionals (Brine, 2023). Breakout rooms were viewed as a “safe option” for pre-registration students to gain confidence and decrease anxiety when communicating with chronically ill patients about sexuality (Rickman Patrick & Butzlaff, 2021, p. 3).

Feeling safe was also proposed to extend to patients participating in the learning activity as “speaking from behind a screen may take away some of the anxiety or awkwardness a patient may feel while speaking with a healthcare provider” (Rickman Patrick & Butzlaff, 2021, p. 3). However, it is interesting to note that one patient participant reported insensitive communication from students within the breakout room, where the patient had been asked by students what they could have done to prevent their cancer diagnosis and if their spouse blamed them for the diagnosis or their attitude/moodiness around being diagnosed with cancer (Rickman Patrick & Butzlaff, 2021). The insensitive communication was attributed to lack of preparation, in that the group of students “did not have a clear understanding of what and how they should communicate with the patients”; however, the interaction suggests that breakout rooms can carry risk of harm to participants (Rickman Patrick & Butzlaff, 2021, p. 4).

### Innovation

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In addition to case studies and scenarios, breakout rooms were a platform to implement innovative nurse education pedagogical approaches including: topic maps, simulated telehealth clinics, medication problem solving exercises, practical demonstration, role playing, and unfolding events such as “pop-up” patients (Almendingen et al., 2023; Cantey et al., 2021; Liesveld et al., 2023; and Sullivan, 2022, p. 42).

Unfolding events were employed to surprise and challenge students, aiming to develop students’ communication and decision-making skills (Liesveld et al., 2023; and Sullivan, 2022). To make their disaster preparation scenario realistic and “come to life”, Liesveld et al. (2023, p. 345) arranged for supervisors to assume the roles of public safety officers and appear periodically in the breakout rooms with new information, escalating the scenario and causing students to re-evaluate their plans. Subsequently, 78% (n=125) of students agreed that the exercise scenario was plausible and realistic (Liesveld et al., 2023).

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Similarly, to prepare graduate nursing students on a primary care family nurse practitioner course with “real life” unexpected situations, a “pop-up” patient concept was utilised (Sullivan, 2022, p. 42). “Pop-up” patient activities were designed as brief case studies with short questions to work through, rather than a full unfolding case with multiple steps (Sullivan, 2022, p. 42). Scenarios included “pop-up” patients: arriving without an appointment, requiring a referral, and calling with an urgent concern or request (Sullivan, 2022). Using the “pop-up” patient approach, students could experience situations they may not see in practice and work together in breakout rooms to formulate pro-active management plans and response strategies (Sullivan, 2022). Interestingly, all students (n=14) rated the primary care family nurse practitioner course as effective and felt faculty inspired interest in course material and linked course learning objectives with nursing practice; however, students differed on their preference for traditional lectures versus flipped learning utilising breakout rooms, with 33% of students preferring traditional lecture, 25% neutral, and 42% not preferring traditional lecture (Sullivan, 2022, p. 43).

The technological features of breakout rooms were also employed by nursing faculty to support students in linking theory to practice (Cantey et al., 2021; and Sullivan, 2022). Within breakout rooms, students who were apart physically could use audio and video capabilities to practise patient handover techniques; conversely, students could observe learning and reduce disruption by turning off cameras and muting microphones during practise (Cantey et al., 2021). Turning off cameras and microphones was also used to elicit a sense of privacy during a nurse-patient role play designed to practise therapeutic communication in an end-of-life care context and following the learning activity students provided constructive feedback about performances and suggested alternative responses (Cantey et al., 2021).

Audio and visual capabilities of breakout rooms were also utilised to facilitate a simulated telehealth dermatology clinic, in which students were given images of skin conditions and email messages from fictional patients in order to develop management plans (Sullivan, 2022). Although the graduate primary care family nurse practitioner course was identified to return to a face-to-face format following easing of Covid-19 restrictions, the benefits of utilising online breakout rooms to continue to simulate telehealth consultation scenarios for future courses were identified (Sullivan, 2022). Cantey et al. (2021) agreed that online breakout rooms are useful to develop interpersonal and communication skills for telemedicine.

Surprisingly, breakout rooms were also used to support development of practical skills. To develop hand hygiene skills, students watched a video on handwashing and then used their cameras to demonstrate handwashing in their own sinks; similarly, to develop vital sign assessment, students practised pulse palpation, respiratory checks, and the mechanics of applying a manual blood pressure cuff (Cantey et al., 2021). To develop assessment skills, students practised general survey, level of consciousness, musculoskeletal, and head and neck assessments with a partner via their cameras (Cantey et al., 2021). Students then verbalised their findings, performed a return demonstration, and received immediate instructor feedback (Cantey et al., 2021). Students evaluated the practical skills teaching sessions using breakout rooms positively; 96% (n=23) and 78% (n=36) agreed they would recommend the sessions for some communication and psychomotor skills; 91% (n=23) and 75% (n=36) thought the sessions helped to practise new psychomotor skills; and 91% (n=23) and 86% (n=36) agreed that the sessions helped to reinforce skills (Cantey et al., 2021, p. 385).



### Support

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Faculty support available to students while using breakout rooms was discussed in four studies. Support ranged from no support within breakout rooms (Almendingen et al., 2023; and Sullivan, 2022), to periodic support within breakout rooms (Liesveld et al., 2023), to continuously present support within breakout rooms (Cantey et al., 2021).

As a means to explore students' opinions of using a pedagogical approach with minimal interaction with educators, Almendingen et al. (2023) did not provide support for students in breakout rooms. Educators did not visit the students' breakout rooms; however, students could "raise a digital hand" to ask for help (Almendingen et al., 2023, p. 10). Subsequently, Almendingen et al. (2023) found that some students would have preferred help from an educator in the breakout rooms, and students wanted more follow-up from educators in the breakout rooms. In response to their findings, Almendingen et al. (2023, p. 10) suggested they, "may have underestimated the students' need for supervision in the breakout rooms". Almendingen et al. (2023) also noted that in the absence of supervision and support in the breakout rooms, students may have needed to use time allocated for learning, for peer-to-peer technical support.

The breakout room activities conducted by postgraduate students on the primary care family nurse practitioner course were also unsupervised (Sullivan, 2022). In contrast to Almendingen et al. (2023), the students in the study did not comment on the lack of supervision or express a need for increased supervision from faculty. This finding may reflect an increased confidence in postgraduate students to work independently and seek help when required. Students within the disaster preparedness scenario engaged in the learning activities unsupported; however, the students received periodic supervision throughout the scenario from faculty facilitators who could answer any questions at the time of their visit to the breakout room (Liesveld et al., 2023). Periodic support was evaluated well by students, who felt faculty were helpful and gave guidance, and liked faculty to "pop in and out of the breakout rooms" (Liesveld et al., 2023, p. 346).

Although the level of support differed, a common theme the studies shared was provision of a support 'safety net', for example, students could "raise a digital hand" to seek support (Almendingen et al., 2023, p. 10). Sullivan (2022, p. 43) utilised a technique termed "muddiest points", where, prior to the end of the weekly plenary session, students could anonymously submit what they found most difficult to understand from the weekly content. Faculty would then respond to these "muddiest points" in the weekly class message (Sullivan, 2022, p. 43). An innovative support 'safety net' was the allocation of a designated breakout room in itself for students to visit to seek support from faculty (Liesveld et al., 2023). In reserving a dedicated breakout room for answering students' questions, faculty only needed to provide supervision in one breakout room as opposed to every breakout room. Students were also provided with facilitator's phone numbers in case of technical problems (Liesveld et al., 2023).

When faculty were continuously present in breakout rooms, a support 'safety net' was not indicated. In their pedagogical approach to teaching pre-registration nursing skills via online breakout rooms, Cantey et al. (2021) provided direct supervision and immediate feedback to students. In turn, this approach received positive evaluation from students who valued, "being guided through actual hands-on activities ... and going through the motions together" (Cantey et al., 2021, p. 387). Additionally, one student also commented, "the educator[s] were always present and helpful" (Cantey et al., 2021, p. 387).

### Group dynamics

Students were randomly allocated to their breakout rooms in three of the studies (Almendingen et al., 2023; Rickman Patrick & Butzlaff, 2021; and Sullivan, 2022) and group size ranged from 2 to 10 students per breakout room. Students responded differently to being randomly allocated to the breakout rooms. Liesveld et al. (2022, p. 346) found that students liked being in teams with people they did not know and who went to different higher education institutions as this gave students a platform for “meeting new people and listening to other student's thoughts”. In contrast, Almendingen et al., (2023) found that several students expressed that they preferred to work with people who they already knew. This was attributed to limited interaction from some of the students in the group, with one student commenting, “we were four students in the group, but only two of us spoke. We tried to include all of us, but we got limited response from the two others” (Almendingen et al., 2023, p. 7). It is interesting to note that, following a brief plenary welcome and zoom etiquette presentation, Liesveld et al. (2022) allocated one hour of the schedule for students to get to know each other in the breakout rooms. In contrast, Almendingen et al. (2023, p. 10) did not allocate any social introduction time for students and acknowledged that they, “might have underestimated the need for social introduction in the breakout rooms”.

In support of the value of social introductions in breakout rooms, Cantey et al. (2021) found that students valued community interaction as this boosted wellbeing and helped to overcome isolation when quarantined. Community interaction was achieved by ensuring all learning activities began with icebreakers or “check-ins”, such as sharing one good thing prior to the lesson (Cantey et al., 2021, p. 385-386).

Team cohesion challenges were explored in two studies. Almendingen et al. (2023, p. 7) found the “major challenges” experienced by students in the breakout rooms involved student passivity, unpreparedness, lack of camera use, lack of contribution, arriving late and leaving early. Regarding camera use, Almendingen et al. (2023) instructed students to use university email accounts to give the option to turn on a virtual background in case students wanted privacy in their home; however, some student participants still did not turn on their cameras (Almendingen et al., 2023). Students arriving in breakout rooms late and leaving early was identified as a contributing factor to changes in group size that interrupted work (Almendingen et al., 2023). However, the students expressed that group work quality was not dependent upon the exact number of people, but on how well the students were prepared, collaborated and contributed (Almendingen et al., 2023).

Collaboration was also identified as a team cohesion challenge by Liesveld et al. (2022) who found that students struggled to think cohesively within the breakout rooms and would pursue separate ideas. Interestingly, within this study, the number of students per breakout room was highest with 8-10, and student feedback identified that although students liked groups being “not too large”, there were too many people in each group to allow everyone to speak (Liesveld et al., 2022, p. 346). Acknowledging that not all students would have the opportunity to speak in breakout rooms, Cantey et al. (2021) instructed their students to appoint a spokesperson to report to the plenary. Feedback was positive and students enjoyed small group dynamics, engagement and interaction with peers and instructors, hearing other student's perspectives, and creating bonds (Cantey et al., 2021).

### Discussion

There were gaps in the literature discussing how learning using breakout rooms was planned and the iterative steps nurse educators followed in the learning design. Although one study provided detail on the

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steps followed to transition the relevant course material to flipped learning (Sullivan, 2022), none of the studies explicitly discussed how the breakout room activities were planned, developed or tested within nursing faculties. This finding has also been apparent in medical education, where comment on the learning design process incorporating breakout rooms has been limited to brief indication of “meticulous planning and preparation” (Hannan et al., 2021, p. 654). Lack of skill and confidence in using breakout rooms have previously been identified as significant barriers to breakout room use for educators within healthcare education (Chandler, 2016) and when training for new online learning platforms is provided for educators, this can focus on technical aspects of using software, and may not reflect the specific pedagogical needs and challenges of nurse education (Breeze & Holford, 2021). Where educators can lack necessary digital literacy skills to make informed choices about appropriate and effective use of technologies, adopting a learning design approach observing the ‘7Cs of Learning Design’ framework: Conceptualise; Capture; Create; Communicate; Collaboration; Consider; and Consolidate, can help educators make informed design decisions to harness the potential of technologies (Conole, 2014).

Breakout room technology provided a setting where student nurses could participate in learning activities with confidence, in an environment perceived to be safe. However, the literature also showed use of breakout rooms in nurse education is not without risk of harm and without adequate preparation and supervision students may not attain expected standards of practice and behaviour (Rickman Patrick & Butzlaff, 2021). The literature has provided evidence of successful use of breakout rooms in the contexts identified by the NMC for simulated practice learning, including: contextualised and supervised scenarios to reflect practice learning with real people, use of actors and role play to portray clinical scenarios, and opportunities to explore diverse areas of practice and experience situations less frequently encountered in the practice setting (NMC, 2023a). The perceived safe environment breakout rooms can provide can support the NMC vision that “students need to learn *to* practise, not just *about*” (2023a, Para. 22).

The literature review revealed diverse activities utilising breakout rooms in nurse education. Innovative approaches included topic maps, simulated telehealth clinics, medication problem solving exercises, practical demonstration, role playing, and unfolding events such as “pop-up” patients (Almendingen et al., 2023; Cantey et al., 2021; Liesveld et al., 2023; and Sullivan, 2022, p. 42). Similar to the “pop-up” patient concept (Sullivan, 2022, p. 42), literature from medical education also discussed inclusion of an innovative “spot diagnosis” learning activity where medical students used polling tools within breakout rooms to predict a diagnosis based on characteristics provided (Peramuna Gamage et al., 2023, p. 710). Furthermore, the ‘RADGames’ concept, utilising breakout rooms for events in a competition designed to increase medical students’ radiology knowledge and skills, provides additional suggestion for an opportunistic connection between breakout room technology and engaging game-based learning design (Bouthillier et al., 2023).

The use of breakout rooms to support development of practical skills was a surprising finding from the literature (Cantey et al., 2021); however, within medical education breakout rooms have also been used to practise ophthalmology surgical skills (Gupta et al., 2023). In both studies, students were sent practical equipment ahead of the learning activity, and directed to utilise household items, such as fruit to simulate eyeballs (Gupta et al., 2023) and water bottles to simulate arms for recording blood pressure (Cantey et al., 2021). These findings serve as a prompt for educators to consider what resources will be required for breakout room activities and how resources can be supplied or sourced.

The literature review findings suggested pre-registration student nurses preferred educators to be present and accessible during breakout room learning activities (Almendingen et al., 2023; Cantey et al., 2021; and Liesveld et al., 2023). This finding relates to the theory of transactional distance, where separation between

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educators and learners creates “a psychological and communication space to be crossed, a space of potential misunderstanding between the inputs of the instructor and those of the learner” (Moore, 1997, p. 22). The extent of transactional distance in an educational programme is a function of dialogue, structure, and learner autonomy; therefore, to reduce transactional distance, each party in a dialogue must be a respectful active listener, and contributor, and build on others’ contributions (Moore, 1997), requiring educators to consider the value of their presence within breakout room learning activities.

Correspondingly, simulated practice learning must be supervised by appropriately trained practice supervisors (NMC, 2023a). There is a risk that the presence of nurse educators in breakout rooms may inhibit active student learning (Almendingen et al., 2022); however, evidence from medical education literature regarding the presence of educators in breakout rooms is positive, with students valuing the presence of educators to answer questions (Gupta et al., 2023) and to receive individualised attention (Peramuna Gamage et al., 2023). To be responsive, nurse educators should have an awareness of the communicational role of teachers in the synchronous online video conferencing environment (Grammens et al., 2022). Within the communicational role, nurse educators must know how to encourage students to take part in conversations and support students to make contributions (Grammens et al., 2022). Nurse educators utilising breakout room learning activities need to not only be confident in starting dialogue, encouraging students to share their thoughts, and facilitating discussions; but also, be prepared to overcome student passivity by developing management strategies, such as specific questioning techniques to use if questions are unanswered (Grammens et al., 2022).

Social introductions and community interactions were valued by student nurses and should not be underestimated or disregarded when developing learning activities to be conducted in breakout rooms (Almendingen et al., 2023; Cantey et al., 2021; and Liesveld et al., 2023). This finding reflects the social role of educators in synchronous online video conferencing environment, which proposes educators should pay “special attention to the facilitation of social interaction and the development of authentic and sustainable relationships with the students and between the students mutually” (Grammens et al., 2022, p. 10). Nurse educators can incorporate simple social interactions into breakout room learning activities, such as “virtual tea and cake” to promote a sense of community among students (Leigh et al., 2020, p. 568). Limited interaction within breakout rooms from some students (Almendingen et al., 2023) appears not to be an isolated phenomenon among nursing education and has also been identified within medical education (Fujiwara et al., 2023). To address the problem of non-engagement within breakout room activity, Fujiwara et al. (2023) proposed the need to establish objective criteria to evaluate unprofessional behaviour and identified further research required in this area.

Learning in breakout rooms was not without challenges. Despite reported success in using breakout rooms for teaching practical skills (Cantey et al., 2021), it was also identified that inability to use therapeutic touch in patient interactions impacted on vocabulary choice as a means of compensating to conveying empathy (Rickman Patrick & Butzlaff, 2021). This finding has been echoed when breakout rooms have been used to develop practical skills in medical education; instructor feedback has identified, “I felt that I had to make sure that my instructions were a lot clearer because there wasn’t the ability to use tactile clues to assist the student” (Gupta et al., 2023, p. 294). These findings suggest nurse educators utilising break out room learning should think about the overall essence of the learning intervention and consider how learners will interact with each other and educators (Conole, 2014).

Breakout rooms were described by one student as “no replacement for a face-to-face interaction” (Rickman Patrick & Butzlaff, 2021, p. 3) and some students reported they wanted less time spent in breakout rooms

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and more traditional face-to-face synchronous interaction with educators (Almendingen et al., 2023). Learning at home presented unique challenges, with a need for nurse educators to keep students actively engaged (Cantey et al., 2021). Students using breakout rooms for a four-hour disaster preparedness event expressed that attending by computer all day was tiring and would be improved by including more breaks and reducing the session length (Liesveld et al., 2023). However, students also reported that, when in breakout rooms, they wanted more time to talk to their peers to discuss their learning experiences (Almendingen et al., 2023). Difficulty concentrating for long periods and a preference for shorter sessions has also been reported when breakout rooms have been utilised in medical education (Fujiwara et al., 2023; and Peramuna Gamage et al., 2023) and should be considered carefully during learning design.

Technical challenges were reported in three studies, including loss of connectivity, difficulty using software, and “dropping off” the online platform (Almendingen et al., 2023; Liesveld et al., 2023; and Rickman Patrick & Butzlaff, 2021, p. 4). To minimise technical problems while using breakout rooms for OSCEs, medical students were sent an initial communication with instructions on how to test their internet speeds and check their device compliance with the system requirements of the videoconferencing platform, including internet bandwidth, operating systems, and processors (Hannan et al., 2021). Subsequently, no technical difficulties were reported, suggesting prior communication, and device and systems testing in accordance with videoconferencing platform requirements are advantageous for minimising technical challenges.

#### Future work

No educational technology, no matter how interactive, can provide benefit to education if it is controlled by educators who, for differing reasons, decide not to take advantage of its affordances (Moore, 1997). Therefore, at the higher educational institutional level, future work may begin with investigating nurse educators’ preparedness for inclusion of breakout room pedagogies; supporting greater collaboration to share best practice; and co-producing the design, development, and delivery of breakout room-based simulation pedagogies. Student preference for educator presence in breakout room pedagogies may impact higher education institute resources, including staff time and finances. Prior to breakout room pedagogies taking place, up front time investment may also be required to teach staff how to use breakout room pedagogies effectively, develop learning materials, and embed breakout room pedagogies (Moster et al., 2023). The literature included in this review did not report whether breakout room pedagogies themselves involved more staff teaching time than otherwise. Therefore, further work is needed to assess whether nurse educators would spend more time teaching students through simulation using breakout room pedagogies compared to the equivalent hours in a clinical practice setting, and the resource requirements for each option.

#### Limitations

The systematic literature review has limitations, some of which are directly related to the studies included. Firstly, participation in all the included studies relied upon self-selection and self-reporting; therefore, bias cannot be excluded. Additionally, low response rates reported in included studies means that not all perspectives may be represented in the data and findings. A second limitation is the narrow focus on the context of nursing education limits the generalisability of the findings to other academic disciplines. A third limitation is the exclusive selection and inclusion of peer reviewed published articles means that there may be other relevant and recent studies that were not selected for this review. Non-peer reviewed publications



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and documented practices in the context of breakout room use in synchronous online nurse education may provide additional insight.

## Conclusion

This literature review has explored the use of breakout rooms in synchronous online nurse education and has provided evidence of successful use of breakout rooms in the contexts identified by the NMC for simulated practice learning, including: contextualised and supervised scenarios to reflect practice learning with real people, use of actors and role play to portray clinical scenarios, and opportunities to explore diverse areas of practice and experience situations less frequently encountered in the practice setting (NMC, 2023a). Breakout rooms were utilised to support a diverse range of learning activities, where students could practise skills in a safe environment; however, supervision and preparation must be adequate to ensure students engage in learning as intended. Nurse educators need to be skilled communicators, able to start dialogue, encourage contribution and facilitate discussion, as well as anticipate and resolve any student passivity within the breakout room environment (Grammens et al., 2022). Social introductions between students can provide a valuable foundation for breakout room learning success and should not be disregarded. Currently, there is a gap in the literature discussing how nurse educators plan, develop, and test breakout room learning activities; therefore, further work is required to develop and disseminate best practice.

## Biography

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