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Brief Report

Enhancing Interactive Teaching for the Next Generation of Nurses: Generative-AI-Assisted Design of a Full-Day Professional Development Workshop

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Abstract

Introduction: Nursing educators and clinical leaders face persistent challenges in engaging the next generation of nurses, often characterized by short attention spans, frequent phone use, and underdeveloped communication skills. This article describes the design and delivery of a full-day interactive teaching workshop for nursing faculty, senior clinical nurses, and nurse leaders, developed using a design-thinking approach supported by generative AI. **Methods:** The workshop comprised four thematic sessions: (1) Learning styles across generations, (2) Interactive teaching methods, (3) Application of interactive teaching strategies, and (4) Lesson planning and transfer. Generative AI was used during planning to create icebreakers, discussion prompts, clinical teaching scenarios, and application templates. Design decisions emphasized low-tech, low-prep strategies suitable for spontaneous clinical teaching, thereby reducing barriers to adoption. Activities included emoji-card introductions, quick generational polls, colored-paper reflections, portable whiteboard brainstorming, role plays, fishbowl discussions, gallery walks, and movement-based group exercises. Participants (N = 37) were predominantly female (95%) and represented multiple generations of X, Y, and Z. Mid- and end-of-workshop reflection prompts were embedded within Sessions 2 and 4, with participants recording their responses on colored papers, which were then compiled into a single Word document for thematic analysis. **Results:** Thematic analysis of 59 mid- and end-workshop reflections revealed six interconnected themes, grouped into three categories: (1) engagement and experiential learning, (2) practical applicability and generational awareness, and (3) facilitation, environment, and motivation. Participants emphasized the workshop's lively pace and hands-on design. Experiencing strategies firsthand built confidence for application, while generational awareness encouraged reflection on adapting methods for younger learners. The facilitator's passion, personable approach, and structured use of peer learning created a psychologically safe and motivating climate, leaving participants recharged and inspired to integrate interactive methods. **Discussion:** The workshop illustrates how AI-assisted, design-thinking-driven professional development can model effective strategies for next-generation learners. When paired with skilled facilitation, AI-supported planning enhances engagement, fosters reflective practice, and promotes immediate transfer of interactive strategies into diverse teaching settings.

Keywords: interactive teaching; generational learning; nursing education; generative AI; professional development

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1. Introduction

Engaging the next generation of nurses presents a critical challenge for nursing educators and clinical leaders, as learners today often exhibit shortened attention spans, extensive mobile phone use, and limited interpersonal communication skills. Empirical evidence documents significant generational shifts in learning behaviors and capabilities. Sancha's [1] narrative review reported that Generation Z students have an average attention span of 8 s and communicate primarily through brief digital exchanges rather than sustained conversation. Shatto and Erwin [2] corroborated these findings, noting that Generation Z spends approximately 9 h daily on cell phones, with this heavy technology immersion correlating with shortened attention spans and underdeveloped critical thinking skills. These trends have been associated with decreased sustained attention and memory consolidation, particularly among individuals who frequently engage with short-form digital media, underscoring the need for instructional approaches that sustain situational interest while managing cognitive load [1,3].

Within today's nursing classrooms and clinical education settings, multiple generations—Generation X (born 1965–1980), Millennials (Generation Y) (born 1981–1996), Generation Z (born 1997–2012), and Alpha (born 2013–present)—converge, each bringing unique values, technological fluency, and preferred learning modalities [1–5]. Generation Z learners, in particular, present a paradox for nursing educators: they are highly connected, visually oriented, and accustomed to rapid information access, yet they struggle with the sustained attention, critical thinking, and interpersonal communication competencies essential for clinical practice. Research consistently identifies core challenges including brief attention spans, problematic mobile device dependency, preference for active learning over passive lectures, and limited face-to-face communication skills [1–3]. Despite common assumptions that digital natives prefer fully online or flipped learning environments, empirical studies reveal more nuanced preferences. Hampton et al. [6] found that Generation Z nursing students rated traditional classroom lectures enhanced with interactive technology (audience response systems) as most preferred and effective, while Bliss [4] similarly reported that 63.2% of students preferred teacher-led classroom approaches, with hands-on activities (91.2%) and video tutorials (82.5%) preferred over reading materials (38.6%). Notably, Bliss [4] found no statistically significant differences in learning preferences across generations, suggesting convergence in educational needs despite generational differences in technological fluency and attention capacity. Tailoring instruction to meet the learning preferences of these cohorts while intentionally addressing the challenges of shortened attention spans, mobile phone distraction, limited critical thinking skills, and the need for strengthening interpersonal communication can bridge generational gaps and promote deeper engagement, relational learning, and professional socialization [1,2,4,6].

In response to these needs, active and collaborative teaching strategies have gained prominence as effective methods to cultivate learner engagement and higher-order reasoning skills. Freeman et al.'s [7] landmark meta-analysis of 225 studies demonstrated that active learning significantly increased student performance by 0.47 standard deviations on examinations and reduced failure rates by 55% compared to traditional lecturing in undergraduate STEM courses. Approaches such as think–pair–share (TPS), role-playing, and gallery walks provide opportunities for social construction of knowledge, peer feedback, and experiential reflection [7–9]. These learner-centered techniques have repeatedly demonstrated stronger learning outcomes than passive lecture methods, particularly in domains requiring real-time application, empathy, and communication—skills essential to clinical nursing practice.

Concurrently, generative artificial intelligence (AI) is emerging as a transformative tool in higher education, reshaping how educators design and deliver instruction.

Nikolopoulou [10] identified multiple teaching and learning applications of AI in higher education, including personalized learning, automated assessment and feedback generation, content creation, and research assistance, while emphasizing that AI functions as a complementary support tool requiring human evaluation rather than replacing educator expertise. Similarly, Bayaga's [11] empirical study of 115 higher education respondents using Unified Theory of Acceptance and Use of Technology (UTAUT) and Technology-Organisation-Environment (TOE) frameworks found that performance expectancy and effort expectancy significantly influence educators' attitudes toward AI, which in turn affects behavioral intention to use AI for pedagogical innovations. When integrated thoughtfully within university and professional education settings, AI can augment instructors' creativity and planning efficiency, supporting rapid prototyping and customization of interactive activities while preserving the relational, human elements central to effective facilitation [10,12–14]. Rather than replacing educator expertise, AI serves as a co-designer—enhancing adaptability, creativity, and learner engagement in academic teaching and learning environments [11,15,16].

While numerous faculty development programs focus on either active learning strategies or AI tool adoption separately, few integrate these approaches in ways that balance technological efficiency with human-centered pedagogy. This gap is particularly pronounced in nursing education, where interpersonal skills, clinical judgment, and relational learning remain paramount. The workshop described in this paper addresses this gap by uniquely combining AI-assisted instructional design with deliberately low-tech, high-engagement facilitation methods—a hybrid approach that leverages AI's efficiency in planning while centering human connection in delivery.

This paper presents the design, execution, and participant outcomes of a full-day interactive teaching workshop for nursing faculty, senior clinical nurses, and nurse leaders. Grounded in design-thinking principles and supported by generative AI during the planning phase, the workshop emphasized low-tech, high-engagement methods—such as emoji introductions, think-share-pair, Socratic questioning, fishbowl observations, role plays, and gallery walks—to foster an inclusive, dynamic, and reflective learning environment. What distinguishes this approach is its intentional bifurcation: using AI as a planning assistant to efficiently generate discussion prompts, role-play scenarios, and structured activities, while deliberately minimizing technology during workshop delivery to maximize interpersonal connection, collaborative meaning-making, and the development of facilitation skills applicable across diverse educational contexts. This model demonstrates that AI can enhance pedagogical innovation without diminishing the irreplaceable human elements of teaching—a critical consideration as nursing education navigates the integration of emerging technologies while maintaining its core commitment to relational competence and humanistic care. The subsequent sections outline the pedagogical design and methods, report participant feedback and thematic analysis findings, and discuss the implications for nursing and health professions education in the era of AI-enhanced professional learning.

2. Methods

2.1. Workshop Background and Context

The workshop idea was initiated by a university-affiliated hospital nursing leaders at a national medical defense university in Taiwan. Nursing department leaders identified multiple challenges in educating newly hired nurses entering the healthcare workforce. Observations during new employee orientation and training revealed concerning patterns including diminished attention spans, low motivation, problematic mobile phone use, poor knowledge retention, inadequate skill transfer, deficient communication competencies, and insufficient preparedness for time-sensitive emergency clinical situations. Department administrators, team leaders, and clinical supervisors collectively identified the need for

interactive teaching approaches to more effectively prepare novice nurses for contemporary clinical practice.

The author, possessing extensive academic and practical expertise in both healthcare research and teaching excellence, as well as established collaborative relationships with academic institutions in Taiwan, was invited to design a full-day workshop focused on interactive teaching strategies for clinical environments. The clinical context presented unique pedagogical challenges: fast-paced workflows, intensive schedules, and the imperative for rapid response to high-acuity, high-pressure clinical situations. Recognizing these contextual demands, the Department of Nursing at the major Veterans Affairs hospital and National Defense Medical University jointly commissioned the author to design and deliver a workshop addressing their specific educational needs in late fall 2024. Following an iterative design process incorporating stakeholder input and evidence-based teaching strategies, the full-day workshop was delivered in June 2025 in Taiwan.

2.2. Workshop Objectives

A full-day interactive teaching workshop was conducted for an audience consisted of nursing faculty, senior clinical nurses, and nurse leaders tasked with educating next-generation nurses. The workshop aimed to develop participants' ability to: (1) recognize generational differences in learning styles, (2) engage in and practice interactive teaching methods, and (3) apply these strategies to their instructional contexts. The curriculum was structured into four sequential sessions: "Learning Styles Across Generations," "Interactive Teaching Methods," "Application of Interactive Teaching Strategies," and "Lesson Planning and Transfer."

2.3. Workshop Design

Informed by design thinking and adult learning theory, all activities were intentionally designed to be low-tech and low-preparation to facilitate rapid adoption, particularly in clinical and time-constrained teaching scenarios. This approach aligns with Knowles' [17] andragogy principles, which emphasize that adult learners prefer content with immediate practical application and minimal barriers to implementation—critical considerations in busy clinical environments where educators balance teaching with patient care demands. Materials included emoji cards for icebreakers, colored papers and hard cardboards for individual reflection, color markers for creative stimulation, portable whiteboards for small-group brainstorming, sticky notes for gallery walk feedback, and small incentives to encourage participation (see Tables S1 and S2 in the Supplementary Materials).

The design-thinking process emphasized whole-class interactivity, with frequent short, focused activities to sustain energy and attention. Activities followed an experiential—reflective cycle, with each exercise linked to participants' own teaching challenges and followed by structured reflection and group debriefing. Sequencing followed a progressive risk structure, beginning with low-stakes openers to ensure early engagement from all participants and building toward activities requiring public sharing and peer feedback. Visual and tactile engagement was incorporated throughout to enhance memory and stimulate creative thinking. All activities directly addressed the workshop's central theme of overcoming teaching and learning challenges with next-generation learners.

2.4. Interactive Teaching Activities

Generative artificial intelligence (AI) tools such as ChatGPT-5.2 were strategically employed in the planning stages of the workshop to augment instructional creativity and efficiency. AI was used to develop the Emoji Introduction icebreaker, generate prompts for generational discussion, design questions for Think–Pair–Share and Socratic questioning, and draft realistic fishbowl and role-play scenarios situated in clinical teaching contexts.

Additionally, AI assisted in creating structured instructions for the Gallery Walk activity and an Application Template to guide participants in designing interactive lessons. The integration of AI in this process substantially accelerated preparation time, broadened the range of pedagogical examples, and ensured contextual alignment with nursing education and clinical teaching environments [8,9,12–14]. Used as a generative partner rather than a replacement for instructor expertise, AI supported design thinking by enabling iterative idea generation and customization while preserving the human relational and reflective elements essential to effective facilitation [12–14,18].

The full-day workshop was structured into four 90 min sessions, each building progressively on experiential learning principles and interactive engagement strategies (see Tables S1 and S2 in the Supplementary Materials for detailed session breakdown).

Session 1: Learning Styles Across Generations (90 min) opened with the Emoji Introduction and a quick generational poll (X, Y, Z), designed to establish psychological safety and early engagement through humor and self-expression. Participants discussed prompts addressing how they were taught growing up, what helps them stay engaged when learning something new, and one learning habit characteristic of their generation. These small-group dialogues, followed by large-group share-backs and individual reflections, fostered cross-generational empathy and set the stage for recognizing diverse learner preferences [2,4].

Session 2: Interactive Teaching Methods (90 min) guided participants through a series of progressively complex active-learning techniques. Think–Pair–Share and Socratic questioning encouraged critical reflection on challenges faced by next-generation learners and effective engagement approaches. Participants then experienced fishbowl discussions and role plays simulating brief clinical teaching encounters without slides, promoting spontaneous interaction and immediate peer feedback. Each activity was followed by structured debriefing to support reflective learning, consistent with Kolb's [19] experiential learning cycle and Chi and Wylie's [20] ICAP model emphasizing interactive and constructive engagement.

Following a lunch break, Session 3: Application of Interactive Teaching Strategies (90 min) began with a synthesis discussion revisiting morning takeaway. Participants then engaged in a Gallery Walk, posting draft teaching strategies addressing common instructional challenges and offering sticky-note feedback to peers. The visual, movement-based structure re-energized the group, stimulated idea exchange, and reinforced collaborative learning [7,9].

Session 4: Lesson Planning and Transfer (90 min) focused on practical application and commitment to change. The Application Template activity guided participants in developing an interactive lesson plan tailored to their own teaching context, incorporating at least one interactive strategy learned during the workshop. Small group sharing allowed participants to present their lesson plans and receive peer feedback. The session concluded with collective reflection, with each participant identifying and publicly sharing "one small new step to try" in their teaching practice to promote post-workshop transfer and accountability.

A detailed outline of the four-session workshop is presented in Tables S1 and S2 in the Supplementary Materials, which maps each phase to its corresponding learning objectives, interactive activities (detailed step-by-step instructions with timing), materials/tools, facilitation notes, and theoretical/pedagogical alignment.

2.5. Pedagogical Underpinnings

The pedagogical design of the workshop was grounded in three complementary learning theories and frameworks that collectively supported its experiential, interactive, and

inclusive approach: Kolb's Experiential Learning Cycle [19], the Interactive, Constructive, Active, and Passive (ICAP) framework [20], and Cognitive Load Theory [21,22]. These frameworks were integrated through a design-thinking process to support experiential, cognitively efficient, and highly engaging learning for busy clinical educators.

Kolb's Experiential Learning Cycle [19] provided the overarching structure for the workshop's flow and sequencing. Each activity followed a cyclical pattern of experience–reflection–conceptualization–application, where participants first engaged in immersive experiences—such as think–pair–share discussions, Socratic questioning, fishbowl discussion, role plays, and gallery walks—followed by individual reflection, small-group debriefing, and collective synthesis. This iterative approach mirrored how nurses learn in practice—through doing, reflecting, and adapting—and reinforced the transferability of interactive strategies to real-world teaching situations.

The ICAP framework [20] further guided the design of activities to deepen cognitive engagement. ICAP—an acronym for Interactive, Constructive, Active, and Passive modes of learning—proposes that learning outcomes improve as learners move from passive reception (listening) to active participation (doing), constructive processing (generating new ideas), and interactive co-construction (collaborative meaning-making). Activities were therefore designed to maximize interaction and co-construction of meaning, such as through collaborative generational group discussion polls, brainstorming on portable whiteboards, and role play reflections and group debriefings. These formats required participants to not only share but also build upon one another's contributions, reinforcing deeper learning and empathy across generational perspectives. To address diverse learner preferences and ensure accessibility, multiple modalities of participation (writing, speaking, moving, observing, and reflecting) were incorporated through colorful tactile materials—emoji cards, color papers, color markers, and sticky notes—that stimulated visual and kinesthetic learning while encouraging creative expression.

Cognitive Load Theory [21,22] informed the chunking of activities into succinct, focused segments to optimize working memory and minimize extraneous cognitive demands. The deliberate use of low-tech, low-preparation, and visually supported activities helped maintain attention and reduce cognitive overload—ensuring that participants could focus on interaction and reflection rather than logistics or technology management. Additionally, motivational elements were embedded throughout the workshop, including attention-capturing creative openers, clinically relevant examples, scaffolded low-stakes practice to build confidence, and reflection with peer feedback to foster satisfaction—all contributing to a psychologically safe and energizing learning climate.

These frameworks were purposefully integrated through a design-thinking lens, emphasizing empathy with learners' needs, iterative reflection, and user-centered design [23,24]. Sequencing followed a progressive risk structure, from low-stakes openers to peer discussion, to gradually build trust and engagement. The resulting design fostered a whole-class interactive environment that blended theory-informed pedagogy with practical applicability. Collectively, these three frameworks provided a coherent pedagogical foundation that balanced engagement, inclusivity, and cognitive efficiency—ensuring that each element of the workshop contributed to an active, reflective, and transferable learning experience for nursing educators and clinical leaders.

2.6. Data Collection

Participants (N = 37) were predominantly female (95%) and represented multiple generations, including Generation X, Millennials (Generation Y), and Generation Z. Most participants reported familiarity with educational technology, and several indicated prior experiences using AI tools for educational or personal purposes.

Data were collected through multiple sources to capture participant experiences and workshop dynamics. Mid-workshop and end-of-workshop reflection prompts were embedded within Sessions 2 and 4, with participants recording their responses on colored papers provided during Session 2 (interactive teaching methods individual reflections) and Session 4 (lesson plan application and "one small new step" commitments). The facilitator also maintained field notes documenting observations of participant engagement, group dynamics, and spontaneous comments throughout the day.

Following the workshop, handwritten reflections were collected, transcribed and translated from Chinese to English by the facilitator, who is bilingual and culturally fluent in both languages. The translated text was compiled into a single Word document for analysis. Thematic analysis was conducted following Braun and Clarke's [25] six-phase approach: (1) familiarizing with the data through repeated reading, (2) generating initial codes by identifying meaningful units related to engagement, learning, and application, (3) searching for themes by grouping related codes, (4) reviewing themes to ensure coherence and distinctiveness, (5) defining and naming themes to capture their essence, and (6) producing the final analysis. A total of 59 reflection statements were analyzed, yielding six themes that were subsequently organized into three overarching categories reflecting engagement patterns, practical applicability, and affective dimensions of the learning experience.

This project received an Institutional Review Borad (IRB) determination of Not Human Subjects Research (NHSR) as defined by DHHS and FDA regulations (STUDY00008673). All activities, including the informal written self-reflection notes analyzed were conducted as part of routine educational programming for the purposes of learning assessment and program improvement. No identifiable private information was collected and no research interventions beyond standard educational activities occurred. Participation in the reflective exercises was voluntary and consistent with customary instructional practice.

3. Results

Participant responses and facilitator observations indicate that the full-day interactive teaching workshop achieved high levels of engagement, relevance, and perceived value. Engagement was consistently strong throughout all four sessions. The warm, low-stakes openers, such as emoji introductions and generational quick polls, effectively involved all participants early and set the tone for active participation. Facilitator observations noted visible increases in energy during movement-based activities, including rotating small-group discussions, portable whiteboard brainstorming, fishbowl observations, role play, and the gallery walk. The use of colorful, tactile materials such as hard cardboards, markers, and sticky notes contributed to a playful yet professional atmosphere that sustained attention and stimulated creativity.

Thematic analysis of 59 mid- and end-workshop reflections revealed six interconnected themes, which can be organized into three overarching categories: (1) engagement and experiential learning, (2) practical applicability and generational awareness, and (3) facilitation, environment, and motivation (Table S3).

Category 1: Engagement and Experiential Learning

The first category, engagement and experiential learning, emerged as the most salient. Participants consistently valued the experiential nature of the workshop, noting that directly practicing strategies such as role play, fishbowl discussions, think–pair–share, and gallery walks deepened understanding and built confidence for application. As one participant explained, "*We didn't just learn the concepts; we experienced and reflected on them, which gave me confidence to try them myself.*" Another elaborated, "*Everyone had to talk, stand up, and interact—I really enjoyed it.*" The frequent activity transitions and movement-based

engagement were specifically noted as preventing disengagement, with one participant stating, "*It was impossible to fall asleep; we were always talking, sharing, writing, or moving.*"

Category 2: Practical Applicability and Generational Awareness

The second category, practical applicability and generational awareness, highlighted the perceived transferability of workshop strategies to both classroom and clinical contexts. Participants emphasized that the activities were low-tech, low-prep, and therefore realistic to implement in time-constrained teaching environments. One participant observed, "*Low-tech methods mean I can adopt them quickly in clinical teaching.*" Multiple participants noted immediate plans to implement specific strategies, with comments such as "*I will use these strategies with my college students and new nurses.*"

Reflections also revealed heightened awareness of generational differences, prompting reconsideration of teaching approaches for younger learners. As one participant stated, "*Older generations read books, but new generations stick to phones—we must use different teaching methods.*" Another reflected, "*I need to stop comparing them to us and adapt my teaching.*" These reflections demonstrate practical engagement with the generational learning literature presented during Session 1, particularly addressing the challenges of shortened attention spans and mobile phone dependency documented by Shatto and Erwin [2] and Sancha [1].

The third category, facilitation, environment, and motivation, underscored the importance of the instructor's role and the broader learning climate. The professor's calm demeanor, passion for teaching, and personable approach created a psychologically safe environment where all participants felt encouraged to contribute. One participant shared, "*The icebreaker opened everyone up to speak.*" Peer-to-peer exchange was also highlighted as impactful, with one participant noting, "*Gallery walk feedback improved my ideas immediately.*" Finally, the workshop was consistently described as motivating and energizing. Several participants highlighted a key principle shared by the instructor—that "*less is more powerful*"—noting that focused, concise activities were more effective in sustaining their attention than information-heavy lectures. Others described the day as "*recharging*" and "*reigniting their passion for teaching*." One participant specifically noted, "*I felt recharged and motivated to try something new*," reflecting the motivational outcomes intended.

In sum, the findings suggest that the combination of design-thinking principles, AI-assisted planning, and skilled, passionate facilitation produced a highly engaging, practical, and motivating professional development experience. The workshop not only provided participants with transferable strategies but also cultivated renewed confidence and commitment to applying interactive teaching methods in their own practice.

4. Discussion

The findings from this study demonstrate a promising approach to integrating interactive, design-informed pedagogy with AI-assisted planning to address persistent challenges in next-generation nursing education. Participants' reflections suggested that experiential and highly engaging strategies—such as think–pair–share, fishbowl discussions, role play, and gallery walks—were perceived as particularly effective in sustaining attention, stimulating critical thinking, and fostering confidence in applying interactive teaching methods. These results align with extensive evidence showing that active and collaborative learning enhances engagement and knowledge retention compared with traditional lectures [7,20].

The high rates of engagement observed throughout the workshop and documented in participant reflections support existing empirical evidence on Generation Z's learning preferences. Specifically, participants' strong positive responses to hands-on, experiential activities mirror Bliss's [4] finding that 91.2% of nursing students preferred hands-on activities, and Hampton et al.'s [6] finding that skills acquisition was the highest-rated dimension of engagement among Generation Z nursing students. Consistently high participation

and the quality of participant-generated strategies during the gallery walk and lesson planning activities illustrate the power of the experiential–reflective learning cycle [19] and the deliberate use of progressive risk sequencing to build confidence and engagement. Low-stakes openers, frequent transitions, and visually stimulating materials sustained motivation, supporting the design principles recommended by Cognitive Load Theory [21] for optimizing working memory through chunked, focused activities. While formal assessment of attention span was not conducted, the absence of observed disengagement and participants' explicit comments about sustained focus suggest that the varied activity structure with frequent transitions may have been effective in addressing the attention challenges documented in the literature [1–3].

The results also directly address generational learning challenges in nursing education. Next-generation learners—particularly Gen Z and emerging Gen Alpha nurses—often exhibit shorter attention spans, multitasking behaviors, and reduced interpersonal communication skills linked to digital immersion [1,2,4]. Workshop discussions fostered empathy and reflection on how educators might adapt strategies to bridge these generational differences, promoting greater generational awareness and learner-centered adaptation. Participants' unprompted reflections about generational differences—such as "*Older generations read books, but new generations stick to phones—we must use different teaching methods*"—suggest that the workshop successfully prompted critical reflection on pedagogical adaptation, though the extent to which this translates to actual teaching practice changes requires longitudinal investigation.

A major strength of this workshop model lies in its practicality and adaptability. Participants consistently valued the low-tech, low-preparation design, emphasizing its relevance to fast-paced clinical and academic environments where time and resources are limited. This finding supports Knowles' [17] principle that adult learners prefer content with immediate practical application and minimal barriers to implementation.

The facilitator's role emerged as central to the workshop's success. Participant comments such as "*The icebreaker opened everyone up to speak*" and repeated observations describing the facilitator as "*highly personable*," "*calm*," and "*passionate about teaching*," suggest that the facilitation approach effectively fostered psychological safety and trust—conditions essential for active participation. This observation reinforces prior research emphasizing that effective facilitation depends not only on pedagogical skill but also on relational authenticity, active listening, and enthusiasm for student learning [26–32].

Finally, the integration of AI-assisted design served as a catalyst for innovation. Generative AI tools were used to create prompts, discussion questions, and structured templates that expanded creative variety and contextual relevance while reducing preparation barriers. This aligns with recent studies identifying AI as a design accelerator that enhances educators' creativity and efficiency and as a tool that can provide multiple educational applications including content creation and research assistance [10,11,15,16]. Importantly, the benefits of AI were maximized when combined with skilled human facilitation, consistent with Nikolopoulou's [10] conclusion that AI functions as a complementary support tool requiring human evaluation rather than replacing educator expertise. Together, these results highlight the potential of AI-assisted, design-thinking-based workshops to offer scalable, human-centered professional development that bridges technological innovation with authentic connection in nursing education.

4.1. Implications for Nursing Education

This workshop model offers several practical implications for nursing education programs: (1) Faculty Development Redesign: Nursing programs should consider incorporating experiential, activity-based professional development rather than relying solely on

traditional lecture-based faculty workshops. The positive participant responses to hands-on practice suggest that "learning by doing" may be particularly effective for preparing clinical educators to teach next-generation learners. (2) Low-Tech, High-Engagement Strategies: The success of simple, accessible teaching methods (think-pair-share, role play, gallery walks) without sophisticated technology demonstrates that effective interactive teaching does not require expensive simulation equipment or learning management systems. This is particularly relevant for resource-constrained clinical settings where bedside teaching remains the primary mode of instruction. (3) Addressing Generational Challenges: Nursing curricula and clinical orientation programs should explicitly address the attention, communication, and critical thinking challenges associated with Generation Z learners. Educators need both awareness of these differences and practical strategies to adapt their teaching accordingly. (4) AI as Planning Tool, Not Delivery Tool: The workshop model demonstrates how AI can enhance instructional design efficiency during planning while maintaining human-centered, relational teaching during delivery. Nursing education programs exploring AI integration should consider this bifurcated approach rather than assuming AI must be present in the classroom or clinical environment. And (5) Psychological Safety in Learning Environments: The emphasis participants placed on the facilitator's warm, encouraging approach and the "safe space" created through low-stakes activities reinforces the importance of affective dimensions in professional learning. Nursing education programs should train faculty not only in pedagogical techniques but also in creating psychologically safe learning climates.

4.2. Limitations

Several limitations should be considered when interpreting these findings. First, this study employed a convenience sample of 37 participants from a single institution in Taiwan, limiting generalizability to other cultural contexts, healthcare systems, or educational settings. The predominance of female participants (95%), while representative of nursing demographics, further constrains transferability of findings.

Second, data collection relied primarily on informal, embedded reflection activities rather than validated instruments or systematic pre-post assessments. While this approach captured authentic participant perspectives in real time, it did not allow for standardized measurement of learning outcomes, knowledge retention, or behavior change. The absence of quantitative rating scales (e.g., Likert-scale evaluations of workshop effectiveness, confidence ratings, or engagement metrics) limits the ability to quantify workshop impact or compare findings with other professional development interventions.

Third, the study lacks longitudinal follow-up data. While participants expressed intentions to implement interactive strategies in their teaching practice (e.g., "one small new step to try"), actual adoption, sustained implementation, and impact on learner outcomes were not assessed. Future studies should include 3-month and 6-month follow-up surveys or interviews to determine which strategies were implemented and with what results.

Fourth, the dual role of the researcher as both workshop facilitator and data analyst introduces potential bias. Participants may have provided socially desirable responses, and the facilitator's interpretation of reflections may have been influenced by expectations for workshop success. Independent data analysis or member-checking procedures could strengthen trustworthiness in future iterations.

Fifth, all reflections were translated from Chinese to English by the facilitator, which may have introduced translation bias or loss of nuanced meaning. Professional translation services or bilingual co-analysis could enhance rigor.

Finally, while the workshop integrated AI-assisted planning, the study did not systematically assess which specific AI-generated materials contributed most to participant

learning or how AI augmentation compared to traditional planning methods. Future research comparing AI-assisted versus non-AI-assisted workshop designs could isolate the specific value-added of generative AI tools.

Despite these limitations, this study provides promising preliminary evidence supporting the feasibility and perceived value of combining AI-assisted instructional design with experiential, low-tech facilitation for nursing educator professional development.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/informatics13010011/s1. Table S1: Morning Workshop Sessions: Interactive Teaching Across Generations. Table S2: Afternoon Workshop Sessions: Application and Transfer. Table S3: Interactive Teaching Workshop Result Table.

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Institutional Review Board Statement: This project received an Institutional Review Board (IRB) determination of Not Human Subjects Research (NHSR) as defined by DHHS and FDA regulations. The approval letter has been uploaded as non-pub material.

Informed Consent Statement: Patient consent was waived due to no identifiable private information was collected, and no research interventions beyond standard educational activities occurred.

Data Availability Statement: The original contributions presented in this study are included in the article/Supplementary Material. Further inquiries can be directed to the corresponding author.

Conflicts of Interest: The author declare no conflict of interest.

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