IMPROVING COMMUNICATION AND COLLABORATION IN A DNP PROGRAM THROUGH THE USE OF TECHNOLOGY: GAMIFYING PROSPECTIVE STUDENT ENGAGEMENT FOR DNP PROGRAM RECRUITMENT

UNIVERSITY OF HAWAIʻI AT MĀNOA SCHOOL OF NURSING AND DENTAL HYGIENE

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Abstract

Background/Significance:

Gamification enhances engagement in virtual learning but requires careful consideration of content complexity, pacing, and technical factors. While gamification has improved classroom interaction, current Doctor of Nursing Practice (DNP) online informational sessions lack these strategies, leading to suboptimal engagement and missed recruitment opportunities.

Purpose:

This project aimed to enhance engagement in online DNP informational sessions by incorporating gamification through integration of Kahoot! activities.

Methods:

A 10-question Kahoot! activity was developed with faculty guidance and integrated into two virtual informational sessions in November 2024 and January 2025. Engagement was assessed via participation rates, answer accuracy, and post-session evaluations measuring responding, valuing, satisfaction, and perceived usefulness.

Results:

Across both sessions, 22 participants engaged in the Kahoot! activity during two DNP informational sessions. Session One had full participation (100%), while Session Two had 69% engagement, with response rates of 56% and 53%, respectively. Participants primarily valued clinical practice and skill development, with the Family Nurse Practitioner track being the most popular. Quiz performance improved in Session Two, with a correct answer rate of 54.55% compared to 18.18% in Session One. Overall, evaluation of the Kahoot! activities indicated strong participant satisfaction and engagement, though perceived usefulness slightly decreased in Session Two.

Conclusions:

Gamification appears to enhance engagement in virtual DNP sessions. Optimizing content pacing and ensuring technical reliability are key to sustaining participation.

Implications/Recommendations:

Future initiatives should refine content delivery, incorporate follow-up strategies, and expand gamification applications in academic and professional settings.

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List of Abbreviations

DNP	Doctor of Nursing Practice
EBP	Evidence-Based Practice
JHNEBP	Johns Hopkins Nursing Evidence-Based Practice
NP	Nurse Practitioner
QI	Quality Improvement
SONDH	School of Nursing and Dental Hygiene
UHM	University of Hawaii at Manoa

Improving Communication and Collaboration in a DNP Program through Technology: Gamifying Prospective Student Engagement for DNP Recruitment

In the United States, the nurse practitioner (NP) profession has become a cornerstone of modern healthcare, with 385,000 licensed NPs contributing significantly to patient care (AANP, 2024). An impressive 96.2% of these NPs hold prescriptive authority (AANP, 2024), enabling them to perform an estimated 1 billion patient visits annually (AANP, 2023). As the need for primary care providers and medical specialty support grows alongside rising healthcare costs, the demand for highly educated and clinically competent nurse practitioners continues to surge (Olson, 2022). To meet this demand, Doctor of Nursing Practice (DNP) programs that prepare graduate nursing students for advanced practice nursing roles must be of the highest quality, ensuring that graduates are not only prepared to deliver exceptional care but also to lead and innovate within the healthcare system.

In Hawaii, the number of nurse practitioners has grown rapidly, mirroring national trends. In 2013, there were fewer than 850 licensed nurse practitioners in the state (HSCN, 2024). By 2023, this number had surged by almost 77%, exceeding 1,400 (HSCN, 2024). This upward trend highlights the increasing demand for DNP education in the state of Hawaii and underscores the need for DNP programs in Hawaii to continue producing competent nurse practitioners capable of meeting the healthcare needs of the community.

Importance of Integrating Communication Technologies into DNP Education

Communication is a fundamental aspect of any academic program and its importance is amplified at the doctoral level. Effective communication channels facilitate the dissemination of critical information, foster collaboration, and contribute to a supportive learning environment. Nurse practitioner students in doctoral programs desire high connectivity (Olson, 2022) and value improved course communication (Cipher et al., 2019). Moreso, students who have a greater number of interactions with both faculty and other students are more successful in core nursing courses (Serembus & Riccio, 2019). Implementing innovative communication technologies into DNP programs can enhance student experiences, ultimately contributing to improved student satisfaction, clinical competency, as well as program efficiency and responsiveness to student needs and expectations.

Integration of educational technology in higher education significantly boosts student engagement, especially in nursing schools (Bond et al., 2020). Additionally, the use of technology in higher education has been shown to improve student access to resources, leading to enhanced learning outcomes as well as better preparation for future clinical practice (Gause et al., 2022). Loureiro et al. (2021) reported that nursing students and faculty identified many benefits to utilizing educational digital technologies, such as access to educational content without time or space constraints, integration of multiple learning tools, and low implementation cost. Such evidence suggests that leveraging the flexibility of technology may enhance graduate nursing students' skills and their capability to provide evidence-based, high-quality patient care, which ultimately contributes to improved healthcare outcomes.

Incorporation of communication technology within DNP programs align with real-life clinical practice, where the use of technology is common and expected. A systematic review found that technology integration in complex healthcare environments is significant to direct patient care, patient safety, teamwork, communication, and the perception of care (Bayramzadeh & Aghaei, 2021). By mirroring this practice method while in graduate school, students will be more effectively prepared to utilize communication technology frequently and efficiently when they transition to the clinical environment.

The University of Hawaii at Manoa's School of Nursing & Dental Hygiene (UHM SONDH) DNP program acknowledges the growing need for innovation and is committed to identifying and incorporating advanced technologies to enhance student engagement and learning experiences. Students have identified specific challenges that could be facilitated with the integration of communication technology tools, which may improve the rapid and timely dissemination of important program-related information, guidance, and updates. Addressing challenges by using communication technologies has been suggested as a method for improving students' overall educational experience, academic success, and future clinical practice.

DNP Project Collaborative Approach

To address the identified need for improved integration of communication technologies in the UHM SONDH DNP program, a collaborative DNP project, composed of a series of interventions, was initiated. This collaborative DNP project encompassed five distinct foci and corresponding interventions, all centered around leveraging technology to enhance communication and enhance education methods. Each initiative aimed to advance the use of communication technologies within the UHM SONDH DNP program.

This collaborative DNP project had five focus areas. One project sought to increase student course evaluation response rates by educating students on the importance of their feedback and raising awareness about the DNP program evaluation process. Another project aimed to improve time efficiency in student clinical evaluations through the use of technology. Another project involved developing a DNP portal constructed using a user-centered design method. Another project was dedicated to refining program informational sessions by integrating interactive technology tools, thereby enhancing attendee engagement, and providing valuable insights into prospective students. Finally, another project aimed to enhance the current learning management system by developing the principles of a user-centered interface, improving accessibility and efficiency for students. This paper discusses the project focused on refining program informational sessions by incorporating interactive technology tools to increase engagement and provide meaningful insights to prospective students.

Background

Communication technologies for DNP Program Recruitment

Gamification tactics or game-based learning involve integrating elements of game design and mechanics into non-game contexts to enhance user engagement, motivation, and participation (An, 2021; Choosang et al., 2023; Khaldi et al., 2023). This can include incorporating features such as points, badges, leaderboards, challenges, and rewards to make activities more interactive and enjoyable (Khaldi et al., 2023). Gamification is used in various settings, including education, marketing, fitness, employee training, and customer engagement. In nursing education, using gamification improved engagement, motivation, and learning achievement (An, 2021; Fijačko et al., 2020; Grech & Grech, 2021).

Various technology tools have been developed to simplify integration of gamification strategies into education. One example is Kahoot!, a software platform launched in 2013, which provides a game-based student response system, empowering educators to craft, personalize, and administer quizzes, surveys, and games that foster classroom engagement and assessment (Aktekin et al. 2018; Hilum & Fitriah, 2021; Wang & Tahir, 2020). In nursing education, Kahoot! has been used to enhance students' knowledge and refining their critical thinking skills to prioritize patient care (Cadet, 2023).

One application of Kahoot! that has not been fully utilized is to enhance recruitment of students into the Doctor of Nursing Practice program. The use of interactive technologies during informational sessions may provide prospective students with a welcoming environment where they can gain clarity of the DNP program experience, gather pertinent information, ask questions, and make informed decisions when applying for the program. Integrating educational technologies and gamification used in nursing education, into informational webinars for the UHM SONDH DNP Program may provide an engaging interactive and immersive experience for attendees, one that is similar to learning experiences that students may have in the program.

Problem Statement

The current informational sessions for the DNP program at UHM SONDH are characterized by a one-sided format approach resulting in suboptimal engagement and potentially missed opportunities for recruitment and program enhancement. Modifying this approach to include interactive elements through the application of gamification strategies may better engage attendees and lead to more effective informational sessions.

PICOT

Does the inclusion of interactive online learning technologies into the UHM SONDH DNP program informational sessions, compared to traditional sessions without interactive technology, lead to higher levels of engagement among DNP informational session participants?

Purpose and Objectives

The purpose of this EBP project is to enhance the UHM SONDH DNP program's informational sessions by integrating interactive technology tools, in order to encourage greater attendee engagement. These specific objectives of this project are:

1. Develop a series of interactive activities (i.e. live polls and Q&A sessions) to be integrated into the DNP informational session.
2. Integrate interactive tools into at least 2 DNP informational sessions.

3. Achieve at least a 25% participant interaction with each of the interactive activities for each info session they are implemented.
4. Evaluate the interactive tools as a means for improved engagement among DNP informational session participants.

Conceptual Framework

The conceptual framework selected for this project is the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model, as detailed in Appendix A. This model was selected for its problem solving approach to clinical decision making in addition to its tools provided to guide individual and broad use among bedside environments, healthcare organizations, and teaching institutions (Dang, et al, 2022). The aim to evaluate, develop, and implement technological innovations within the doctorate of nursing program and curricula at University of Hawaii at Manoa aligns with the core components that guide the JHNEBP model. These components include inquiry, practice, and learning (Dang, et al, 2022). The JHNEBP model three step process that integrates these components include (1) practice question, (2) evidence, and (3) translation (Dang, et al, 2022).

Practice questions were developed after review of current use of technology within the DNP program which led to identification of areas needing improvement. Following development of practice questions, a thorough literature review was conducted to discover current evidence-based research on the topic. Translation is the implementation of interventions developed based on areas needing improvement identified within the DNP program.

Synthesis of the Evidence

Evidence Search

A literature search was conducted using the following databases: PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Google Scholar. Medical subject headings (MeSH) terms included: (engagement OR "student engagement") AND ("informational webinar" OR "educational webinar") AND (gamification OR "educational gamification") and "Gamification" AND "Education, Nursing" AND "Kahoot!" The search returned a total of 95 articles. Inclusion criteria for the literature review included peer-reviewed journal articles, written in English language, and published within the last 10 years. Exclusion criteria for the literature review were non-peer-reviewed sources, articles not written in English, and articles published more than 10 years ago. This resulted in a total of 63 articles. Title, abstract and content review of each article was reviewed for its focus on student engagement, the effectiveness of informational or educational webinars, and the use of gamification in nursing education. Articles that did not meet these specific criteria were excluded. This process resulted in a final selection of 22 articles that provide an evidence base for understanding and implementing strategies to increase engagement of prospective students. The Johns Hopkins Nursing Evidence-Based Practice tool (JHNEBP) was utilized to assign the studies based on research design, quality of the study, and applicability to student engagement (Dang, et al., 2022). (See Appendix B).

Literature Synthesis

Positive Impact of Gamification on Student Engagement

A comprehensive synthesis of evidence across the literature reveals a compelling case for the efficacy of gamification, particularly through platforms like Kahoot!, in higher education, as outlined in Appendix C. Seven studies consistently highlight the positive impact of gamified approaches on student engagement, motivation, and learning outcomes. Platforms such as

Kahoot! foster active participation and interaction among students, leading to heightened engagement levels and increased motivation to learn (Aktekin et al., 2018; Altawalbeh, 2023; An, 2021; Cadet, 2023; Fijačko et al., 2020; Grech & Grech, 2021; Ishizuka et al., 2023; Ismail et al., 2023; Khaldi et al., 2023; Li et al., 2023; Malicki et al., 2020; Min et al., 2022; Pesare et al., 2016; Saleem et al., 2022; Tavares, 2022; Wan Hamzah et al., 2015; and Zhang & Yu, 2021). Specifically, Aktekin et al. (2018) found that students in gamified environments exhibited a 25% increase in participation compared to traditional settings, while Malicki et al. (2020) reported a significant improvement in learning outcomes, with gamified quizzes enhancing information retention by 30%.

Enhancement of Learning Outcomes and Skills

Additionally, gamification is recognized as an effective learning tool that enhances knowledge retention, critical thinking skills, and overall educational experiences. The studies by An (2021), Gentry et al. (2019), Li et al. (2023), Pesare et al. (2016), and Tavares (2022) provide evidence of this effectiveness, transcending various disciplines and demonstrating the suitability of gamified approaches across diverse educational contexts. For instance, An (2021) demonstrated how integrating Kahoot! into regular classroom activities significantly boosted student engagement, defined as active participation and involvement in learning tasks, making the learning process more dynamic and interactive. Gentry et al. (2019) found that students using Kahoot! for exam preparation achieved higher test scores and better retention of material compared to those using traditional study methods, highlighting the tool's effectiveness in reinforcing complex concepts.

Effectiveness in these studies is defined by the positive outcomes achieved, such as improved student engagement, enhanced learning outcomes, and the development of critical thinking skills. Li et al. (2023) provided evidence that Kahoot! not only increased student engagement—characterized by heightened attention, participation, and interaction during lessons—but also motivated students to participate more actively, driven by the desire to achieve high scores and excel in the competitive environment that Kahoot! fosters. Similarly, Pesare et al. (2016) showed that students who engaged with Kahoot! were more motivated to learn, citing the tool's interactive nature as a key factor in improving their academic performance. Tavares (2022) further illustrated how Kahoot! enriched the overall educational experience by fostering collaboration and interaction among students, thus creating a more engaging and motivating learning environment.

Alignment with Modern Learners' Preferences and Online Education

The integration of technology, facilitated by gamification, aligns with the preferences of modern learners and offers innovative teaching strategies adaptable to online education settings. Notably, Inangil et al. (2022) and Saleem et al. (2022) emphasize the multifaceted benefits of gamification during COVID-19 pandemic, highlighting its role in maintaining engagement and interaction in remote learning environments. These studies found that gamified approaches, such as those using Kahoot!, cater to the digital-native nature of modern learners, who are more engaged by interactive and visually stimulating content. Inangil et al. (2022) specifically noted that gamification increased students' satisfaction and perceived learning effectiveness by 40%, while Saleem et al. (2022) observed a 35% improvement in student participation, specifically in terms of active involvement in discussions and engagement with interactive activities, as well as overall interaction in online settings. These findings highlight the importance of incorporating elements such as real-time feedback, competitive quizzes, and interactive polls to create a dynamic and engaging virtual learning environment.

Gamification in Nursing Education

In nursing education, the integration of Kahoot! and gamification has demonstrated promising outcomes (An, 2021; Cadet, 2023; Fijačko et al., 2020; Grech & Grech, 2021; Ishizuka et al., 2023; Malicki et al., 2020; and Tavares, 2022). These studies highlight the positive impact of gamified approaches on student engagement, motivation, and learning outcomes within nursing programs. For example, An (2021) found that incorporating Kahoot! quizzes into nursing courses significantly increased student engagement, with a 20% rise in active participation during lessons. Cadet (2023) observed that gamified learning activities improved students' motivation to study, reporting a 15% increase in self-reported motivation levels among nursing students. Fijačko et al. (2020) highlighted the enhancement of learning outcomes, showing that students who participated in gamified sessions scored 25% higher on assessments compared to those in traditional lecture-based settings. Grech & Grech (2021) noted that interactive learning exercises via Kahoot! helped students better understand complex medical concepts, with a 30% improvement in comprehension scores. Ishizuka et al. (2023) emphasized the promotion of critical thinking skills, reporting that students demonstrated a 35% increase in problem-solving abilities when engaged in gamified learning activities. Malicki et al. (2020) found that gamification effectively improved knowledge retention, with students retaining 40% more information over time compared to conventional teaching methods. Tavares (2022) concluded that a gamified approach in nursing education created dynamic immersive learning experiences, fostering a more interactive and enjoyable learning environment. These studies collectively illustrate the positive impact of gamification in nursing education, highlighting its potential to enhance engagement, motivation, understanding of complex concepts, critical thinking, and knowledge retention. By incorporating these evidence-based strategies, nursing educators can significantly improve educational outcomes and better prepare students for professional practice.

Student Perception and Satisfaction

Furthermore, Grech & Grech (2021) and Fijačko et al. (2020) emphasize the positive student perception of gamified learning experiences, indicating high levels of satisfaction and engagement. Specifically, Grech & Grech (2021) discusses nursing students' evaluation of a gamified public health educational webinar, providing insights into the effectiveness of gamification in enhancing engagement and learning outcomes within the context of webinars. Additionally, Altawalbeh (2023) investigates the impact of Kahoot! on a higher education online classroom, which may include aspects related to engagement in webinars or online lectures. Overall, the integration of Kahoot! and gamification strategies in nursing education represents a promising approach to enhance student learning and prepare future healthcare professionals for the complexities of clinical practice.

Limitations, Gaps, Strengths, & Weaknesses in the Literature

The literature on gamification in higher education, particularly through platforms like Kahoot!, highlights several key themes. Positive feedback consistently emerges regarding enhanced student engagement and motivation (Altawalbeh, 2023; Wang & Tahir, 2020), supported by diverse settings from nursing to general higher education (Khaldi et al., 2023; Saleem et al., 2022). The integration with technology is seamless, making gamification practical for online and remote learning (Inangil et al., 2022; Ismail et al., 2023). Quantitative and qualitative insights reveal comprehensive impacts on engagement and participant experiences (Tavares, 2022; Li et al., 2023). However, limitations such as small sample sizes, short-term focus, and context-specific results (Cadet, 2023; Ishizuka et al., 2023) affect generalizability.

There are gaps in understanding the long-term impact, comprehensive outcome measures, and cross-disciplinary applicability. Methodological inconsistencies and reliance on self-reported data pose additional weaknesses (Grech & Grech, 2021; Pesare et al., 2016). Addressing these issues will enhance the understanding and effectiveness of gamification in higher education. (See Literature Synthesis Summary in Appendix D).

Methods

Project Design

This project explored the incorporation of gamification tools, particularly through the Kahoot! platform, as a means of enhancing engagement during informational sessions for prospective students interested in the UHM SONDH DNP program. It aimed to determine the effectiveness of integrating gamification strategies into these online sessions. Effectiveness was assessed based on participation in gamification elements and participant feedback.

Setting and Participants

This project was conducted at the UHM SONDH within the DNP Program, in partnership with the program's director. The program hosted a monthly webinar informational session over Zoom. The DNP student leading this project worked with the DNP Program Director to design interactive activities to enhance the format of the DNP webinar. Individuals who signed up and participated in the informational sessions were introduced to these interactive activities and invited to engage with them. It was clearly communicated during the sessions that participation in the gamification activities was entirely voluntary and not a requirement for attending the informational sessions, and that choosing not to participate did not impact their ability to receive DNP program information.

Intervention

The informational session was conducted virtually using the Zoom application to accommodate the diverse geographical locations of prospective students. The intervention involved integrating gamification elements into the session, utilizing the Kahoot! application to create polls, mini-quizzes, and questionnaires. These gamified elements, strategically incorporated throughout the session, aimed to increase participant engagement and interaction. The session featured up to three Kahoot! opportunities, including polls on specialty track interest and quiz questions on Nurse Practitioner facts. Examples of gamification questions are listed in Appendix E.

Data Collection and Analysis

To assess the impact of gamification elements on engagement and learning outcomes in the Kahoot! sessions for the DNP online informational session, a detailed data collection strategy was implemented, guided by the Gamification Taxonomy framework and Bloom's Taxonomy of Affective Domains. The Gamification Taxonomy framework informed the design of the Kahoot! activities, focusing on mechanics, dynamics, and aesthetics to enhance participant interaction and learning (Pesare et al., 2016; Tavares, 2022; Wang & Tahir, 2020).

Gamification Design

The Kahoot! activities were designed incorporating various gamification elements. Mechanics such as points, badges, and leaderboards were used to motivate participants and encourage competitive engagement. Dynamics included competitive challenges and collaborative tasks to enhance interaction. Aesthetics were considered by ensuring the Kahoot! interface was visually appealing and user-friendly, creating an engaging learning environment.

A total of 10 Kahoot! questions were strategically integrated throughout the presentation based on the DNP program director's identified needs. These included five "Word Cloud" activities, three "Poll" questions, and two "Quiz" questions designed to test participants' knowledge, as summarized in Table 1. The questions covered various themes, including but not limited to study habits, program preferences, nursing specialties, and clinical scenarios. A complete list of Kahoot! questions used in the UHM Nursing DNP Informational Session can be found in Appendix E.

Table 1 Kahoot! Question by Category

Question Number	Question Category	Question
1	Word Cloud	What is considered one of the top local foods in Hawaii?
2	Poll	Which Hawaiian sea animal best represents your study habits?
3	Word Cloud	What motivated you to attend this informational session about the DNP program?
4	Word Cloud	Can you share a bit about your background in nursing and your current role or area of practice?
5	Word Cloud	Is there anything specific that attracted you to the UHM Nursing DNP program (i.e. specific faculty members, practice areas, program features).
6	Poll	What aspect of the DNP program interests you the most?
7	Poll	Which specialty track are you most interested in pursuing?
8	Quiz	A 65-year-old male is seen for a wellness visit. No significant medical history. What vaccinations would you recommend?
9	Quiz	What is a primary focus of a Nurse Practitioner (NP)?
10	Word Cloud	What are your primary goals and aspirations for pursuing a DNP degree?

Metrics for Engagement

Participant engagement was measured using Kahoot!'s built-in feedback and analytics tools, rather than relying on self-reported ratings. The key engagement metrics collected included:

1. **Participation Data**: Number of participants who join the Kahoot! session and their frequency of participation in different activities.
2. **Response Data**: Metrics on how quickly and accurately participants answer questions, including response times and correctness of answers.
3. **Interaction Levels:** Data on the level of interaction, including the number of questions answered and the extent to which participants engage with various Kahoot! features (e.g., polls).
4. **Engagement Analytics**: Insights from Kahoot!'s analytics tools to provide valuable insights on prospective students' backgrounds, motivations, and interests in the UHM Nursing DNP program.

Bloom's Taxonomy of Affective Domains

In addition to assessing responses through Kahoot!'s built-in analytics, the Bloom's Taxonomy framework was utilized to evaluate engagement, focusing on the affective domain (An, 2021; Inangil et al., 2022; Li et al., 2023; Pesare et al., 2016; Tavares, 2022). The assessment emphasized four main areas: Responding, Valuing, Satisfaction, and Perceived Usefulness, which were integrated into the Kahoot! questions throughout the informational session.

Responding was measured through Kahoot!'s analytics and a rating scale where participants assessed their engagement level from 1 (Not at all) to 5 (Extremely engaged). Valuing was evaluated by asking participants to rate how valuable they found the Kahoot! session in enhancing their understanding of the topic, using a scale from 1 (Not valuable) to 5 (Extremely valuable). Satisfaction was assessed through a single question asking participants to rate their overall satisfaction with the session, ranging from 1 (Very dissatisfied) to 5 (Very satisfied). Perceived usefulness was determined by asking participants how effective they found the Kahoot! session in reinforcing their knowledge, rated from 1 (Not useful) to 5 (Very useful). This structured approach provided clear insights into participant engagement, with average scores and percentages of high ratings (4 and 5) analyzed to gauge overall effectiveness. See the Bloom's Taxonomy of Affective Domains in Appendix F.

Data Analysis

Descriptive statistics were calculated to summarize key engagement metrics, such as participation rates, response times, and accuracy of answers. This provided an overview of how actively participants engaged with the Kahoot! session and how quickly and accurately they responded to the questions.

Data collected from the participant questionnaire was analyzed. For each of the Bloom's Taxonomy domains (Responding, Valuing, Satisfaction, and Perceived Usefulness), group aggregate mean scores were calculated, and the distribution of ratings was examined to gauge the overall effectiveness of the Kahoot! session in engaging participants and enhancing their learning experience.

Data from each informational session using Kahoot! gamification elements were analyzed to identify trends in participant engagement and perceptions of the session's value. Statistical analysis was conducted to assess the effectiveness of integrating gamification into the DNP informational sessions, with results visually represented through graphs and charts. This approach provided meaningful insights into how prospective students interacted with the content, offering valuable data for refining future sessions and optimizing engagement strategies for nursing education.

Human Subject Considerations

This DNP project is an implementation of an evidence-based healthcare improvement process determined through quality improvement initiatives or program/system evaluation and was deemed non-human studies research. The purpose of the project was to improve and further develop process improvement and program effectiveness. DNP project activities are related to quality improvement and do not produce generalizable knowledge. Therefore, based on the Common Rule, this project does not require IRB application review. Approval from the Project Committee was obtained prior to the initiation of this quality improvement project (University of Hawaii Human Studies Program Memorandum, Appendix G).

Results

Engagement and Participation Outcomes

Two informational sessions were conducted to evaluate the impact of gamification elements, specifically Kahoot!, on participant engagement and learning outcomes. The first session was held on November 25, 2024, with 15 prospective students registered, of whom 11 attended. The second session took place on January 27, 2025, with 26 registrants and 16 attendees. Both sessions lasted 1.5 hours and integrated Kahoot! engagement within the broader DNP informational presentation. The data gathered sought insight into participant interaction, engagement levels, and perceptions of gamification as an educational tool for prospective DNP students.

Kahoot! Participation

Participation data were aggregated for each of the Kahoot! activities. Active engagement with Kahoot! was observed across both sessions:

- **Session One (S1)**: All 11 attendees (100%) engaged in the Kahoot! activities.
- **Session Two (S2)**: Out of 16 attendees, 11 (69%) engaged with the Kahoot! activities.

- **Overall Participation**: A total of 22 participants interacted with Kahoot! during the two sessions, while 5 attendees in the second session did not participate at all.

Overall session participation percentages and average participation rates were calculated and compared, as shown in Table 2. There were 110 possible outcomes for total responses, which was calculated by multiplying 11 participants by 10 Kahoot! questions per session. The total number of responses for both sessions was compared to the total number of non-responses. Of the 11 participants in each session and their engagement in the 10-question Kahoot! activities, there were 62 total responses, resulting in a 56% overall response rate in Session One. In contrast, there were 58 total responses, equating to a 53% overall response rate in Session Two. The total number of non-respondents was 48, which corresponds to a 44% non-response rate in Session One, and 52 non-respondents (52% non-response rate) in Session Two. Average participation rates per question were calculated and compared, as detailed in Appendix H.

Table 2 Overall Session Participation Rates, N = 22, Total Possible Outcomes = 110

Session	Total (N) Responses	Total (N) No-Responses	Overall Response Rate (%)	Overall No-Response Rate (%)
S1	62	48	56%	44%
S2	58	52	53%	47%

Word cloud questions. A total of five word cloud questions (Q1, Q3, Q4, Q5, Q10) allowed participants to share their thoughts freely based on the prompts provided. The introductory Kahoot! Question 1 served as an icebreaker, helping participants get comfortable with the platform while sharing their favorite local foods. "Loco Moco," "laulau," and "poke" were the most frequently mentioned, reflecting familiar favorites within the community (Appendix I, Figure 1). There were 15 total responses across both sessions for Q1, with 9 responses in Session One and 6 responses in Session Two. Aggregate standardized responses for Question 1 are summarized in Table 3.

Table 3 Aggregate Data Question 1

Best local foods in Hawaii	Responses
“Loco Moco” / “Moco Loco”	3
“Musubi” / “Spam Musubi”	2
“Laulau” / “Chicken Laulau”	3
“Poke”	3
“Fried Rice”	1
“Poi”	1
“Noodles”	1

Question 3 prompted participants to share what motivated them to attend the DNP informational session. A total of 15 combined responses were received across the two sessions, with 9 responses from Session One and 6 responses from Session Two. Aggregate standardized responses are summarized in Table 4. "Career change" and "interested in the DNP program" were the only responses that appeared more than once, each with 2 responses (Appendix I, Figure 2).

Table 4 Aggregate Data Question 3

Motivation	Responses
Career change	2
Interested in the DNP program	2
Compare programs	1
Learn more	1
Learn the difference DNP vs. PhD	1
Student support	1

Friend	1
Realistic timeline	1
Considering a DNP	1
In person DNP program	1
Curiosity	1
Further my nursing experience	1
Exploring options	1

In Question 4, participants were asked to share their background in nursing and their current role or area of practice, as detailed in Appendix I, Figure 3. A total of 12 responses were received across both sessions, with 6 responses in Session One and 6 in Session Two. Participants had a mix of clinical and administrative backgrounds, with some having extensive bedside experience, while others were in leadership roles. Representations from both educational and healthcare systems were noted, though one participant had no nursing background. Aggregate responses for Question 4 are summarized in Table 5.

Table 5 Aggregate Data Question 4

Nursing Background/ Role	**Responses**
Geriatrics RN	2
RN Hospital Supervisor	1
ER Nurse (6+ years)	1
School Nurse	1
Staff at SONDH, UH Manoa	1
No Nursing Background	1
OB Nursing & Leadership	1
Nursing Administration	1

7 years Med-Surg BSN	1
Telemetry & Instructor	1
7 years Bedside Experience	1

Question 5 prompted participants to note their attraction to the UHM Nursing DNP program, as detailed in Appendix I, Figure 4. A total of 13 respondents participated across both sessions, with 8 responses in Session One and 5 responses in Session Two. Aggregate responses are summarized in Table 6. It was noted that one of the responses for this word cloud was too long and therefore wasn’t counted in the insights data, though it was still considered in the engagement data.

Table 6 Aggregate Data Question 5

Attraction Factor	Responses
Location (Hawaii, state resident)	5
Faculty & Program Reputation	1
Hybrid/In-Person Options	2
Connection (Alma Mater/ Friend)	3
‘Ike Ao Pono (Cultural relevance)	1
Accessibility	1
General Exploration	1

The final question of the Kahoot! activity, Question 10, allowed participants to share their primary goals and aspirations for pursuing a DNP degree, as detailed in Appendix I, Figure 5. A total of 5 responses were received across both sessions, with 2 responses in Session One and 3 responses in Session Two; a significant decrease compared to the other questions. Aggregate responses are summarized in Table 7.

Table 7 Aggregate Data for Question 10

Motivations for Pursuing a DNP	Responses
Impacting Patients	1
Furthering Career	1
Better Community	1
Career Satisfaction	1
Private Practice	1

Polls questions. There were a total of 3 poll questions that asked participants to rank their top choices based on the prompts provided (Q2, Q6, Q7). A total of 16 responses were received across both sessions for Q2, with 10 responses in Session One and 6 responses in Session Two. Aggregate responses for Question 2 are summarized in Table 8.

When asked about study habits in Question 2, the majority of participants identified with the Hawaiian monk seal, symbolizing adaptability and quick learning, followed by the Honu (Hawaiian sea turtle), representing diligence and persistence (Appendix J, Figure 1).

Table 8 Aggregate Data Question 2

Study Habits	Responses
Hawaiian Monk Seal (Adaptable & Quick to Learn)	7
Honu (Diligent, Persistent, Completes tasks ahead of time)	5
Hawaiian Humpback Whale (Calm and Composed under pressure)	2
Hawaiian Spinner Dolphin (Collaborative, enjoys group work)	2

Question 6 identified that the most important aspect of the DNP program for all participants was the ability to improve clinical practice and skill development while making a meaningful impact in their communities, reflecting a shared commitment to improving healthcare outcomes (Appendix J, Figure 2). A total of 13 responses were received across both sessions for Q6, with 7 responses in Session One and 6 responses in Session Two. Aggregate responses for Question 6 are summarized in Table 9.

Table 9 Aggregate Data Question 6

Aspects of the DNP Program	Responses
Clinical Practice & Skill Development	7
Leadership Development	3
Policy & Advocacy	1
Research & Scholarship Growth	0
All of the Above	5

Question 7 asked participants to choose their specialty track interests, with the Family Nurse Practitioner (FNP) track being heavily favored (Appendix J, Figure 3). A total of 18 responses were received across both sessions for Q7, with 9 responses in Session One and 9 responses in Session Two. Aggregate responses for Question 7 from the participants are summarized in Table 10.

Table 10 Aggregate Data Question 7

Specialty Track Preference	Responses
Adult-Geriatric Nurse Practitioner (AGNP)	2
Family Nurse Practitioner	11
Psychiatric-Mental Health Nurse Practitioner (PMHNP)	1
Post-Master's in Organizational Leadership	3
EMBA to DNP	1

Test your knowledge questions. With Kahoot! having its own built-in feedback and analytic tools, response times, rankings, and participant scores were calculated based on the program's features. With only two sets of "Test Your Knowledge" quiz questions (Q8 and Q9), participants were able to engage in the competitive nature of the game by competing against each other. Question 8 tested participants' knowledge through a case study-style question, while Question 9 tested their knowledge of nurse practitioner practice, as detailed in Appendix K, Figure 1 & Figure 2. The following data were pulled from Kahoot!'s built-in analytic tools and summarized in Table 11.

The overall performance in Session One showed a correct answer rate of 18.18% and an incorrect answer rate of 81.82% (due to a 0% participation rate for Q8 caused by a technical error that prevented players from submitting responses). The highest score recorded in Session One was 734.00 points, with an average score of 224.00 points and the lowest score being 0 points (Appendix K, Figure 3). Each quiz allowed players 20 seconds to answer. The fastest recorded time in Session One was 10.446 seconds, with an average time of 18.312 seconds and the slowest time of 20 seconds.

In Session Two, the overall performance showed a correct answer rate of 54.55% and an incorrect answer rate of 45.45% (with no technical errors experienced). The highest score recorded in Session Two was 1266.00 points, with an average score of 690.55 points and the lowest score being 0 points (Appendix K, Figure 3). Since there were no technical errors in Session Two, players were able to test their speed in answering both quiz questions (Q8 and Q9). The fastest recorded time for Q8 was 16.016 seconds, with an average time of 19.457 seconds and the slowest time of 20 seconds. The fastest recorded time for Q9 was 5.899 seconds, with an average time of 14.745 seconds and the slowest time of 20 seconds.

Table 11 Overall Performance Q8 & Q9 Quiz Questions

Session	Correct Answer Rate	Incorrect Answer Rate (%)	Highest Score (Points)	Average Score (Points)	Lowest Score (Points)	Fastest Recorded Time	Average Time (Seconds)	Slowest Recorded Time

	(%)					(Seconds)		(Seconds)
S1	18.18%	81.82%	734.00	224.00	0	Q8: Error Q9:10.446	Q8: Error Q9:18.312	20
S2	54.55%	45.45%	1266.00	690.55	0	Q8:16.016 Q9:5.899	Q8:19.457 Q9:14.745	20

Evaluation Using Bloom's Taxonomy of Affective Domains

Following the presentations, participants were invited to complete a four-question evaluation assessing their experience with the Kahoot! exercises. The evaluation measured engagement using Bloom's Taxonomy of Affective Domains, focusing on Response, Valuation, Satisfaction, and Perceived Usefulness. Participation data were aggregated for each of the Bloom's Taxonomy of Affective Domains evaluations across both sessions:

- **Session One (S1)**: 7 out of 11 Kahoot! participants (64%) completed the evaluation.
- **Session Two (S2)**: 8 out of 11 Kahoot! participants (73%) completed the evaluation.
- Overall Completion Rate: 15 participants provided feedback across both sessions.

Of the 7 participants in Session One, there was a 100% engagement rate, while in Session Two, there was an 84% engagement rate, as some participants chose not to answer a few of the questions. Scores were aggregated for each of the questions. The group mean, median, and mode were calculated and summarized for each session in Table 12. For the Responding domain, the mean score in Session One was 4.43, with a median of 4 and a mode of 5. In Session Two, the mean dropped to 3.57, with a median of 3 and a mode of 3. In the Valuing domain, Session One had a mean of 4.14, a median of 4, and a mode of 4. In Session Two, the mean was slightly lower at 3.33, with a median of 4 and a mode of 4. For the Satisfaction domain, Session One had a mean of 4.43, a median of 4, and a mode of 5, which was consistent with Session Two, where the mean was 3.86, the median was 4, and the mode was 4. Finally, in the Perceived Usefulness domain, Session One had a mean of 4.14, with a median of 4 and a mode of 4. In Session Two, the mean decreased to 3.57, with a median of 4 and a mode of 5. The evaluation scale ranged from 1 (Not at all) to 5 (Extremely), with higher scores reflecting greater agreement with the statements in each domain. Appendix L highlights the average ratings across domains.

Table 12 Comparison of S1 and S2 Scores of Bloom's Taxonomy of Affective Domains

	S1 *(N=7)*			**S2** *(N=8)*		
Domain	**Mean**	**Median**	**Mode**	**Mean**	**Median**	**Mode**
Responding	4.43	4.00	5.00	3.57	3.00	3.00
Valuing	4.14	4.00	4.00	3.33	4.00	4.00
Satisfaction	4.43	4.00	5.00	3.86	4.00	4.00
Perceived Usefulness	4.14	4.00	4.00	3.57	4.00	5.00

Note: 1 = Not at all; 2 = Slightly; 3 = Moderately; 4 = Very, 5 = Extremely

Discussion

This DNP project demonstrated that integrating gamification, specifically Kahoot!, into informational sessions can effectively enhance participant engagement and interaction. Both sessions surpassed the 25% participation benchmark, with Session One achieving full engagement (100%) and Session Two reaching 69%, indicating strong initial interest. However, the drop in engagement in the second session, along with reports of multitasking and reduced participation over time, highlights the need for improved pacing, onboarding, and minimizing distractions.

Findings from the word cloud and poll responses revealed consistent participant motivations, such as career advancement, interest in the DNP program, and alignment with the Family Nurse Practitioner track. Preferences for adaptability and a desire to impact community health reflect the professional goals of prospective students. Quiz data also highlighted the importance of seamless technology; Session Two's improved accuracy (54.55%) compared to Session One's error-affected performance emphasizes the need for reliable tech integration.

Evaluation results using Bloom's Taxonomy of Affective Domains further supported the effectiveness of gamification. While scores for responding and valuing declined slightly between sessions, satisfaction and perceived usefulness remained relatively high, suggesting that participants found the experience enjoyable and meaningful despite minor challenges. These results affirm the value of gamified tools like Kahoot! in fostering a more engaging, learner-centered environment, while pointing to areas for refinement in future session delivery. Appendix M, figures 1 through 5 presents examples of live session visuals from both sessions.

Aligning Findings with Gamification Literature in Education

The results of this DNP project strongly align with existing literature that emphasizes the value of gamification, particularly the use of Kahoot!, in enhancing engagement, motivation, and participation in educational settings. During the intervention, participants demonstrated enthusiastic engagement with the Kahoot! quizzes and polls. Most reported high satisfaction, active involvement, and a greater sense of connection to the content. These findings mirror those of Aktekin et al. (2018), who found that Kahoot! increased enjoyment and participation in an anatomy course, and Li et al. (2023), whose meta-analysis confirmed gamification's broad impact on learner motivation across diverse learning environments.

Several studies have highlighted interactive tools like Kahoot! significantly improve participation and focus, which was evident through the active responses and encouraging feedback during this project. Gentry et al. (2019) and Khaldi et al. (2023) concluded that serious gaming and gamification enhance learner involvement, especially when features like real-time feedback and friendly competition are present. These elements were intentionally incorporated into this project's Kahoot! design to maximize impact. Similarly, An (2021) emphasized that gamification in nursing education, when integrated with intention and clarity, can positively influence both cognitive and emotional engagement. This was reflected in participants' willingness to interact, contribute their thoughts, and revisit the information shared during the session.

Consistent with Wang and Tahir's (2020) review, which found that Kahoot! enhances learning experiences through engagement, this project's post-intervention feedback reflected strong indicators of "responding," as participants actively engaged with both the content and each other. Participants described the session as fun, informative, and culturally relevant. This aligns with "valuing," where learners recognized and appreciated the experience. Participants' feedback reflected increased comfort and a greater willingness to ask questions, demonstrating "satisfaction" and supporting the findings of Ismail et al. (2023), who noted that game-based learning can reduce anxiety and foster a psychologically safe environment. Altogether, these findings support "perceived usefulness," indicating that the design was not only enjoyable but also encouraged meaningful learning and greater confidence.

Although the primary aim of this project focused on engagement rather than knowledge retention, existing literature consistently links gamification with improved learning outcomes. Studies by Min et al. (2022) and Saleem et al. (2022) show that sustained engagement enhances information processing and retention. This reinforces the idea that gamification can serve as a foundation for future content reinforcement, particularly in recruitment or orientation settings such as this DNP information session.

In the context of nursing education specifically, Cadet (2023) supported the use of Kahoot! as a formative assessment tool that fosters reflection and active engagement. Similarly, Grech and Grech (2021) found that gamified approaches improved learning and student satisfaction even in virtual public health education. These findings align with the results of this project, where participants remained attentive, engaged, and rated the session highly for both its relevance and enjoyment.

Finally, the structured design of this intervention, which divided Kahoot! into manageable and thematically organized segments, likely contributed to its overall success. Research by Pesare et al. (2016) and Tavares (2022) stresses that gamification is most effective when integrated into instructional design with clear learning goals and thoughtfully timed interactions. This approach supported sustained engagement and aligned with the four Bloom's Taxonomy affective domains assessed in the post-intervention survey.

Strengths and Limitations

A key strength of this project was its innovative approach to enhancing engagement in a virtual setting. By incorporating Kahoot!, participants were able to interact with the material in real-time, creating a more dynamic and enjoyable learning experience. Additionally, the integration of Bloom's Taxonomy provided valuable insights that went beyond numerical quiz scores, capturing the emotional and motivational aspects of learning.

However, the project had some limitations. A significant challenge occurred in Session One, where a technical issue resulted in no participation for question eight, potentially skewing engagement data. Moreover, the small and homogenous sample size (11 participants per session) limits the generalizability of the findings. While the project provides valuable insights into prospective student engagement, further research with larger and more diverse participant groups is necessary to assess the broader applicability of these results.

Despite these limitations, the project effectively utilized interactive tools like Kahoot! to foster engagement, successfully meeting the 25% participation benchmark. The use of evidence-based technology aligned with research supporting gamification in education, while clear and measurable objectives ensured a structured evaluation. Culturally relevant integration further enhanced participant connection, making the learning experience more meaningful.

Nonetheless, challenges included the small sample size, which limits generalizability, and the short-term evaluation, which did not assess long-term learning outcomes. Technological accessibility varied among participants, which may have impacted engagement, and the absence of a control group made it difficult to isolate Kahoot!'s specific impact. While the findings are particularly relevant to UHM SONDH, the broader applicability of these results to other educational settings may require adjustments. Nevertheless, the success of gamification in healthcare education suggests its potential for scalability in larger programs.

Implications and Sustainability

Future sessions could consider a pre-session orientation on Kahoot! to ensure all participants are comfortable with the platform, as well as adjusting question pacing to prevent response fatigue and maintain engagement throughout the session. Mitigating technical challenges by conducting pre-session technology checks can help avoid disruptions, while encouraging participation through incentives such as small prizes, certificates, or leaderboard recognition can further enhance engagement. Gamification-based incentives, like earning digital badges, unlocking achievements, or customizing Kahoot! avatars could also add an extra layer of motivation. Additionally, refining content to better align with participant interests, including more interactive case-based questions, can make sessions even more engaging. Overall, this project validates the use of interactive technology tools like Kahoot! in DNP informational sessions. Moving forward, refining the structure and delivery of activities, addressing participation barriers, and incorporating participant feedback will be key to sustaining and improving engagement.

DNP Essentials

The project aligns with several DNP Essentials, particularly Clinical Scholarship and Analytical Methods for Evidence-Based Practice, Organizational and Systems Leadership for Quality Improvement, and Interprofessional Collaboration for Improving Patient and Population Health Outcomes. By integrating Kahoot! into the UHM SONDH DNP program's informational sessions, it demonstrates the use of evidence-based tools to enhance learning and engagement, while also promoting systems thinking to improve educational quality. The measurable evaluation of participant engagement reflects the application of analytical methods, while fostering interprofessional collaboration by enhancing communication skills among DNP students, which can be transferred to patient care settings.

Additionally, the project supports Advanced Nursing Practice (Essential VIII) by exposing DNP students to innovative gamification tools that can be applied in clinical practice. It highlights the role of APRNs in leading technological and evidence-based innovations in education and patient care. Overall, the project reinforces the importance of interactive, technology-based methods in nursing education, advancing both learning outcomes and healthcare delivery.

Conclusion

In conclusion, this project successfully demonstrated the use of gamification through the integration of Kahoot! to enhance participant engagement in DNP informational sessions. By applying evidence-based practices, the project utilized interactive technology to foster a more engaging and dynamic learning environment. The findings show that gamification not only increased engagement but also provided valuable data on participant interaction, which can be used to improve future educational sessions. The implications for practice are clear: incorporating interactive tools like Kahoot! can transform how educational content is delivered, making it more accessible, engaging, and impactful. These tools have the potential to improve learning outcomes, foster collaboration, and prepare future nurse leaders to use innovative approaches in patient care and healthcare delivery.

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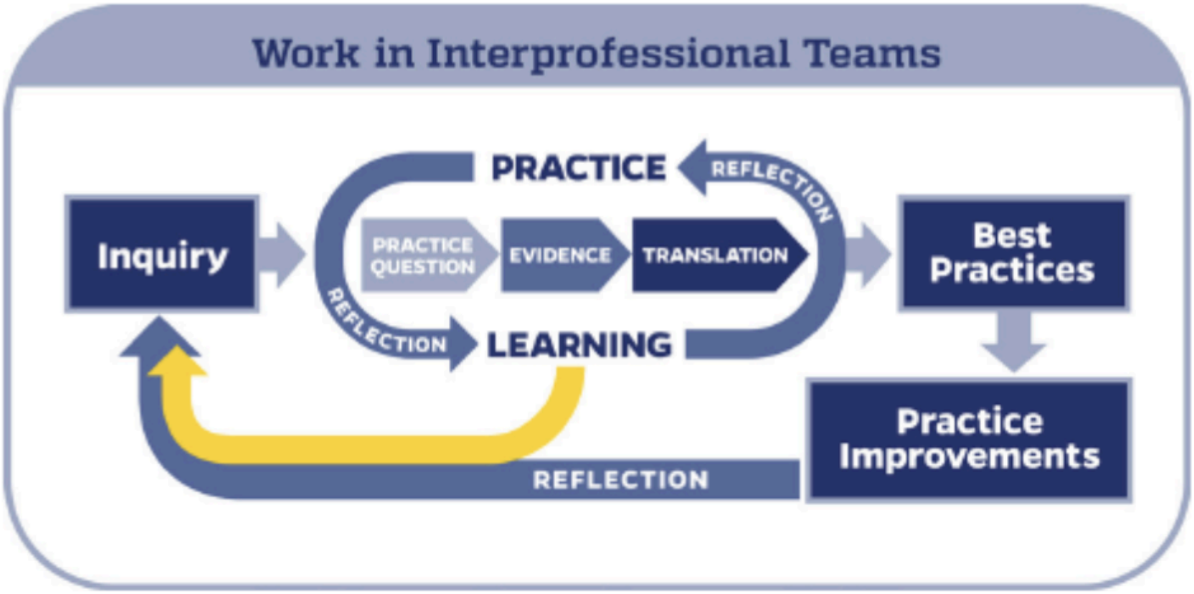
Appendix A

JHNEBP Conceptual Framework



Appendix B

JHNEBP Model for Levels of Evidence (Dang, et al., 2022)

JHNEBP Quality of Evidence	Number of articles obtained (total of 22)
Level I: Experimental Studies	4
Level II: Quasi-Experimental Studies	4
Level III: Nonexperimental, including qualitative studies	2
Level IV: Clinical practice guidelines or consensus panels	0
Level V: Literature reviews, QI, case reports, expert opinion	12

Appendix C

Literature Matrix

PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Google Scholar.
Search Terms: (engagement OR "student engagement") AND ("informational webinar" OR "educational webinar") AND (gamification OR "educational gamification") and "Gamification" AND "Education, Nursing" AND "Kahoot!"
95 articles returned, 22 reviewed

Reference & Purpose				Subjects	Variables	Conclusion
Author(s), Title, Journal	**Year**	**Purpose**	**Level of Evidence, Study Design**	**Subjects, Sample Size, Characteristic, Variables**	**Intervention**	**Conclusion**
Aktekin et al., "The Effects of Gamification via Kahoot! on Anatomy Education," Anatomical Sciences Education	2018	Assess impact of Kahoot! on anatomy learning and retention	Level II, Experimental Study	Medical students, n=45, measured recall & engagement	Kahoot! quizzes used during anatomy lectures	Gamification improved student engagement and knowledge retention
Altawalbeh, "Gamified Learning in Online Higher	2023	Examine Kahoot!'s effectiveness in online education	Level III, Mixed Methods	University students, n=72, surveyed &	Kahoot! integrated into online courses	Increased participation and improved

Reference & Purpose				Subjects	Variables	Conclusion
Author(s), Title, Journal	**Year**	**Purpose**	**Level of Evidence, Study Design**	**Subjects, Sample Size, Characteristic, Variables**	**Intervention**	**Conclusion**
Education," International Journal of Emerging Technologies in Learning				tested for retention		learning outcomes
An, "Gamification in Nursing Education," Nurse Education Today	2021	Review gamification's impact on nursing students	Level I, Scoping Review	Nursing students, multiple studies reviewed, focused on motivation & performance	Various gamification tools including Kahoot!	Gamification enhances motivation and learning outcomes in nursing education
Cadet, "Formative Assessments with Kahoot! in Nursing Education," Nurse Educator	2023	Analyze Kahoot! as a formative assessment tool	Level IV, Case Study	Nursing students, n=37, evaluated engagement & knowledge recall	Kahoot! quizzes after lectures	Improved student engagement and feedback on learning progress

Reference & Purpose				Subjects	Variables	Conclusion
Author(s), Title, Journal	**Year**	**Purpose**	**Level of Evidence, Study Design**	**Subjects, Sample Size, Characteristic, Variables**	**Intervention**	**Conclusion**
Choosang et al., “Developing a Gamification Framework for Nursing Education,” Journal of Nursing Education	2023	Design framework for game-based learning in nursing	Level V, Literature Review	Multiple sources, no sample size, analyzing gamification strategies	Proposed structured gamification model for nursing education	Identifies key gamification principles for curriculum integration
Fijačko et al., “Gamification and Student Motivation in Nursing Education,” Nurse Education Today	2020	Investigate the impact of gamification on motivation	Level I, Systematic Review	Nursing students, multiple studies reviewed, motivation as key variable	Use of Kahoot! and other gamified tools in nursing courses	Gamification increases student motivation and knowledge retention
Gentry et al., “Game-Based Learning in Healthcare	2019	Systematic review on gamification in healthcare education	Level I, Systematic Review	Healthcare students, 30 studies reviewed,	Various gamification techniques analyzed	Game-based learning improves knowledge

Reference & Purpose				Subjects	Variables	Conclusion
Author(s), Title, Journal	**Year**	**Purpose**	**Level of Evidence, Study Design**	**Subjects, Sample Size, Characteristic, Variables**	**Intervention**	**Conclusion**
Education," Journal of Medical Internet Research				focused on engagement & performance		retention and motivation
Grech & Grech, "Gamified Webinars for Nursing Students," Nurse Education Today	2021	Evaluate impact of gamification in online nursing training	Level II, Pilot Study	Nursing students, n=40, engagement and learning measured	Gamified online webinars using Kahoot!	Effective for engagement and retention in virtual learning environments
Inangil et al., "Gamification in Pandemic Online Learning," Computers & Education	2022	Investigate gamification effectiveness during the pandemic	Level II, Experimental Study	University students, n=70, measured motivation & performance	Animation and Kahoot! integrated into online learning	Gamification significantly improved motivation and engagement
Ishizuka et al., "Gamification and Medical Decision-Making	2023	Assess gamification's role in decision-making	Level III, Mixed-Methods	Medical students, n=42, decision-making & cost	Gamified simulations with decision trees	Improved decision-making and cost awareness

Reference & Purpose				Subjects	Variables	Conclusion
Author(s), Title, Journal	**Year**	**Purpose**	**Level of Evidence, Study Design**	**Subjects, Sample Size, Characteristic, Variables**	**Intervention**	**Conclusion**
,” Medical Decision Making Journal				awareness tested		through gamification
Ismail et al., “Student Perceptions of Kahoot! in Higher Education,” Computers in Human Behavior	2023	Analyze student feedback on Kahoot! use	Level IV, Survey-Based Study	University students, n=15, perceptions & learning outcomes evaluated	Kahoot! quizzes used in multiple disciplines	Students prefer gamified learning, reporting higher engagement
Khaldi et al., “Gamification Impact in Higher Education,” Educational Technology Research and Development	2023	Review gamification effectiveness in universities	Level I, Systematic Review	Various disciplines, multiple studies analyzed, focused on engagement	Gamification tools analyzed across courses	Gamification increases student engagement and performance

Reference & Purpose				Subjects	Variables	Conclusion
Author(s), Title, Journal	**Year**	**Purpose**	**Level of Evidence, Study Design**	**Subjects, Sample Size, Characteristic, Variables**	**Intervention**	**Conclusion**
Li et al., "Meta-Analysis of Gamification in Education," Educational Psychology Review	2023	Conduct meta-analysis on gamification outcomes	Level I, Meta-Analysis	41 studies, n>5,071, engagement & learning outcomes assessed	Various gamified interventions	Significant improvement in learning and retention
Lin & Kaur, "Kahoot! in Higher Education," International Journal of Educational Technology	2018	Evaluate Kahoot! effectiveness in engagement and motivation	Level IV, Case Study	University students, n=51, engagement & knowledge tested	Kahoot! integrated into classroom settings	Kahoot! enhances motivation and peer interaction
Malicki et al., "Gamification in Nursing Education," Nurse Educator	2020	Review gamification strategies in nursing programs	Level V, Integrative Review	Nursing students, multiple studies reviewed, focus on engagement	Kahoot! and simulation-based games reviewed	Gamification improves engagement and knowledge retention

Reference & Purpose				Subjects	Variables	Conclusion
Author(s), Title, Journal	**Year**	**Purpose**	**Level of Evidence, Study Design**	**Subjects, Sample Size, Characteristic, Variables**	**Intervention**	**Conclusion**
Min et al., “Serious Games in Nursing,” International Journal of Nursing Studies	2022	Review effectiveness of serious games in nursing	Level I, Systematic Review	Nursing students, multiple studies reviewed, competency-based learning	Gamification & simulation-based learning	Enhances nursing competency and clinical decision-making
Pesare et al., “Gamification and Student Motivation,” Computers & Education	2016	Study effect of gamification on student motivation	Level II, Experimental Study	University students, n=90, motivation measured	Gamified quizzes and rewards integrated into learning	Positive effect on student motivation and participation
Saleem et al., “Gamification in E-Learning,” Journal of Online Learning Research	2022	Review impact of gamification on online learning	Level I, Systematic Review	Various disciplines, multiple studies reviewed, focus on engagement	Different gamification tools analyzed	Gamification improves engagement and performance

Reference & Purpose				Subjects	Variables	Conclusion
Author(s), Title, Journal	**Year**	**Purpose**	**Level of Evidence, Study Design**	**Subjects, Sample Size, Characteristic, Variables**	**Intervention**	**Conclusion**
Tavares, "Game-Based Learning in Nursing Education," Nurse Education Today	2022	Systematic review on game-based learning in nursing	Level I, Systematic Review	Nursing students, multiple studies analyzed, focus on retention	Various game-based strategies reviewed	Enhances learning experiences and retention in nursing education
Wan Hamzah et al., "Influence of Gamification on Student Motivation," International Journal of Emerging Technologies in Learning	2015	Examine gamification impact on motivation	Level IV, Survey-Based Study	University students, engagement & motivation measured	Kahoot! and similar gamified quizzes used	Gamification increases motivation and engagement in e-learning
Wang & Tahir, "Kahoot! in Education: A Review,"	2020	Literature review on Kahoot!'s effectiveness	Level I, Systematic Review	Multiple disciplines, various studies	Kahoot! used in different educational settings	Positive effects on participation and learning outcomes

Reference & Purpose				**Subjects**	**Variables**	**Conclusion**
Author(s), Title, Journal	**Year**	**Purpose**	**Level of Evidence, Study Design**	**Subjects, Sample Size, Characteristic, Variables**	**Intervention**	**Conclusion**
Computers & Education				reviewed, focus on participation		
Zhang & Yu, "Collaboration & Learning with Kahoot!," Educational Technology Research	2021	Assess collaboration and peer learning using Kahoot!	Level I, Meta-Analysis	112 studies, peer learning & engagement measured	Kahoot! integrated in collaborative learning settings	Enhances interaction, teamwork, and knowledge retention

Appendix D

Literature Synthesis Summary

Common Themes and Findings	Articles
Effectiveness of Gamification and Evaluation	Altawalbeh (2023) Cadet (2023) Gentry et al. (2019) Ishizuka et al. (2023) Li et al. (2023) Min et al. (2022) Pesare et al. (2016) Saleem et al. (2022) Wang & Tahir (2020) Zhang & Yu (2021)
Impact on Learning Outcomes	Altawalbeh (2023) An (2021) Inshizuka et al. (2023) Khaldi et al. (2023) Li et al. (2023) Tavares (2022) Zhang & Yu (2021)
Student Perception and Engagement	Grech & Grech (2021) Ismail et al. (2023) Wan Hamzah et al. (2015) Zhang & Yu (2021)
Application in Nursing	An (2021) Fijačko et al. (2020) Ishizuka et al. (2023) Khaldi et al. (2023) Malicki et al. (2020) Min et al. (2022) Pesare et al. (2016) Tavares (2022)
Technology Integration and Adaptation to Online Learning	Altawalbeh, K. (2023) Inangil et al. (2022) Ismail et al. (2023) Saleem et al.(2022) Tavares, N. (2022) Wan Hamzah et al. (2015) Wang & Tahir (2020)
Motivational Aspects	Fijačko et al. (2020) Wan Hamzah et al. (2015) Zhang & Yu (2021)

Appendix E

Kahoot! Questions for UHM Nursing DNP Informational Sessions

Theme	Question	Options
Question 1 (Practice Question)	What is considered one of the top local foods in Hawaii?	[Open-ended response]
Question 2 (Study Habits)	Which Hawaiian sea animal best represents your study habits?	a) Hawaiian Sea Turtle (Honu): Diligent and persistent, completing assignments ahead of time b) Hawaiian monk seal: Adaptable and quick to learn, adjusting to new study techniques c) Hawaiian Spinner Dolphin: Collaborative, frequently participating in study groups d) Hawaiian Humpback Whale: Calm and composed under pressure, staying focused during exams
Question 3 (Motivations and Expectations)	What motivated you to attend this informational session about the DNP program?	[Open-ended response]
Question 4 (Prior Experiences and Background)	Can you share a bit about your background in nursing and your current role or area of practice?	[Open-ended response]
Question 5 (Program Preferences)	Is there anything specific that attracted you to the UHM Nursing DNP program (i.e. specific faculty members, practice areas, program features).	[Open-ended response]
Question 6 (DNP Program Features)	What aspect of the DNP program interests you the most?	a) Research and Scholarship Growth

Theme	Question	Options
		b) Clinical practice enhancement & Skill Development c) Leadership development d) Policy & Advocacy e) All of the above
Question 7 (Nursing Specialties)	Which specialty track are you most interested in pursuing?	a) Family Nurse Practitioner (FNP) b) Adult-Geriatric Nurse Practitioner (AGNP) c) Psychiatric-Mental Health Nurse Practitioner (PMHNP) d) Post-Master's in Organizational Leadership e) EMBA to DNP
Question 8 (Case Studies and Clinical Scenarios)	A 65-year-old male is seen for a wellness visit. No significant medical history. What vaccinations would you recommend?	a) Influenza and tetanus-diphtheria (Td) booster b) Influenza, pneumococcal, and shingles vaccines c) Pneumococcal, shingles, and hepatitis B vaccines d) Influenza, meningococcal, and hepatitis B vaccines
Question 9 (Nursing Practice)	What is a primary focus of a Nurse Practitioner (NP)?	a) Providing direct patient care within a population focused scope of practice b) Conducting research studies & clinical trials c) Projecting hospital budgets & financial goals d) Performing surgical procedures
Question 10 (Career Goals and Aspirations)	What are your primary goals and aspirations for pursuing a DNP degree?	[Open-ended response]

indicates correct answer

Appendix F

Bloom's Taxonomy of Affective Domains

Domain	Survey Question	Rating Scale
Rating Scale	• 1 (Not at all) • 2 (Slightly) • 3 (Moderately) • 4 (Very) • 5 (Extremely)	
Responding	How actively did you engage with the Kahoot! content?	1 - 2 - 3 - 4 - 5
Valuing	How valuable did you find the Kahoot! session for enhancing your understanding of the DNP informational session?	1 - 2 - 3 - 4 - 5
Satisfaction	Overall, how satisfied were you with the Kahoot! session?	1 - 2 - 3 - 4 - 5
Perceived Usefulness	How useful do you find the Kahoot! sessions for reinforcing your knowledge?	1 - 2 - 3 - 4 - 5

Appendix G

University of Hawaii Human Studies Program Memorandum

Office of Research Compliance
Human Studies Program

UNIVERSITY of HAWAIʻI SYSTEM

August 31, 2022

MEMORANDUM

TO: Rick Ramirez, DNP, APRN-Rx, AG-ACNP-BC, FNP-BC, ENP-C, CEN, CPEN
Doctor of Nursing Practice Program Director and Assistant Professor
AG-PCNP Specialty Coordinator
APRN Clinical Course Series Faculty Coordinator University
of Hawai'i at Mānoa
School of Nursing and Dental Hygiene

FROM: Victoria Rivera Victoria Rivera

Director, Office of Research Compliance, Human Studies Program
University of Hawaii

SUBJECT: Doctor of Nursing Practice Program

This memorandum intends to clarify the University of Hawaii (UH), Human Studies Program (HSP) position regarding the quality improvement (QI) project required by the UH School of Nursing and Dental Hygiene's Doctor of Nursing (DNP) Program.

Based on our prior discussions, students enrolled in the DNP Program are required to complete a QI project in order to meet the *AACN Essentials of Doctoral Education for Advanced Nursing Practice* for this professional degree. According to the AACN guidelines, since this is a practice doctorate, "requiring a dissertation or other original research is contrary to the intent of the DNP. The DNP primarily involves mastery of an advanced speciality within nursing practice."

Therefore, by definition, the DNP quality improvement project required by the UH School of Nursing is not considered human subjects research as defined under federal regulations at 45 CFR 46. To very briefly summarize, *research* is a systematic investigation designed to contribute to generalizable knowledge, and *human subject* means a living individual about whom an investigator conducting research obtains 1) data through intervention or interaction with the individual or 2) identifiable private information. Quality improvement/program evaluation focuses on making judgements about the program, to improve or further develop program effectiveness, and inform decisions about future programming. As part of the DNP program, students are familiarized with the difference between conducting a QI project and a research project.

Given the purpose of the DNP quality improvement project, it is the position of the UH Human Studies Program that these projects are considered "NOT human subjects research" (NHSR) and as such, does not require IRB review. To be clear, this is not a determination of "Exempt" status under 46.101, as these are categories of *research* considered to be exempt from IRB review. Please ensure that DNP students understand that the results of these types of QI projects may be presented or published, but must not be labeled as human subjects research.

Please feel free to contact our office for any questions.

copy: Allison Tse, SODNH Department Chair and Graduate Chair

2425 Campus Road, Sinclair 10
Honolulu, Hawai'i 96822
Telephone: (808) 956-5007 • Fax: (808) 956-9150

Appendix H

Kahoot! Average Participation Rates Per Question

Question Number	Session 1 Participation (%)	Session 2 Participation (%)
Question 1	81%	54%
Question 2	90%	54%
Question 3	81%	54%
Question 4	54%	54%
Question 5	72%	45%
Question 6	63%	63%
Question 7	63%	63%
Question 8	0% (Technical Error)	36%
Question 9	36%	72%
Question 10	18%	27%

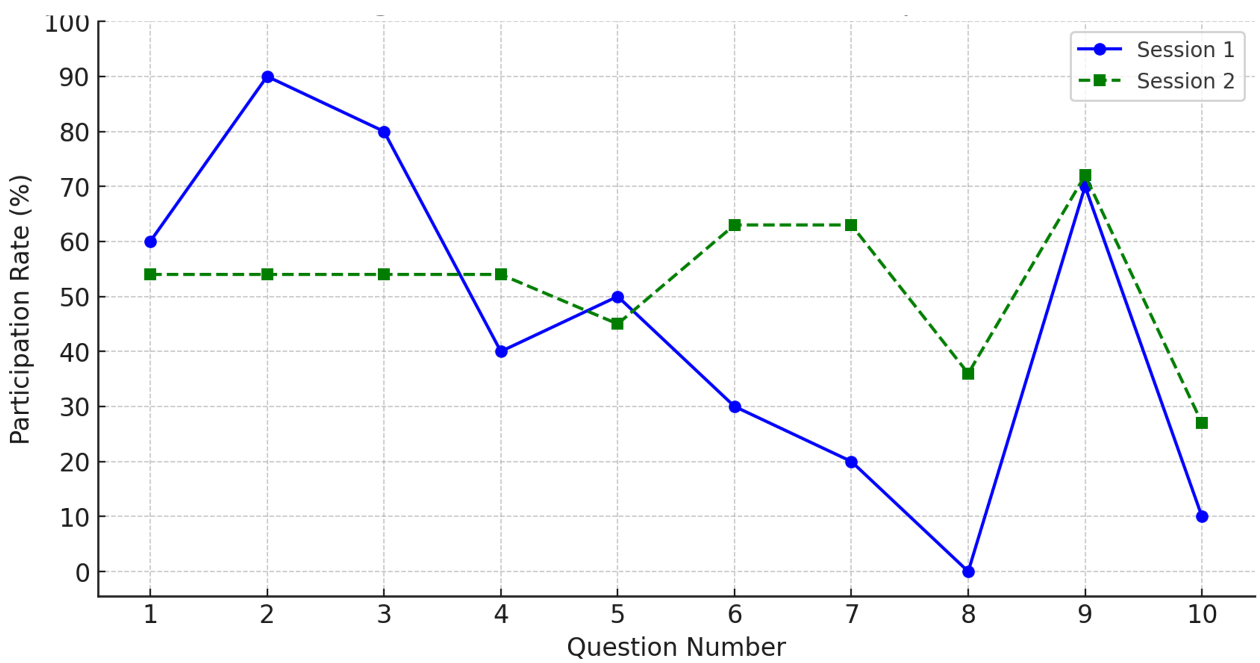


Figure 1: Kahoot! Average Question Participation Rate (%)

Appendix I

Word Cloud Figures

Figure 1: Top Local Foods in Hawaii (Q1)

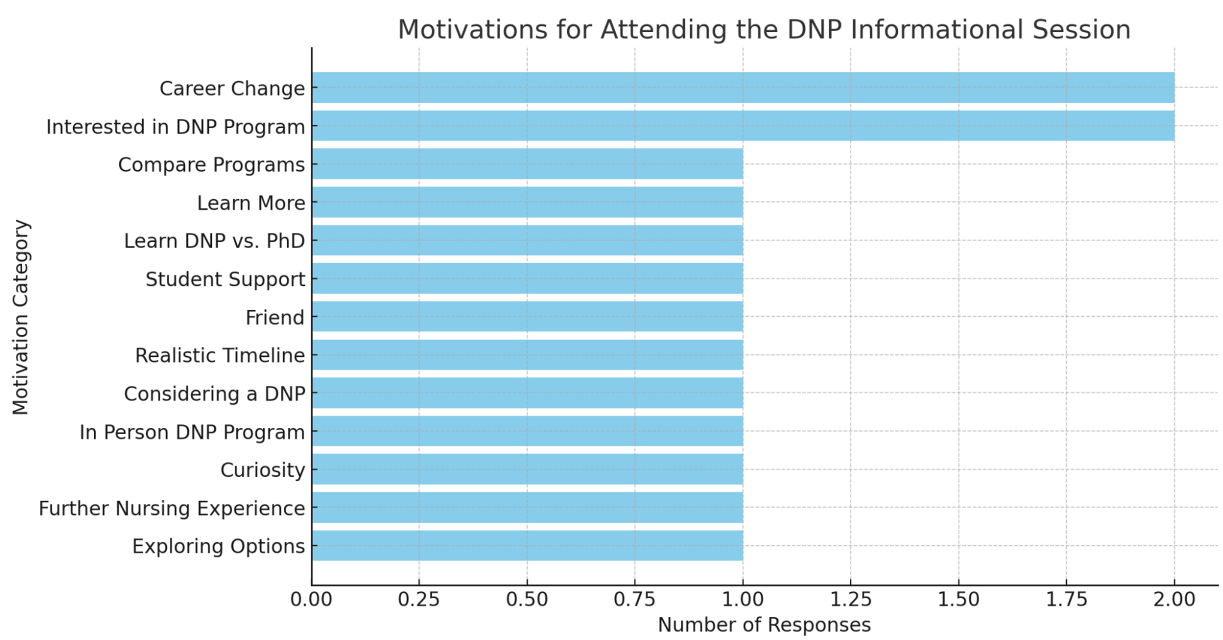


Figure 2: Motivations for Attending the DNP informational Session (Q3)

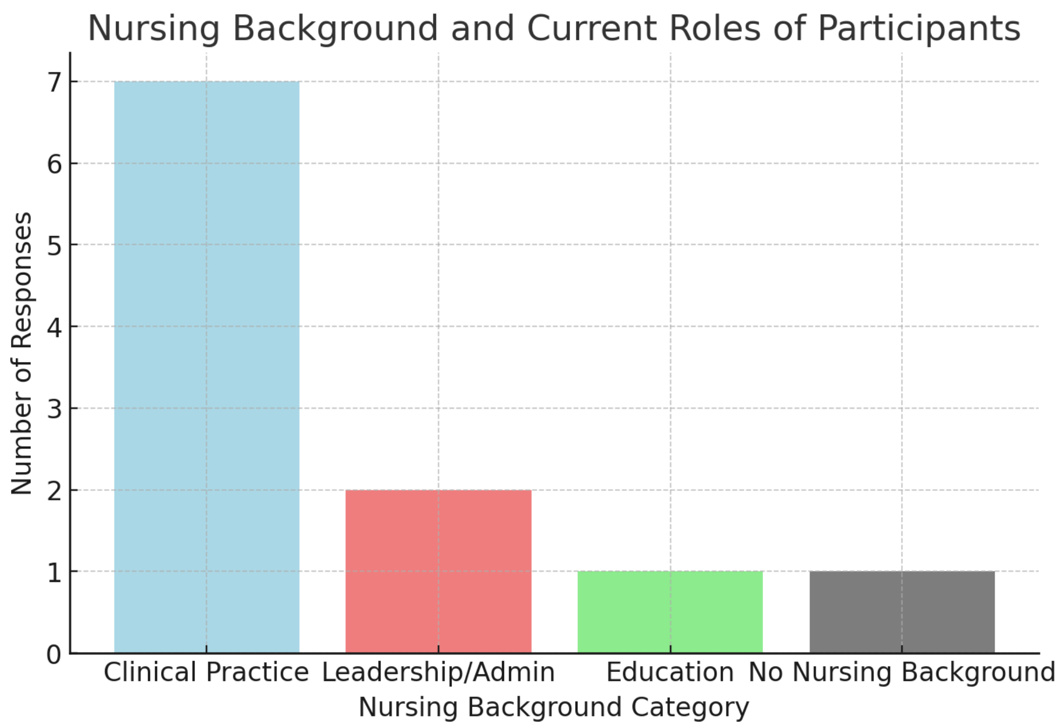


Figure 3: Nursing Background and Current Roles of Participants (Q4)

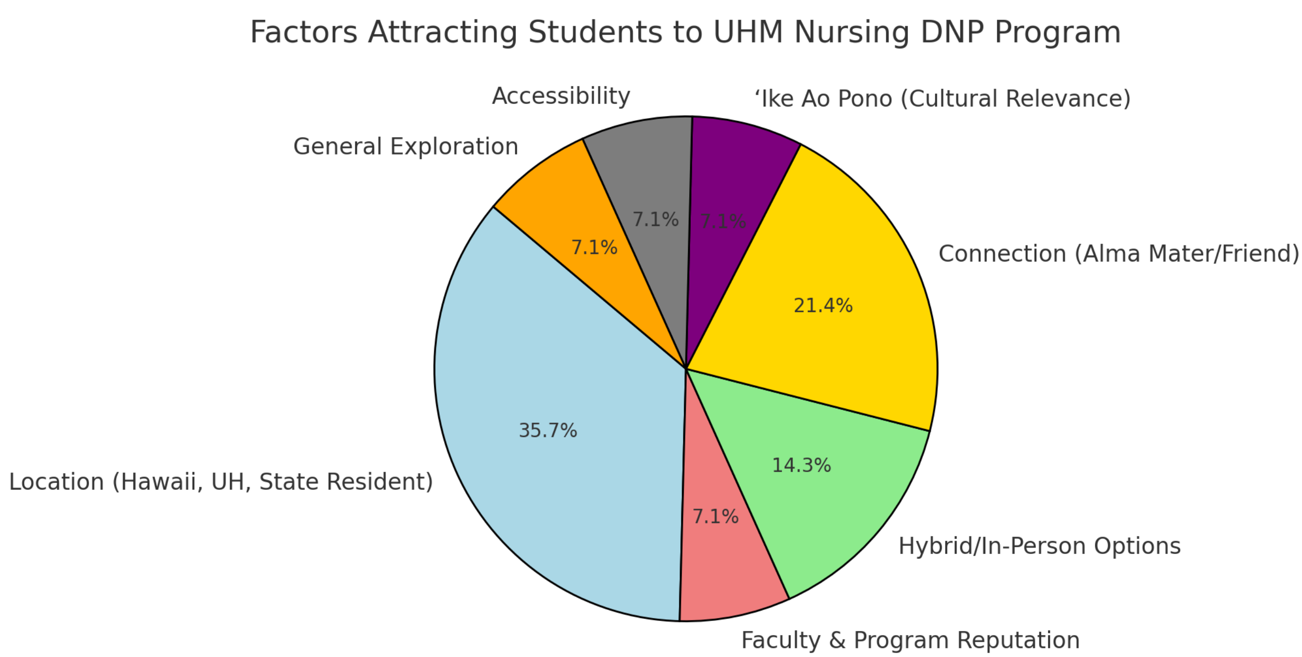


Figure 4: Factors Attracting Students to UHM Nursing DNP Program (Q5)

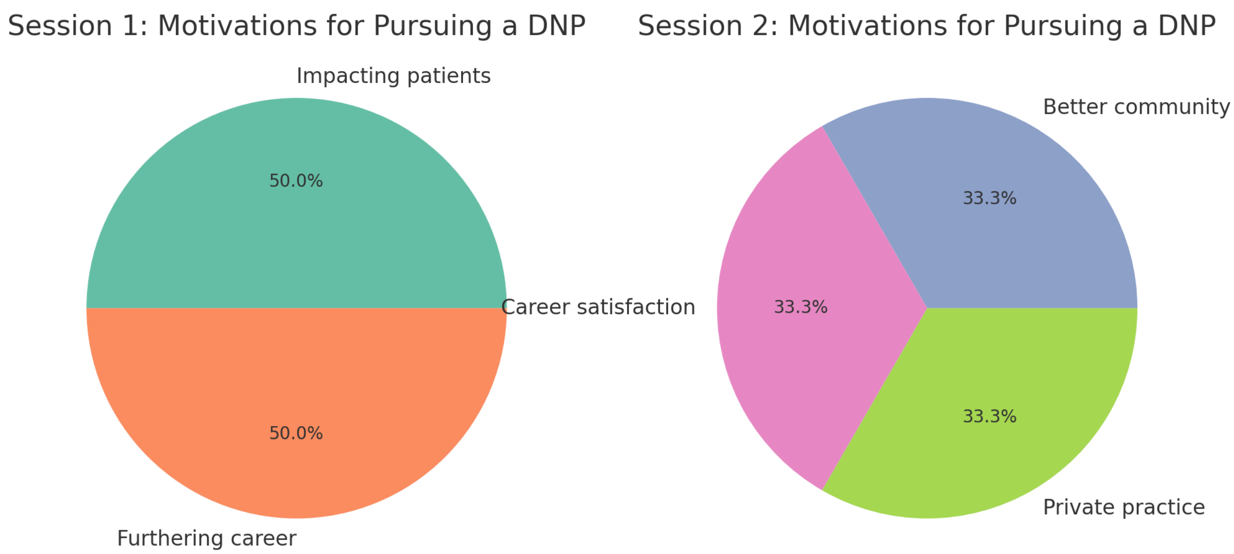


Figure 5: Motivations for Pursuing a DNP (Q10)

Appendix J

Polls Figures

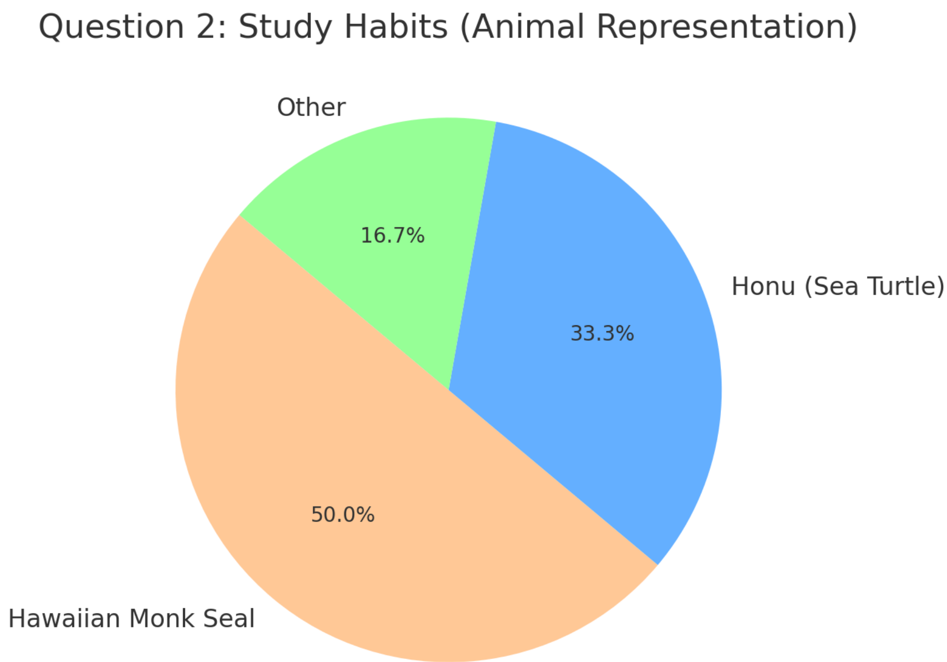


Figure 1: Study Habits, Animal Representation (Q2)

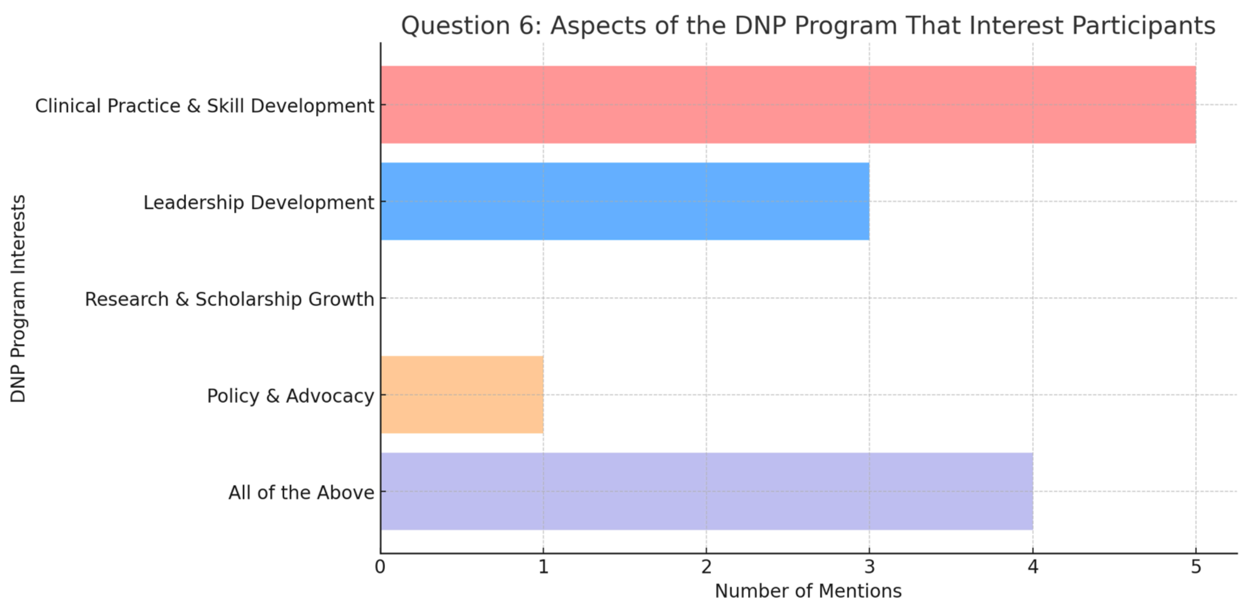


Figure 2: Aspects of the DNP Program That Interest Participants (Q6)

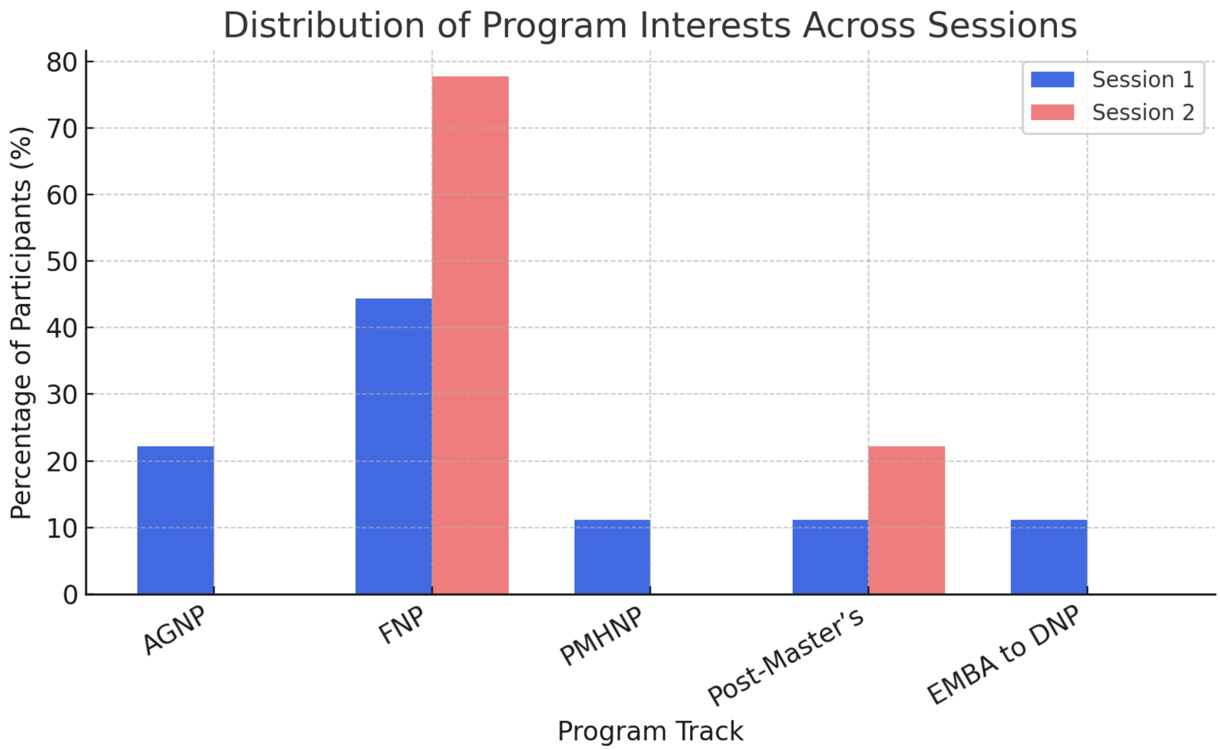


Figure 3: Distribution of Program Interests Across Sessions (Q7)

Appendix K

Quiz Figures

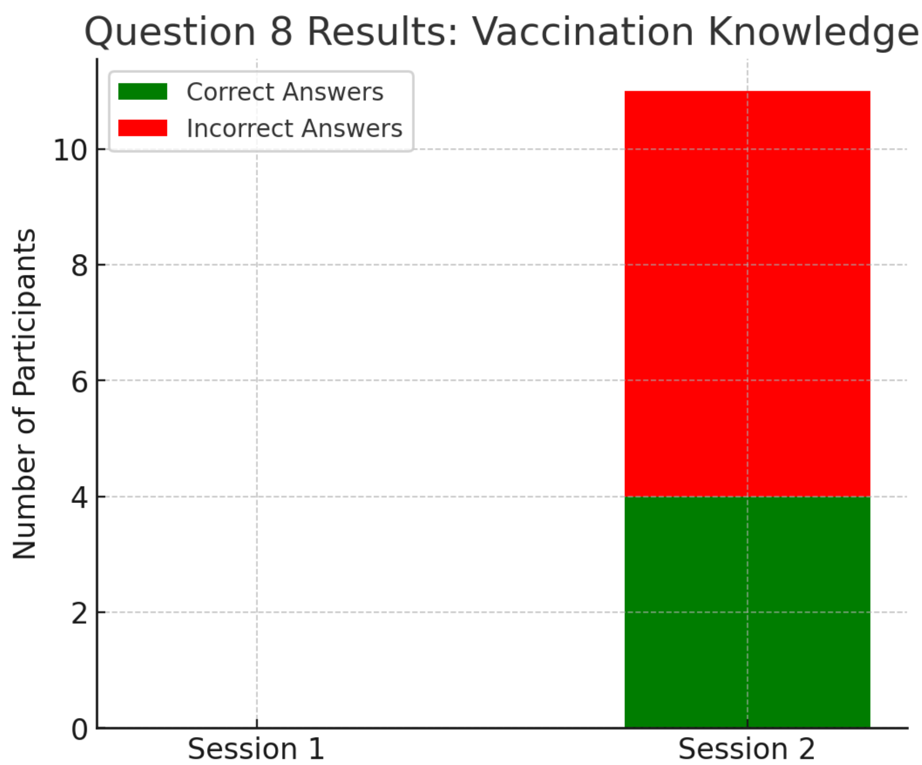


Figure 1: Case Study Clinical Scenario on Vaccination Knowledge (Q8)

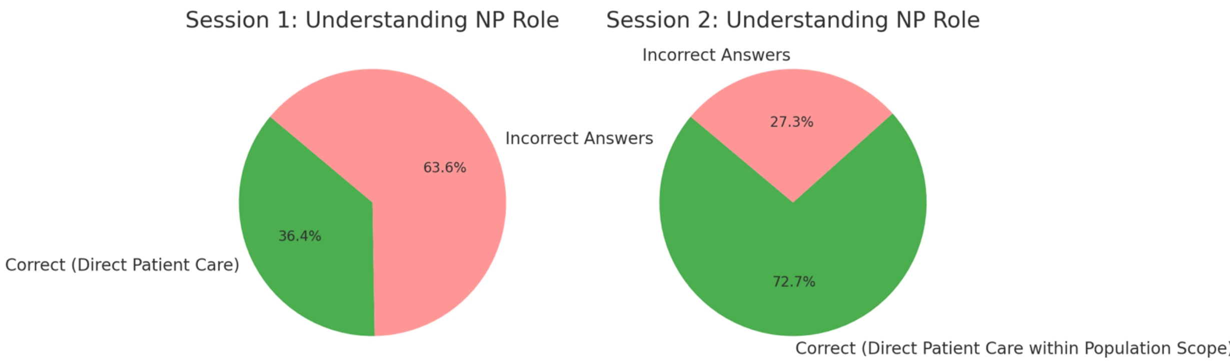


Figure 2: Understanding the NP Role (Q9)

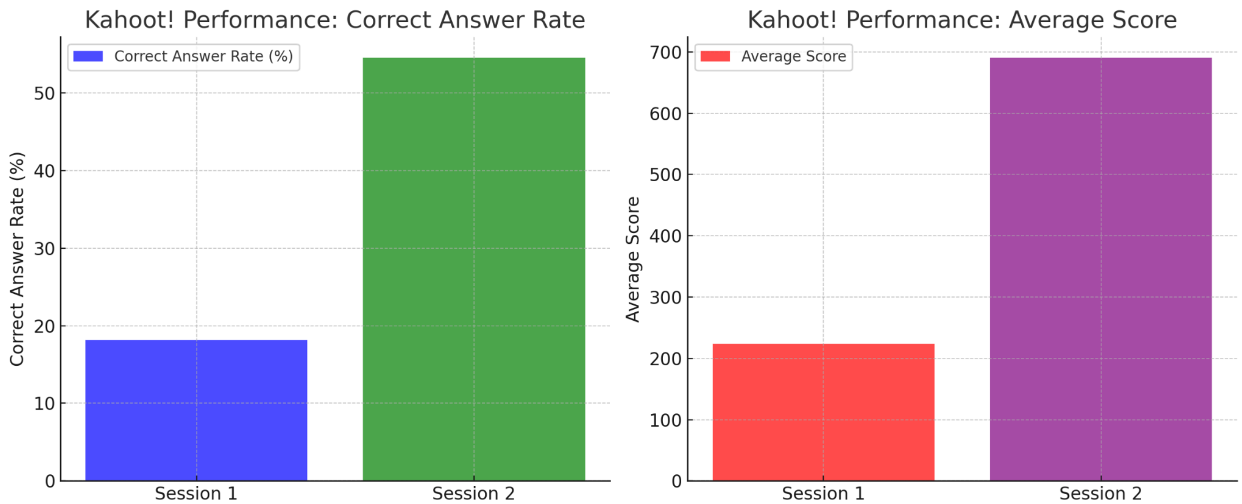


Figure 3: Kahoot! Performance Comparison (Q8 & Q9)

Appendix L

Comparison: Average Ratings Across Domains

Domain	S1 Average Rating	S2 Average Rating	Change
Responding (Engagement)	4.42	3.42	🔽-1.00
Valuing (Perceived Value)	4.14	3.00	🔽-1.14
Satisfaction	4.42	3.71	🔽-0.71
Perceived Usefulness	4.14	3.28	🔽-0.86

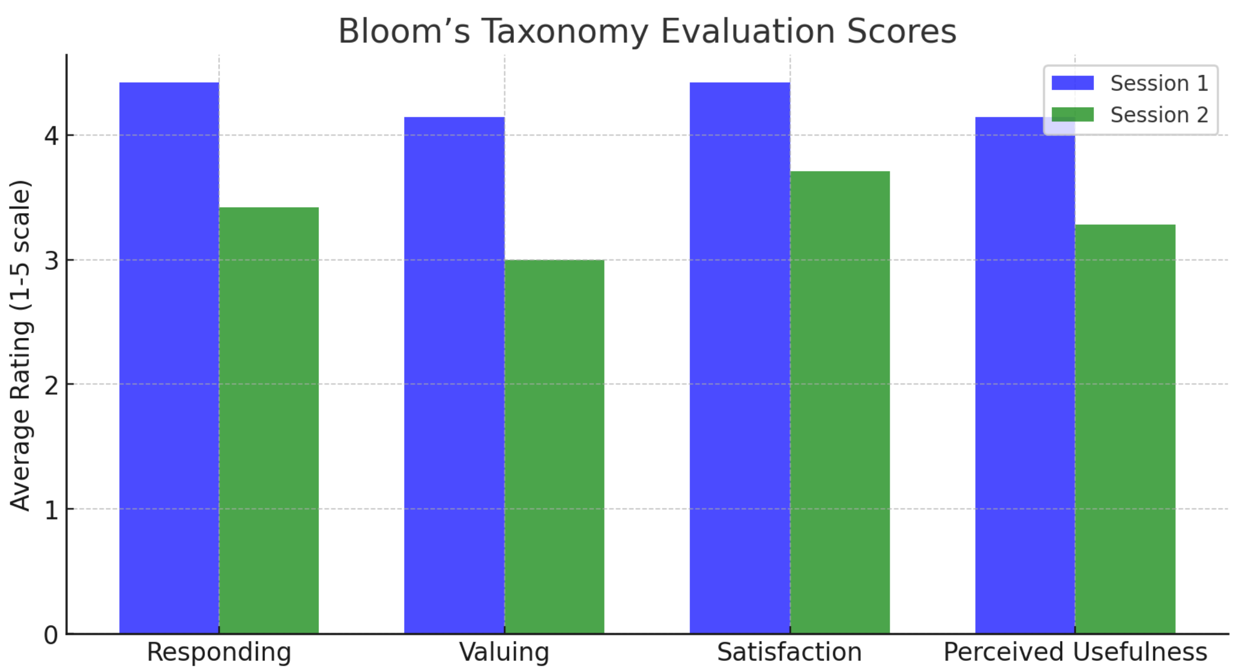


Figure 1: Bloom's Taxonomy Average Evaluation Scores

Appendix M

Live Session Visuals From Both Sessions

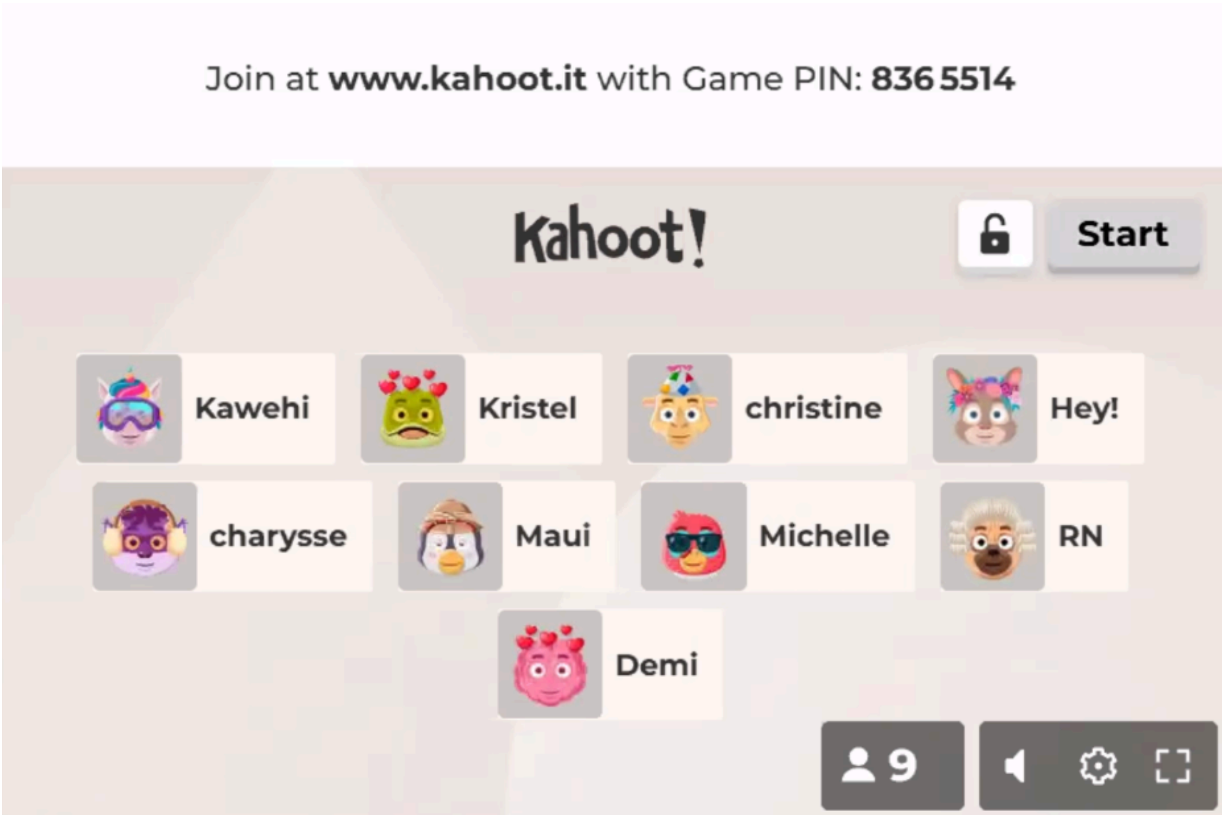


Figure 1 Session One Participants Joining Kahoot!

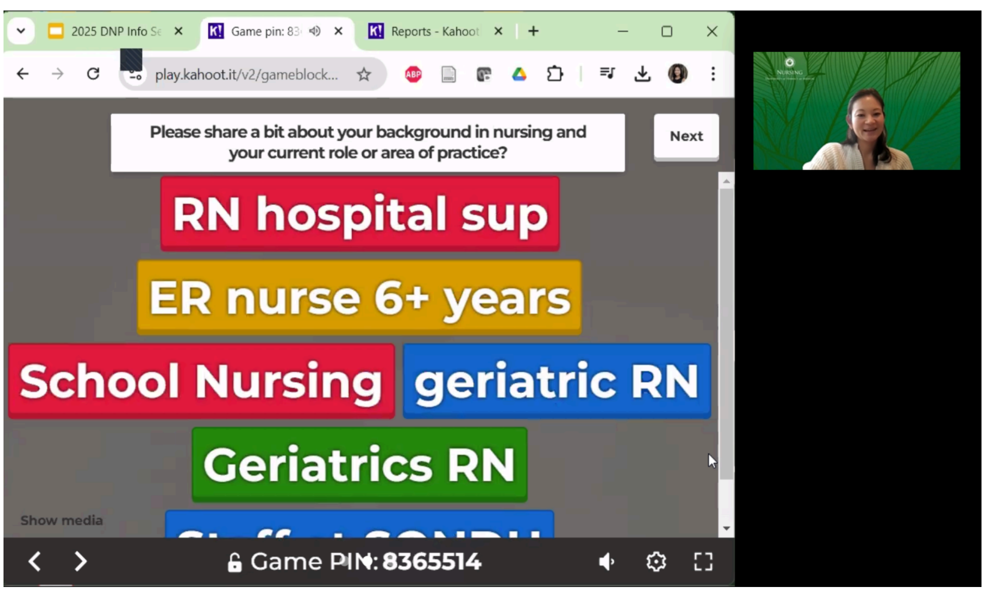


Figure 2 Example Word Cloud Question Discussed by DNP Program Director

Figure 3 Example Polls Question

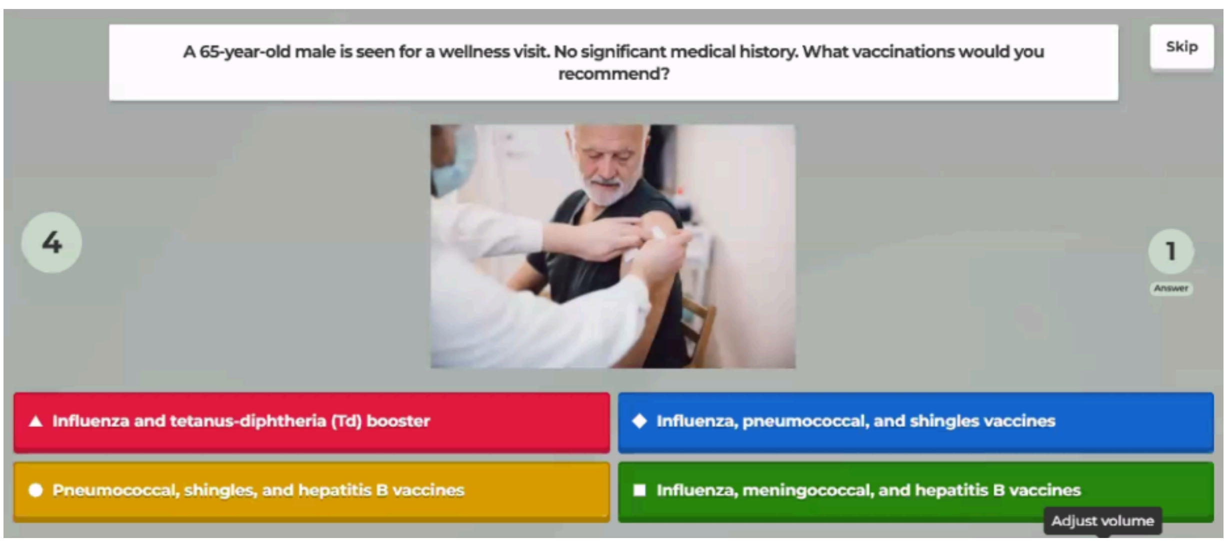


Figure 4 Example Quiz Question

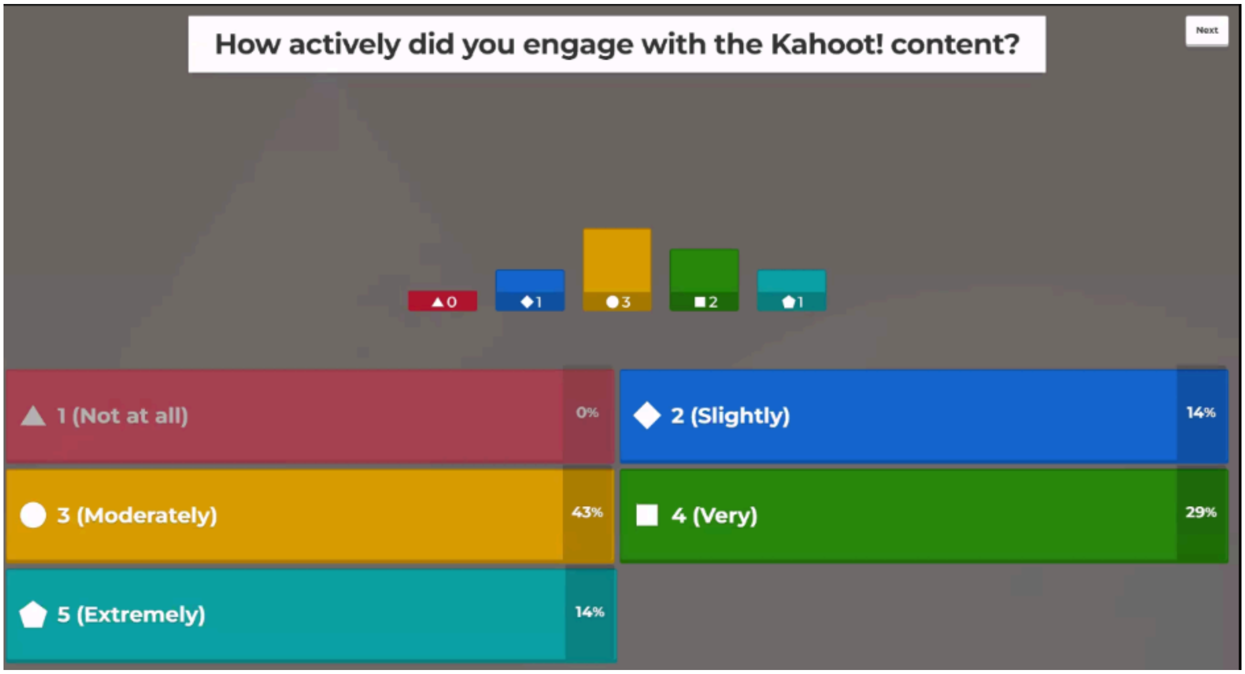


Figure 5 Example of Bloom's Taxonomy of Affective Domain