Learning for the Fun of It – The Use of Gamification in Educating Pediatric Perioperative Clinical Staff

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Background

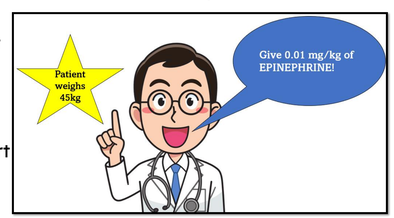
- Historically, yearly education was provided on department-specific topics and clinical skills utilizing lecture-based learning activities and limited hands-on demonstrations to reinforce knowledge of pediatric patient care.
- With the lecture-based format, staff reported that reviewing an abundance of pertinent information on multiple topics in one sitting made it difficult to retain the content.
- Staff reported dissatisfaction with lecture-based learning and self learning modules.
- Limited participation from staff was observed, therefore the Educators were eager to find a way to develop "innovative activities to play on fun themes while reinforcing key clinical concepts for staff".[5]
- Gamification is defined as the process of adding game-based elements to training sessions to engage people, motivate action and incentivizes the learner to use critical thinking skills.[2,3]
- Additionally, gaming has a positive impact on knowledge retention, confidence levels, motivation, and engagement.[4]

Objectives

- Improve staff engagement and comprehension
- Enhance knowledge retention
- Strengthen confidence and comfort level in emergent situations
- Create a fun and safe learning environment

Methods

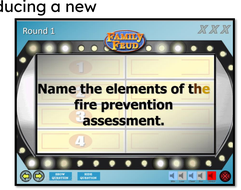
- Learning objectives were created following revised Bloom's Taxonomy, to help develop a plan, design valid assessment strategies, and evaluate that staff comprehension aligned with the desired outcomes for each learning event.[1]
- Pre and post surveys were developed utilizing the Likert scale (1-5) to evaluate effectiveness of format, content, and staff's comfort level of the information presented.
- Pre and post surveys were administered for 4 training sessions. However, only post surveys were administered for an additional 5 training sessions.
- Staff responses were summarized with descriptive statistics including the mean, median, Q1, Q3, range, standard deviation, and p-values.
- Pre and post survey responses were unpaired, and the comfort levels were compared using Kruskal-Wallis tests.
- Kruskal-Wallis tests were also used to compare overall comfort levels with the respective topic by game type.



Implementation

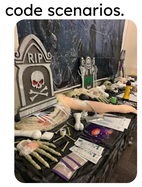
- Introduced gamification to pertinent education topics between November 2021 to December 2022:
  - Escape Room– Malignant Hyperthermia (MH)
    - Escape Room was a timed event where staff had to identify MH and solve puzzles to treat an MH crisis. Educators developed a PowerPoint for clue prompts during the learning event.
    - Objectives included: stopping anesthesia gases, cooling with ice, obtaining the MH cart, calculating the medication dose, drawing up Dantrolene Sodium, and identifying resources.

  - Bingo!– Malignant Hyperthermia (MH)
    - Educators created custom Bingo! cards to test staff's knowledge of MH and MH Treatments.
    - Objectives included: recognizing signs and symptoms of MH, treatment, and introducing a new Dantrolene Sodium product purchased for the organization.



  - Family Feud– Fire and Laser Safety
    - Staff competed in teams to answer questions related to fire and laser safety in the Periop Setting. Educators customized a Family Feud PowerPoint to facilitate the learning event.
    - Objectives included: activating a Code Red, recalling the elements of the Fire Prevention Assessment, and fire and laser safety interventions.

  - Relay Races– Code and Airway Emergencies
    - Staff competed in teams in relay race events simulating a code blue or airway emergency. Educators used PowerPoint and low fidelity manikins to simulate the patient decompensation scenarios.
    - Objectives included: performing manual ventilation, inserting an oral airway, identifying supplies needed for rapid sequence intubation, drawing up and administering code-dose medications, and documenting code scenarios.
  - Perioperative House of Horrors– Skills Lab
    - Staff rotated through a Halloween Haunted House themed skills competency validation. Educators developed 3 stations of low volume, high risk topics, where staff completed hands-on demonstration:
      - Central Line Cemetery – Central line dressing change or a PIV removal
      - Frankstein's Laboratory – Foley insertion or high-quality compressions using Zoll with CPR feedback
      - Count Dracula's Blood Bank – Blood product set-up using an IV fluid warmer or B.Braun IV pump



Results

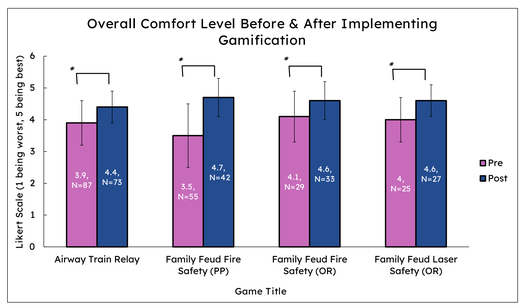


Figure 1: *$p < 0.01$, Significant difference between pre and post comfort level. Likert scale ranged from 1-5 (pre-survey), 3-5 (post survey). Data labels are mean values ± SD, N.

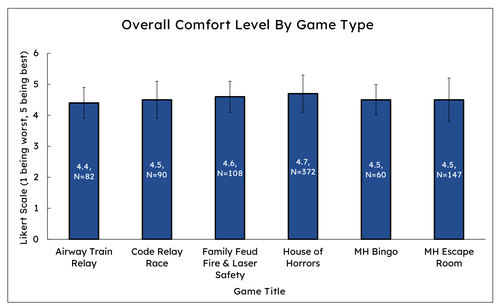


Figure 2: *$p < 0.0001$, Significant difference between game types. Likert scale ranged from 1-5 in the post survey. Data labels are mean values ± SD, N.

	Staff Training Method Preferences						
Teaching Method	Airway Train Relay N = 82	Code Relay Race N = 90	House of Horrors N = 124	MH Bingo N = 60	MH Escape Room N = 147	Family Feud OR Fire & Laser Safety N = 33	Family Feud Pre-Op & PACU Fire Safety N = 42
Learning Modules	12 (14.6%)	7 (7.8%)	28 (22.6%)	22 (36.7%)	59 (40.1%)	12 (36.4%)	6 (14.3%)
Lecture	16 (19.5%)	16 (17.8%)	30 (24.2%)	29 (48.3%)	54 (36.7%)	19 (57.6%)	11 (26.2%)
Gamification	70 (85.4%)	79 (87.8%)	102 (82.3%)	36 (60.0%)	87 (59.2%)	11 (33.3%)	28 (66.7%)

Table 1: The question "How would you prefer to review education events annually?" was asked in all post surveys. The top 3 training method preferences are highlighted.

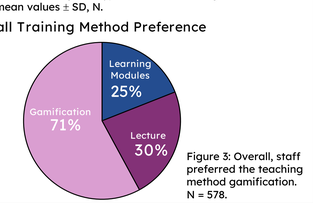


Figure 3: Overall, staff preferred the teaching method gamification. N = 578.

Limitations

- Not all training sessions have pre surveys, therefore we discovered early on that we were unable to directly analyze the effectiveness of the trainings without developing pre and post surveys
- Training sessions were opportunities, not mandatory
- A paired analysis could not be done because the pre and post surveys of the participants were not linked
- Not all staff members answered each survey
- Staffing challenges created a barrier for staff to attend

Successful Practice

- Prior to implementing gamification, staff showed a lack of engagement and dissatisfaction with training methods
- Surveys demonstrated staff training method preferences favored gamification when compared to self learning modules and lecture-based learning
- Overall, gamification improved comfort level when comparing pre and post survey data
- Post survey results illustrated gamification was effective, regardless of game type
- Therefore, gamification allowed staff to apply critical thinking skills in a fun and safe environment, further building their confidence and knowledge in Perioperative emergencies

Future Implications

- Investigate linking pre and post survey staff responses
- With a paired analysis we would be able to show how much staff's scores changed, however currently we can only compare the staff's overall scores
- Educate staff to recognize the importance of data collection
- Evaluate knowledge retention and how it applies to gamification

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Contact

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