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Abstract

Healthcare continues toward team-based approaches in which multiple disciplines collaborate to ensure holistic patient care. National standards for intraprofessional collaboration guide curriculum design for entry-level occupational therapy (OT) and occupational therapy assistant (OTA) programs to ensure students acquire specific skills and knowledge needed for current OT practices. Effective intraprofessional collaboration includes effective communication, respect, trust, and understanding of role delineation, which students prefer to learn in experiential, face-to-face formats. The purpose of this study was to examine OT and OTA students' perspectives of participating in an educational escape room (EER) as a novel experience for intraprofessional education. Investigators created an EER with a healthcare plot and conducted it at two sites with 76 students, who had 60 minutes to solve puzzles based on OT/OTA knowledge to "escape" the room. Seventy-five students provided feedback on the EER in an online survey. Participants enjoyed working together in the EER, and felt it was a fun way to apply learned skills. They reported that collaboration was a key benefit and that this learning approach made them feel like equal contributors and created a sense of accomplishment. OT educators should consider including novel game-based learning activities such as EERs in their programs and in collaboration with other programs.

Keywords

Intraprofessional education, occupational therapy education, game-based learning, educational escape room, novel educational methods

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The Great Escape: A Novel Approach to Team-Based Learning (Pilot)

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ABSTRACT

Healthcare continues toward team-based approaches in which multiple disciplines collaborate to ensure holistic patient care. National standards for intraprofessional collaboration guide curriculum design for entry-level occupational therapy (OT) and occupational therapy assistant (OTA) programs to ensure students acquire specific skills and knowledge needed for current OT practices. Effective intraprofessional collaboration includes effective communication, respect, trust, and understanding of role delineation, which students prefer to learn in experiential, face-to-face formats. The purpose of this study was to examine OT and OTA students' perspectives of participating in an educational escape room (EER) as a novel experience for intraprofessional education. Investigators created an EER with a healthcare plot and conducted it at two sites with 76 students, who had 60 minutes to solve puzzles based on OT/OTA knowledge to "escape" the room. Seventy-five students provided feedback on the EER in an online survey. Participants enjoyed working together in the EER, and felt it was a fun way to apply learned skills. They reported that collaboration was a key benefit and that this learning approach made them feel like equal contributors and created a sense of accomplishment. OT educators should consider including novel game-based learning activities such as EERs in their programs and in collaboration with other programs.

Introduction

Healthcare continues to move toward team-based approaches to patient care that utilize the expertise of multiple disciplines to ensure that individuals receive the highest level of holistic care (Johnson, 2017). As a ripple effect of this movement, educators are now using interprofessional education (IPE) and intraprofessional education to improve the preparation of college graduates in an array of healthcare fields to work as part of a team (Smith & Anderson, 2018). Intraprofessional relationships occur among professionals who are educated in the same discipline and work toward a common goal (Dennehy, 2017) while interprofessional relationships occur among professionals from different healthcare disciplines who use their discipline-specific knowledge to work toward a common goal (American Occupational Therapy Association [AOTA], 2018). Emerging literature on occupational therapy (OT)/occupational therapy assistant (OTA) intraprofessional education is limited and mostly describes the effectiveness and content delivery of specific learning experiences; even fewer studies identify universal structural frameworks, pedagogical approaches, or guidelines to teach intraprofessional collaboration (Pitonyak et al., 2020). The purpose of this study was to examine OT and OTA students' perspectives of participating in an educational escape room (EER) as a novel experience for intraprofessional education. The researchers also explored whether the Interprofessional Education Collaborative (IPEC) standards and specific Accreditation Council for Occupational Therapy Education (ACOTE) standards pertaining to intraprofessional collaboration could be used as a guiding framework for the creation and implementation of the learning experience.

Literature Review

Interprofessional and Intraprofessional Education Standards

The Accreditation Council for Occupational Therapy Education (ACOTE) sets specific national standards that OT and OTA programs must follow to ensure accountability for educational curriculum designs (Dennehy, 2017). The newest set of standards from ACOTE include those that target certain elements of the intraprofessional relationship between OT and OTA students (ACOTE, 2018). These standards dictate that both OT and OTA students, for all degree requirements, be able to "demonstrate effective intraprofessional OT/OTA collaboration…" (ACOTE, 2018, p. 33). The standards also cover other topics, such as the direction of OT services, collaboration with interprofessional colleagues, effective communication skills, team dynamics, and team roles (ACOTE, 2018).

The Interprofessional Education Collaborative (IPEC) is an organization that sets national standards to guide different health professions in interactive learning to prepare students for interprofessional collaboration in the workforce (IPEC, 2016). IPEC has four main competencies that can also be applied to OT/OTA inter- and intraprofessional education even though these are not specific to OT education (Diamant et al., 2018). The four sub-competencies used to describe the longer defined competencies are values/ethics for interprofessional practice, roles and responsibilities, interprofessional

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communication, and teams and teamwork. These align with the ACOTE standards on intraprofessional OT/OTA collaboration by reinforcing skill development in effective communication, mutual respect for other professionals and disciplines, team dynamics, and role delineation (ACOTE, 2018; IPEC, 2016).

Diamant and colleagues (2018) sought to identify and describe vital competencies related to intraprofessional collaboration for practicing OTs and OTAs to guide future intraprofessional education opportunities. Occupational therapy practitioners completed an online survey ranking 20 identified competencies from the four IPEC domains in order of importance for intraprofessional collaboration. The authors found significant agreement between OTs and OTAs in identifying several important competencies, and only five differences from the given competencies. The authors suggested these identified competencies could contribute to a structural framework that can aid in creation and implementation for intraprofessional learning opportunities for OT/OTA education (Diamant et al., 2018).

Emerging Literature on Intraprofessional OT Education

Collaboration and role delineation can be difficult to teach within the classroom setting. Collaboration is a complex concept that creates an opportunity for involved practitioners to add value to an array of treatments provided to an individual client and exists only within the group of collaborators (Dennehy, 2017). Effective collaborators commit to working together and making decisions that value the skills and contributions of each team member. Role delineation and understanding the purpose of each team member is vital for effective collaboration (Dennehy, 2017).

Emerging literature on intraprofessional OT education shows positive results for increasing understanding of role delineation, effective communication, and collaboration. A recent study by Dennehy (2022) exploring a college elective course to teach OT/OTA collaboration showed that effective intraprofessional collaborative education included students learning communication, a strong understanding of each professional's role and creating more opportunities for intraprofessional learning. Dennehy acknowledged that for students to master effective intraprofessional collaboration, they must be exposed to multiple immersive learning opportunities over time. Therefore, increasing and planning for these opportunities may create logistical challenges (Dennehy, 2022).

Fan and colleagues (2021) used a two-part collaborative learning experience in an evidence-based practice course to aid in increasing intraprofessional collaboration between OT and OTA students. Occupational therapy and OTA learners attended separate but scheduled didactic learning courses focused on using evidence-based practice. All students then participated in a four-week collaborative learning experience where they were paired intraprofessionally and evaluated scholarly articles using the *Currency, Relevance, Authority, Accuracy, and Purpose* (CRAAP) test, a checklist for evaluation of evidence credibility. Data were collected through a subjective survey and the evidence-based practice ability test. The authors found that for OT students, the perceived importance of intraprofessional roles increased, while for OTA students, the

perceived ability to engage in intraprofessional communication increased. The authors also found that both OT and OTA students' perceived ability to work as a team, identify their roles, communicate with others, and read scholarly literature increased after the learning experience (Fan et al., 2021).

Carson and colleagues (2018) created an OT/OTA intraprofessional experiential learning activity through community collaborations to aid in teaching role delineation and preparation for positive working relationships. The experience was completed in two phases in which OT and OTA students participated in a preparatory planning meeting to discuss role delineation, plan group interventions, and establish rapport with each other followed by leading their designed group interventions in community-based centers. Students then completed a survey that revealed that most students experienced increased understanding of role delineation and established a beginning working relationship with each other by participating in this experience. The students also reported this experience was effective in applying their learning skills and that they would recommend this activity to other OT/OTA students (Carson et al., 2018).

Pitonyak and colleagues (2020) were eager to understand the context in which OT and OTA practitioners learned and felt most confident in their ability to engage in intraprofessional collaboration. Occupational therapy practitioners completed an online survey and selected their top three choices in which context they felt they learned the most about intraprofessionalism. Both OT and OTA practitioners identified work experience as their top context for developing intraprofessional competency, followed by fieldwork or formal work training for OTs and fieldwork or OT educational training for OTAs (Pitonyak et al., 2020).

While these studies produced positive results for increasing intraprofessional collaboration, role delineation, and effective communication, they did so through a combination of didactic course work and limited experiential learning opportunities. It is interesting to note that OTs and OTAs perceived that work or fieldwork contexts were the most effective for promoting interprofessional competency, suggesting that novel approaches in the classroom such as face-to-face and virtual immersions with fully experiential opportunities may be particularly important for effective interprofessional learning. Also notable is inconsistent use of universal guiding frameworks or pedagogical approaches for intraprofessional learning activities leaving ambiguity in the standard of best practice for OT/OTA intraprofessional education.

Game-Based Learning

Though the evidence for a consistent best practice to teach intraprofessionalism is limited (Diamant et al., 2018), utilizing novel approaches can lay groundwork for the development of strong intra- and interprofessional relationships among students (Dennehy, 2017) while exploring the effectiveness of current standards which can support best practice and creation of guiding frameworks (Diamant et al., 2018).

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One way to create an innovative and engaging collaborative learning opportunity is with game-based learning (GBL). Games have long been a part of human experiences and are present in all cultures (Oliver, 2017). Games and gaming are also represented independently within the Occupational Therapy Practice Framework in the domains of leisure and play (AOTA, 2020). While GBL is a newer approach in the classroom, educators are applying this concept with definitions and required elements as it acquires status as a pedagogical approach to learning (Wiggins, 2016). Game-based learning is a technique to enhance classroom learning using actual games while gamification is the use of game-based elements, such as point systems, rewards, leader boards, and levels, in non-game contexts like the classroom (Wiggins, 2016). Game-based learning aids in increasing student motivation and engagement to contribute to the acquisition of knowledge and specific skills (Mullen & Seiler, 2019; Oliver, 2017), allows the learner to see a real-world application of learned skills, and creates an atmosphere for risk-free mistakes by using virtual, live, or physical games (Oliver, 2017). Game-based learning is an active approach to education that can produce a release of endorphins, which can increase feelings of happiness in learners during game play and help them retain knowledge (Oliver, 2017). Researchers have found that game play can stimulate the production of dopamine in the brain, leading to reinforced neural connections that mediate retention of learned knowledge. GBL offers educators a unique opportunity to narrow generational gaps with students while maximizing their retention of didactically learned knowledge and skills (Mullen & Seiler, 2019).

Educational Escape Rooms

An interesting approach to GBL is the novel activity of an EER. The premise of an escape room is that individuals are “locked” in a room and must solve a series of puzzles and games to gain clues that ultimately allow them to “escape” the room. Although these rooms are largely created as a recreational experience, they are gaining popularity as an educational tool for IPE (Kinio et al., 2018). The use of recreational escape rooms began in Japan in 2007 (Adams et al., 2018) and quickly made its way across the globe before appearing as recreational experiences in the United States in 2012 (Adams et al., 2018).

Various healthcare programs have utilized EERs in curricula for collaborative learning and research studies, which report positive outcomes and benefits in many areas (Adams et al., 2018; Franco & DeLuca, 2019; Gomez-Urquiza et al., 2019; Kinio et al., 2018; Moore & Campbell, 2021). Benefits and outcomes for pilot EERs in other disciplines have included giving students the opportunity to work as a team while applying knowledge through action in context (Franco & DeLuca, 2019) with increased communication skills among team members (Backhouse & Malik, 2019; Moore & Campbell, 2021). Educational escape rooms use multiple learning styles within one activity to facilitate inclusion of all learners (Adams et al., 2018) which helps increase motivation for students to prepare for the activity and consolidate the ready knowledge needed for the activity (Kinio et al., 2018). Finally, EERs provide a fun, novel way to

apply learned concepts (Gomez-Urquiza et al., 2019; Oliver, 2017). Current research discusses positive results from engagement in EERs, both for intraprofessional and interprofessional learning, in nursing, pharmacy, and medical programs, but there is minimal representation in therapy-centered curricula (Taraldsen et al., 2020).

The design of an EER also aligns with constructivist learning theory, which defines four main elements as its framework. These four elements are: 1) that knowledge is shared between teacher and learner, 2) both teacher and students share authority in the classroom, 3) the teacher assumes a facilitative role to guide students through learning, and 4) students learn in small groups together (Hrynchak & Batty, 2012). In addition to the ACOTE and IPEC standards, educators can also use the constructivist learning theory elements in EERs in the following ways. Educational escape rooms are typically led by a "game master," an individual who is knowledgeable in the subject matter and logistics of the room's puzzles. An EER is a novel approach to applying learned material and offers students the opportunity to learn new techniques and methods from peers. These opportunities are provided to challenge a student's current understanding of the material and to help them learn new schemes through new experiences. Optimally, an EER is experienced in small group of no more than eight to 12 individuals. Finally, faculty can lead a debriefing session at the completion of the EER activity to give students time to reflect on the experience, where students are provided with time to reflect on new experiences after small-group learning (Hrynchak & Batty, 2012).

Educators in university healthcare programs that use inter- and intraprofessional educational activities to prepare students to work as a member of a healthcare team are committed to providing effective and novel approaches to learning these skills. There is a growing need to explore and understand whether novel activities, such as an EER, effectively prepares students to learn collaborative strategies that can be applied in professional practice. Therefore, the purpose of this pilot study was to examine OT and OTA students' perspectives of participating in an EER designed as a tool for intraprofessional education and collaborative learning. Research questions included: How is an EER activity viewed by students when presented as an intraprofessional learning opportunity? How can certain ACOTE standards and the IPEC core competencies be used to design and intraprofessional learning activity? How are certain ACOTE standards and the IPEC core competencies met during an EER activity for intraprofessional learning?

Methods

Study Design

This pilot project included program creation and implementation followed by collection and analysis of quantitative data through an investigator created post-participation survey. Quantitative data was analyzed using descriptive statistics and responses to open-ended survey questions were analyzed for frequency of responses. The open-ended question responses served as supportive data and to aid in further revision and implementation of the EER for future educational use.

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Procedures

The investigators followed a specific set of steps to create *Alice's Apartment,* an EER with a healthcare storyline that incorporated OT/OTA knowledge through puzzles and clues. First, the investigators attended a local escape room at a franchise in their home city to participate in a professionally created room to gather ideas for *Alice's Apartment* and gain a better understanding of how to run an escape room. They identified three requirements for *Alice's Apartment*: puzzles based on OT/OTA knowledge, materials that are portable and can be set up in the learning laboratory of any OT/OTA program, and the construction of two nearly identical kits for the setup of *Alice's Apartment* to accommodate the number of participants needed for the pilot study. The investigators met several times to create a scenario with a total of nine puzzles. Once investigators finalized the scenario and puzzles, they created a materials list and directed the purchase of all items from various companies. They used both low- and high-cost means, such as paint and labels as low-cost means to alter materials to fit the EER's theme and puzzles and custom created props as high-cost items. Once a single set of materials was finished, all materials were set up in the OT program lab, and investigators completed a trial run of the activity to determine whether the materials or puzzles needed further alteration for use in the pilot study. After making final changes, investigators purchased a second kit of nearly identical materials and travel storage bins for use at the second site.

Alice's Apartment tells the brief story of a young woman, Alice, who is a survivor of a brain injury and lives alone in her apartment. In this story, a storm the previous night has indirectly caused all of Alice's nine areas of occupation to become unbalanced. Students need to work together to bring the areas of occupation back into balance and "escape" her apartment within 60 minutes. After the students read the introductory story, the EER begins, and they must solve various puzzles related to the nine areas of occupation (see Table 1).

Table 1

Areas of Occupation Addressed

Area of Occupation	Objective to Achieve Occupational Balance
Health management	Sort medication properly
Instrumental activities of daily living (IADLs)	Address kitchen safety concerns (knives and candles)
Work	Organize refrigerator calendar properly
Activities of daily living (ADLs)	Choose appropriate clothing for events
Play/leisure	Complete puzzle
Leisure/work	Reconnect internet for gaming and work training
Education	Complete online work training
Social participation	Retrieve phone message from a friend
Sleep	Prepare the environment for sleep

The EER for this project and scenario contained multiple pieces of equipment and information traditionally used in OT education and practice, such as a pill sorting box, active range of motion norms, kitchen safety guidelines, proper assistance levels, and sleep hygiene strategies. The scenario also included equipment for special effects that were created to align with everyday OT practice and to add an exciting element to the experience. These items included candles that students had to blow out in correct order to open a lock on a box, open a combination-based locked pill bottle that contained extra clues, and a custom sound machine for sleep hygiene that students tuned correctly to open a locked box.

Participants

A convenience sample of OT and OTA students from each program was invited to participate in the EER activity and complete the post-participation survey. Inclusion criteria were students in the first year of the entry-level OT doctorate (OTD) and OTA programs from participating universities and having access to transportation to travel to the escape room locations.

Measurements

An investigator-created survey was hosted in the Qualtrics online platform and included questions about the student participants' perspectives of participating in an EER designed as a tool for intraprofessional education, collaborative learning, and identification of ACOTE and IPEC competencies each participant felt was addressed during the EER. The content of the survey questions was created based on information gathered from the *2018 Accreditation Council for Occupational Therapy Education (ACOTE) Standards and Interpretive Guide*, the *Occupational Therapy Practice Framework: Domain and Process (4th ed.),* and the *Core Competencies for Interprofessional Collaborative Practice: 2016 Update* (ACOTE, 2018; AOTA, 2020; IPEC, 2016). The questions were reviewed for content by four OT/OTA educators external to the project. The survey consisted of multiple-choice questions, Likert scales, and open-ended questions. The questions included four basic demographic questions, 21 questions related to students' experience of the EER and competency identification, and four open-ended questions for which students could give additional comments related to the EER. The survey remained open to students for one week after the EER experience. Results of the surveys were anonymous, stored in Qualtrics, a password-protected platform, and accessed only by investigators on a password-protected computer. Information collected will be stored for three years and then permanently deleted from the online platform and computer. Results of the survey are discussed in detail in the discussion section.

Escape Room Pilot

This pilot study was approved by the primary investigator's Institutional Review Board (IRB) for research with human subjects. The EER was run a total of 10 sessions on a single day, five times at each of the two sites, where each OT education program was housed. The investigators invited students from both the separate OT and OTA programs to participate in the immersive and collaboratively designed EER and

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complete a post-participation survey about the experience. Faculty in each program distributed paper flyers and used verbal invitation to students to recruit for the study. The flyers explained the study's purpose, methods, voluntary nature, the ability for student participants to withdraw from the study at any time with no penalty, the risks and benefits of participation, and the time required for participation. Student participants were provided with a notice of informed consent and information to participate in which it was stated that each participant gave their consent by participating in the escape room and completing the post-participation survey.

Students who agreed to participate were placed into 10 groups (nine groups of eight students and one group of nine students). Each group had three to four students from the OTD program and four to five students from the OTA program and were assigned to a time and location for participation. Each student participant then traveled to their assigned location at their given time.

Before each game began, each group of students was read a list of rules by the study investigators (game masters) to orient them to the EER activity, to ensure that no materials would be damaged, and to ensure no participants would be injured during the game. Each group then read the introductory story and had 60 minutes to complete the puzzles and escape the room. Once each group completed the EER, they were asked to exit the lab space so it could be reset for the next group. Student participants were given a small incentive, a custom sticker pack related to the theme of the game, for their participation. After each group exited the lab space, they were asked to complete a post-participation survey on their smartphone or computers within one week.

Results

A total of 76 students (N=76) participated in the EER with 32 students being from the OTD program and 44 from the OTA program (n= 32 OTD students; n= 44 OTA students). Of those students, 75 completed the post-participation survey.

Participant Demographics

Of the 75 participants who completed the post-participation survey, 4% (n=3) identified as male and 96% (n=72) identified as female; 71% (n=53), 26.6% (n=20), and 3% (n=2) reported their age as 22–35 years, 18–21 years, and 36 years or older, respectively. Only 20% (n=15) of participants reported previous participation in an interdisciplinary learning opportunity, which they indicated had occurred through other class and lab opportunities. Likewise, only 11% (n=8) of students reported prior participation in intraprofessional learning opportunities.

Logistics of *Alice's Apartment*

A 5-point Likert scale was used to gather participants' views on the basic logistics of their experience with *Alice's Apartment* (see Figure 1) through frequency of responses (see Table 2).

Figure 1

Logistics of Alice's Apartment

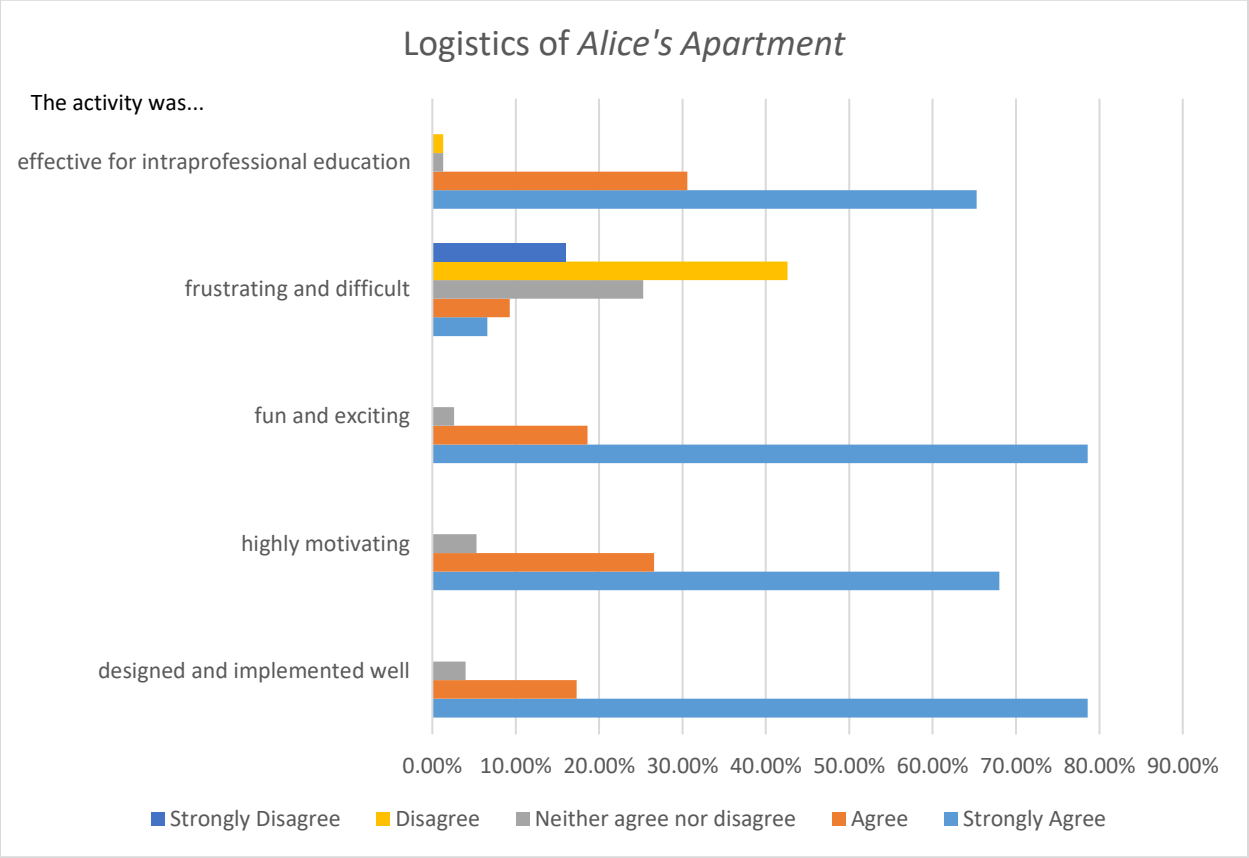

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Table 2

Frequency Responses for the Logistics of Alice's Apartment

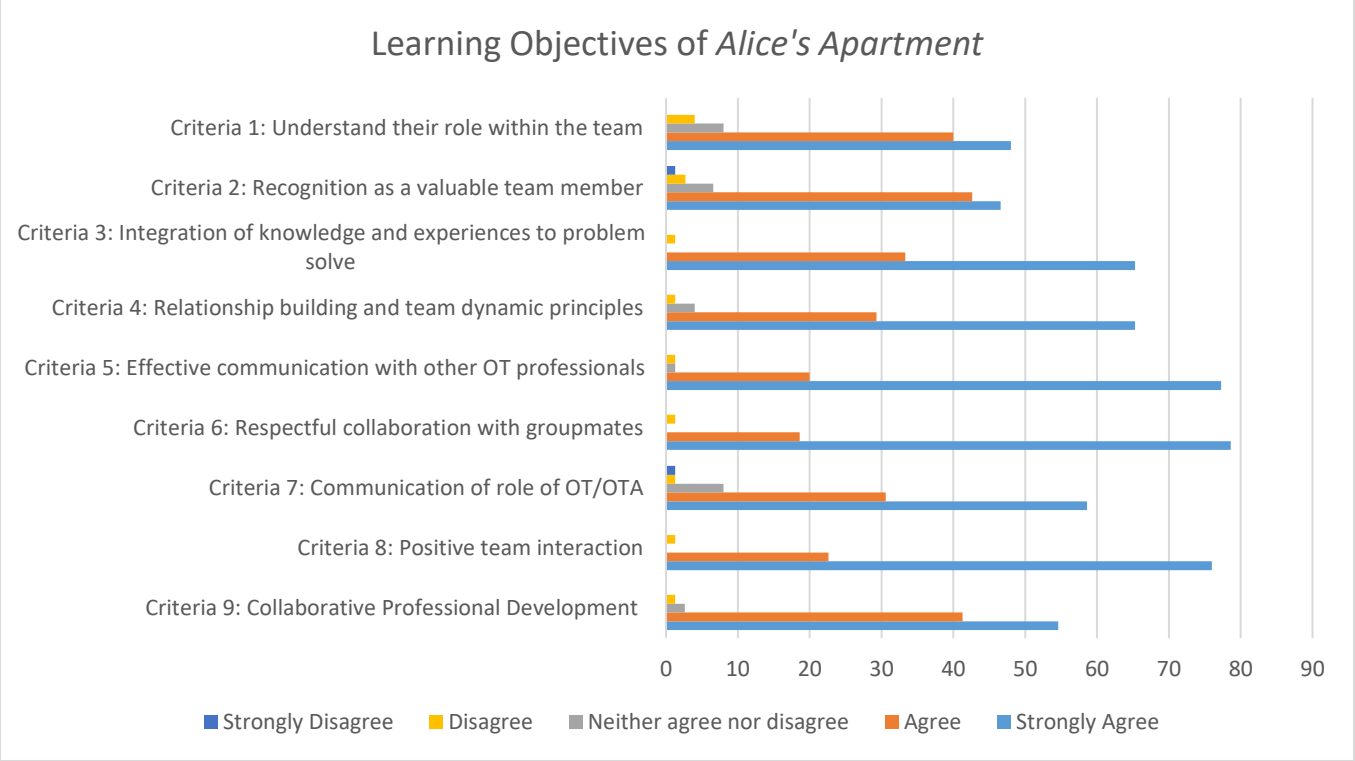
Criteria	Frequency Responses (n= 75)
The activity was designed and implemented well	Strongly Agree (n=59): 78.6% Agree (n=13): 17.3% Neither agree nor disagree (n=3): 4% Disagree (n=0): 0% Strongly Disagree (n=0): 0%
The activity was highly motivating	Strongly Agree (n=51): 68.0% Agree (n=20): 26.6% Neither agree nor disagree (n=4): 5.3% Disagree (n=0): 0% Strongly Disagree (n=0): 0%
The activity was fun and exciting	Strongly Agree (n=59): 78.6 % Agree (n=14): 18.6% Neither agree nor disagree (n=2): 2.6% Disagree (n=0): 0% Strongly Disagree (n=0): 0%
The activity was frustrating and difficult	Strongly Agree (n=5): 6.6 % Agree (n=7): 9.3% Neither agree nor disagree (n=19): 25.3% Disagree (n=32): 42.6% Strongly Disagree (n=12): 16.0%
The activity was effective for intraprofessional education	Strongly Agree (n=49): 65.3 % Agree (n=23): 30.6% Neither agree nor disagree (n=1): 1.3% Disagree (n=1): 1.3% Strongly Disagree (n=0): 0%

Learning Objectives Through *Alice's Apartment*

The same 5-point Likert scale was used to gather participants' views on the specific learning skills they used during *Alice's Apartment* (see Figure 2) through frequency of responses (see Table 3).

Figure 2

Learning Objectives of Alice's Apartment



ACOTE and IPEC Standards

The survey continued with a chart containing four educational standards from the ACOTE OT/OTA standards and the four core competencies from IPEC. Respondents were asked to select all the competencies and standards they felt were addressed during the intraprofessional activity (see Figure 3). Choices are ranked from most to least addressed, as selected by students, with the frequency of each selection noted numerically in parentheses.

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Table 3

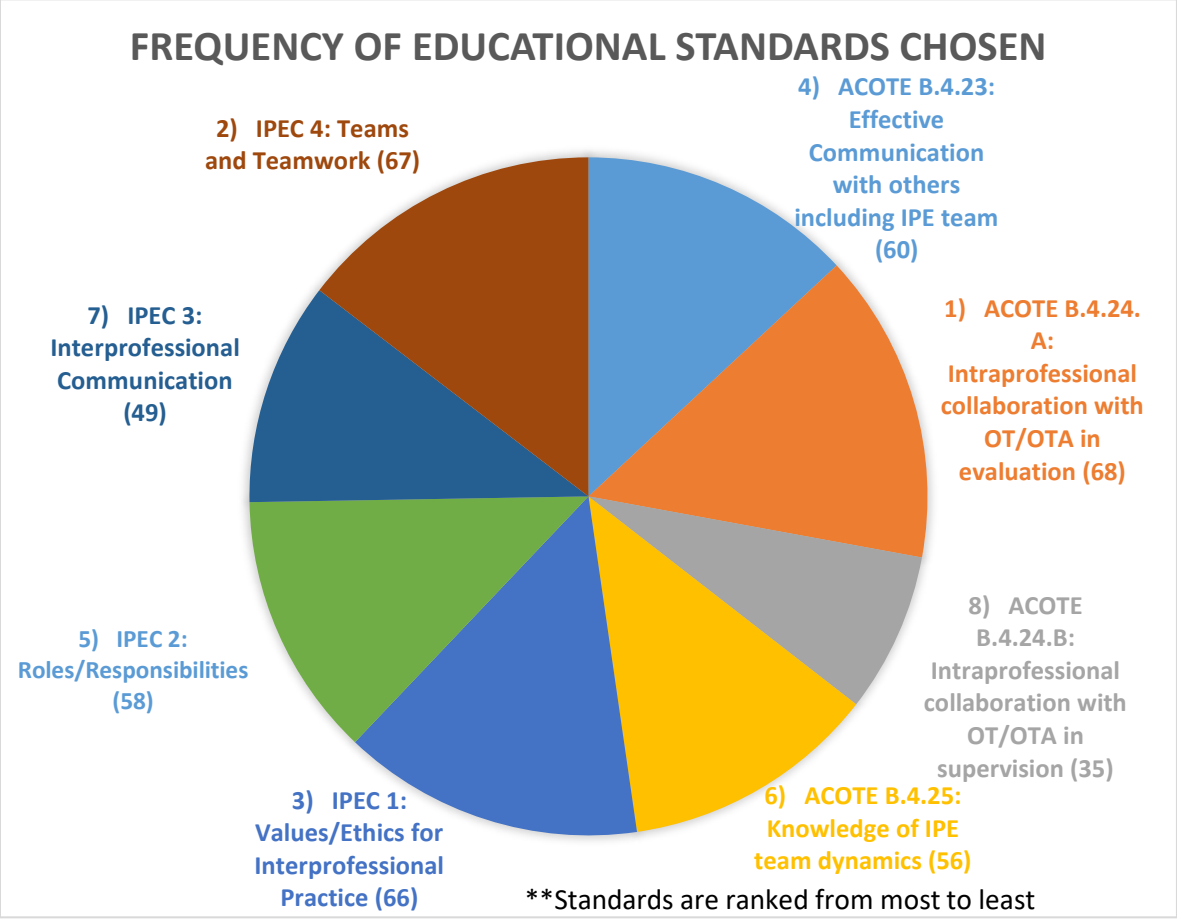
Frequency Responses for learning objectives of Alice's Apartment.

Criteria	Frequency Responses (n= 75)
Criteria 1: Understand their role of OT/OTA within the team	Strongly Agree (n=36): 48.0% Agree (n=30): 40.0% Neither agree nor disagree (n=6): 8.0% Disagree (n=3): 4.0% Strongly Disagree (n=0): 0%
Criteria 2: Recognition as a valuable member of the team	Strongly Agree (n=35): 46.6% Agree (n=32): 242.6% Neither agree nor disagree (n=5): 6.6% Disagree (n=2): 2.7% Strongly Disagree (n=1): 1.3%
Criteria 3: Integration of knowledge and experiences to formulate solutions through collaborative team problem solving	Strongly Agree (n=49): 64.0% Agree (n=25): 33.3% Neither agree nor disagree (n=2): 2.6% Disagree (n=0): 0% Strongly Disagree (n=0): 0%
Criteria 4: Relationship-building and team dynamic principles to perform effectively in different team roles	Strongly Agree (n=49): 65.3 % Agree (n=22): 29.3% Neither agree nor disagree (n=3): 4.0% Disagree (n=1): 1.3% Strongly Disagree (n=0): 0.0%
Criteria 5: Communicate effectively with other OT professionals	Strongly Agree (n=58): 77.3% Agree (n=15): 20.0% Neither agree nor disagree (n=1): 1.3% Disagree (n=1): 1.3% Strongly Disagree (n=0): 0%
Criteria 6: Collaborate with groupmates in a respectful and professional manner	Strongly Agree (n=59): 78.6% Agree (n=14): 18.6% Neither agree nor disagree (n=2): 2.6% Disagree (n=1): 0% Strongly Disagree (n=0): 0%
Criteria 7: Communication of the distinct value of my role as an OT or OTA with groupmates	Strongly Agree (n=44): 58.6% Agree (n=23): 30.6% Neither agree nor disagree (n=6): 8.0% Disagree (n=1): 1.3% Strongly Disagree (n=1): 1.3%

Criteria 8: Fostered positive team interaction to solve the given problems	Strongly Agree (n=57): 76.0% Agree (n=17): 22.6% Neither agree nor disagree (n=0): 0% Disagree (n=1): 1.3% Strongly Disagree (n=0): 0%
Criteria 9: Development as a collaborative healthcare professional	Strongly Agree (n=41): 54.6% Agree (n=31): 41.3% Neither agree nor disagree (n=2): 2.6% Disagree (n=1): 1.3% Strongly Disagree (n=0): 0%

Figure 3

ACOTE and IPEC Standards Addressed



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Narrative Responses

Participants were asked to share written narrative responses for four open-ended questions at the end of the post-participation survey. Investigators reviewed all narrative responses for common and frequent responses and have used these as supporting evidence and for future activity revisions. Response rates for the open-ended questions were substantial, with 90.6% of participants responding to the question asking what they enjoyed most about the activity and 84% responding to the question asking what they would change about the activity. When participants were asked if they would recommend this activity to other students, 98.6% chose “yes” and 89.3% elaborated on why they would recommend this activity to others. The most frequent narrative responses include that the EER activity was a fun and exciting way to learn, students enjoyed the opportunity to collaborate with students from another program, collaboration was identified as a key benefit of this activity, and students felt they were able to apply the skills they learned in their respective OT programs. These results will be discussed in detail in the next section.

Discussion

This pilot project produced favorable findings and feedback overall. Participant responses about the logistics of this activity and its perceived effectiveness for intraprofessional learning add to the growing literature related to content delivery of intraprofessional learning activities. Almost all survey responses regarding the logistics of the activity and the intrapersonal and clinical skills participants felt they used during the activity were positive. Participants also reported that they viewed the EER as an effective activity for collaborative learning and felt they understood their role on the team. The implementation and use of OT skills, active listening, effective communication, and teamwork as used within the intraprofessional activity of *Alice’s Apartment* are vital for future healthcare workers to embody when working on a healthcare team (Dennehy, 2017). These results support those found in previous studies exploring the experiences of students engaging in intraprofessional education opportunities (Carson et al., 2018; Dennehy, 2017; Fan et al., 2021) and previous EERs in other healthcare disciplines (Adams et al., 2018; Franco & DeLuca, 2019; Gomez-Urquiza et al., 2019; Kinio et al., 2018; Moore & Campbell, 2019).

Participants overwhelmingly noted in their narrative responses that not only was this activity a fun and exciting way to learn, but that they also enjoyed the opportunity to collaborate with students from another school to apply the skills they learned in their respective OT programs. Students felt the EER allowed them to bond quickly and work together to solve the problems, much as they will do in their future work environments. As reported by the participants, this learning approach made them feel like equal contributors and created a sense of accomplishment. These results correlate with those of several previous studies in healthcare disciplines outside of OT (Adams et al., 2018; Gomez-Urquiza et al., 2019; Kinio et al., 2018). Almost all (74 of 75) students stated they would recommend this experience to other students.

Responses rating which ACOTE and IPEC standards were addressed through this activity add to the limited research on best practice and universal guiding frameworks for intraprofessional education. The highest-ranking standards that the students perceived were addressed were related to role delineation, working in teams, and effective communication between disciplines. The standard students felt was the least addressed by this EER was the second part of ACOTE B.4.24 relating to the supervision requirements between OTs and OTAs. These identified standards between ACOTE and IPEC can add to the limited literature identifying best practices and guiding competencies for designing intraprofessional education activities, as suggested in Diamant and colleagues' (2018) previous research.

Participants also highlighted a few areas for improvement, including recommending smaller group sizes with equal numbers of students from each school, fewer cues from game masters, more time before the EER experience for participants to socialize and get to know each other, and modifications to or additional clarification for some of the puzzles and special effects. Some students also suggested extending the game with more puzzles because it was so enjoyable. Students requested more frequent opportunities to engage in game-based learning activities like an EER. Creating more experiential intraprofessional learning opportunities supports Dennehy's (2017, 2022) findings that the skills for effective intraprofessional collaboration require time to develop which can be done through multiple immersive learning opportunities.

Collaborative and game-based learning are teaching strategies that can help participants learn to work with peers to meet a common goal and encourage critical thinking, problem solving, and individual accountability for knowledge retention (Wiggins, 2016). Using an EER for collaborative learning promotes utilization of an approach to patient care that students can reflect on in their future careers when they are tasked with a difficult or complicated challenge. Inter- or intradisciplinary approaches to patient care are strongly encouraged by healthcare workers and used in traditional practice settings.

Collaborative learning promotes critical thinking and, when it involves GBL or gamification elements, delivers immediate feedback. The EER is a low-risk, low-fear setting and, as such, levels the playing field so that participants can share ideas and attempt solutions with their peers without feeling uncomfortable. Finally, holding individual students accountable for their own knowledge retention enables them to contribute to the group effort and support their peers. Incorporating these approaches into OT/OTA education can familiarize students with these cooperative methods before they start entry-level professional positions, which will increase their potential to achieve intraprofessional competency through formal OT education rather than later during work experiences (Pitonyak et al., 2020).

Implications for Occupational Therapy Education

As new generations of students enter OT programs, faculty will strive to enhance their curricula to appeal to current student interests and to find a balance of teaching material in an attractive way that maintains attention and increases knowledge retention. This

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pilot study supports the use of an EER as a novel learning activity to enhance OT curricula and foster intraprofessional learning. While the use of a large scale EER such as the one used in this study may not be feasible for all, faculty in OT and OTA programs are still encouraged to implement activities like this EER or lower-budget options, such as digital escape rooms or gamification elements to teach OT knowledge in their courses.

Occupational therapy educators can also create their own intraprofessional learning opportunities using specific ACOTE and IPEC standards, and constructivist theory elements as a guide, such as the situated learning model used by Dennehy (2017, 2022). The established IPEC standards are being utilized more frequently by OT educators as a guide for intraprofessional education activities, which subsequently increases their strength as a potential framework for intraprofessional education. Using these standards in addition to the ACOTE standards (B.4.23; B.4.24; B.4.25) to guide modern collaborative education aids in increasing student motivation, collaboration, and teamwork within the cohort. Moreover, these standards as a framework contribute to creating a learning environment in which students can fail without penalty, receive quick feedback for the correction of mistakes, and enjoy a fun learning opportunity that is more appealing than didactic education (Oliver, 2017; Wiggins, 2016).

Limitations and Future Study Suggestions

This pilot study has several limitations. First, there was a small sample size, with participants representing only two well-established OT education programs in the state. These programs are located close to each other and the faculty who conducted this project have a long-standing collaborative relationship. Next, the use of an investigator-created survey only at post-participation limited the amount and type of responses collected and analyzed. Future studies should consider incorporating more sites to increase the sample size and representation of participants. Future studies can also consider use of standardized assessments or questionnaires to collect responses related to specific skills addressed in the activity to collect objective data. Since certain ACOTE standards were reported as not being adequately addressed during the activity, future studies can incorporate ways to address these standards more efficiently in the EER activity. Current research has been conducted exploring use of competency frameworks through interprofessional education opportunities, which is vastly different than intraprofessional education opportunities for OTs and OTAs. Since this current study is the first to explore competencies through the intraprofessional education lens, further research in this area is needed.

While participating in the EER, an unequal number of students from the two OT programs participated in each group. Each group had a total of eight to nine students, with no more than three or six students from the OT and OTA programs, respectively. Student participants reported that this imbalance created an atmosphere that could have been perceived as uncomfortable as students from familiar programs tended to form subgroups to solve puzzles. Another limitation was the unforeseen technical

difficulties with the game room props. Two main props malfunctioned in different ways at each location, which required game masters to intervene and assist with game play so it would run smoothly. Certain props, such as the rotary phone, were unfamiliar to the students, which delayed game times while they worked to understand how to use this prop.

The physical space of each EER also created limitations. The escape room was conducted in each program's respective lab space, so one group of student participants was always familiar with the original arrangement of the room and could quickly detect major differences created by the game setup. Some student participants reported this as a disadvantage to game play as it helped students who were familiar with the original room setup advance more quickly during game play. Students also saw this as an aspect that limited the challenging nature of the game. Faculty who served as game masters were present in the space with the students during game play. Each faculty member occasionally gave students simple, unsolicited clues, and students felt this had a negative impact as they wanted to be challenged throughout game play.

Other ideas for future use include creating an EER kit or instructional manual for commercial sale so other OT and OTA programs can easily set up and run the room as an activity within their programs. A final idea would be to create an interdisciplinary activity with a second EER using a new scenario and puzzles that incorporate other healthcare disciplines.

Conclusion

This study showed that collaborative learning using the emerging pedagogical approach of game-based learning via an EER is perceived by OT and OTA students to be an effective and motivating means of creating intradisciplinary collaboration, critical thinking, and knowledge retention for both levels of students studying OT (OT and OTA). Our findings suggest that students felt this activity helped them practice and strengthen soft skills such as communication, active listening, collaboration, and teamwork while facilitating the application of specific OT knowledge from their respective curricula. We also found that using an EER allowed for contribution equity among the players. Occupational therapy educators should feel encouraged to use game-based learning and gamification as successful tools for both the review of knowledge and to prepare future practitioners to be collaborative and productive members of an intradisciplinary team. The use of ACOTE and IPEC standards and their perceived representation in the EER supports continued use of these standards by current educators as guides for creating meaningful and effective intraprofessional learning activities for OT and OTA students.

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