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Use of a board game format to promote interprofessional learning

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ABSTRACT

Interprofessional learning is a fundamental component of healthcare education. In order to promote interprofessional competency, students must understand the roles and responsibilities of the team members. Through the use of an interprofessional board game, the researchers were able to improve student perceptions of learning in the areas of teamwork and interprofessional roles. Significant differences in student perceptions pre and post-game play were noted in the areas of knowledge of roles, requirements for practice of various professions such as licensure, certification, continuing education, and support of other professions. The board game format was readily accepted and provided an adaptable method for introducing, evaluating, and reinforcing concepts related to interprofessional education.

1. Introduction

Collaboration is vital to the successful delivery of quality patient care. Baker¹ states that “teamwork requires a shared acknowledgement of each participating member’s roles and abilities. Without this acknowledgement, adverse outcomes may arise from a series of seemingly trivial errors that effective teamwork could have prevented” (p. 14). Teaching collaborative care presents new challenges for educators in the health professions while best practices for interprofessional education (IPE) are not fully developed. This mixed methods research project focused on evaluating a game format for delivery of interprofessional education concepts.

Utilizing games in education is not a new concept. According to Crews,² “research supports the use of games in public, academic, and school libraries as a way to engage patrons and students, and to help develop important skills” (p. 10). Nicholson⁵ recommends several game models where multiple players are engaged during each “turn” rather than using the single player per turn, question-answer type of game model. Utilizing a team approach with discussion during game play “would allow players to learn more from one another” (p. 61). The game described in this study utilizes a team approach with questions focused around the Core Competencies for Interprofessional Collaborative Practice.

The Core Competencies for Interprofessional Collaborative Practice³ identifies four critical areas in which students must demonstrate competency in order to function within a healthcare team. Competency Domain 2 focuses on the healthcare provider’s ability to identify and understand his/her role as well as the roles of others on the team.

Effective teaching methods regarding professional roles and responsibilities are needed. The IPE Challenge game presents a possible method for providing education on the Core Competencies in a unique way to promote interprofessional education.

2. Format

The *IPE Challenge!* game format was modeled loosely after similar entertainment games such as *Trivial Pursuit* (HASBRO) where players move a game pawn around a board and collect tokens by answering questions related to each category. The researchers created a customizable game board template (see Fig. 1) and obtained color-coded game tokens representing each healthcare profession. Researchers also created various question cards (see Appendix A) and surveyed faculty from different professions to obtain ‘correct’ answers to be used during the game.

Students from different professions met during a required classroom activity utilizing the *IPE Challenge!* game. Interprofessional teams were formed and each were provided with game directions for the *IPE Challenge!* game (see Appendix B). Gameplay began with an empty “silo” (coin tube) for each team. A player or team “turn” consisted of rolling the dice, moving the game pawn around the board and answering a themed question from a question card (see Fig. 2) related to interprofessional roles and responsibilities corresponding to the square on the game board where the game pawn landed. Players on the same interprofessional team were allowed to discuss each question and reach a consensus for the answer. If the team answered correctly, the team would be awarded a color-coded game token related to the profession

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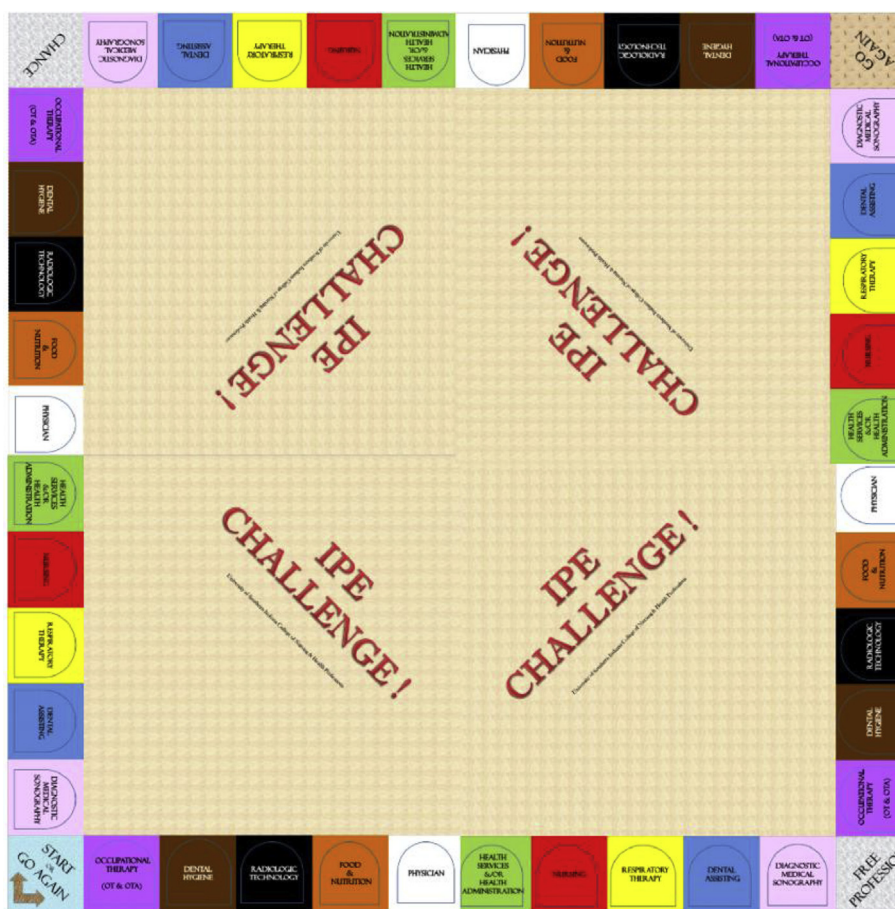


Fig. 1. Layout of IPE Challenge! game board.

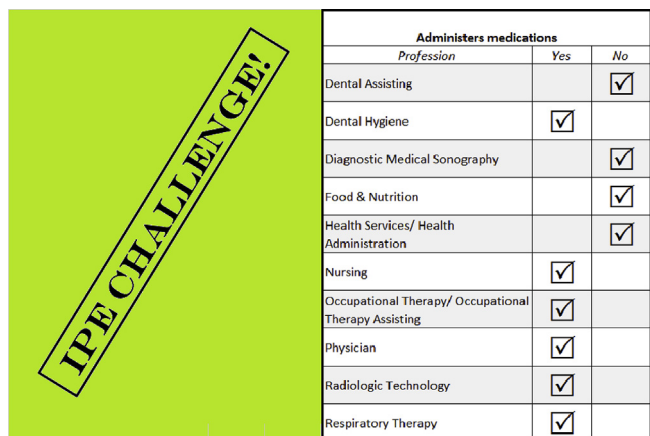


Fig. 2. Sample question card back and front. These cards can be reused for each of the different professions included in the game.

for which the question was asked (e.g. Radiologic Technology tokens are black). Each team collected color-coded game tokens representing each of the professions and symbolically filled the team's interprofessional multicolor silos (coin tubes) by the end of the game. Faculty served as facilitators by briefing participants on the purpose of the game, answering questions and guiding team interaction. As game play progressed, student teams interacted with each other to answer questions and resolve disputes. Faculty resolved minor disputes regarding question clarity or disagreements regarding answers on the question cards. Debriefing followed game play in order to facilitate reflection on what was learned as well as discuss attitudes toward the game format.

3. Target audience

The undergraduate radiologic technology (RADT), respiratory therapy (RESP), and occupational therapy assistant (OTA) programs each have 16, 14, and 30 students respectively. During game play, students were asked to self-select teams with no more than two occupational therapy assistant students, one radiologic technology student and one respiratory therapy student in order to promote interprofessional support and teamwork. A total of 57 students, 15 first year radiologic technology students, 13 first year respiratory therapy students and 29 first year occupational therapy assistant students, were in attendance and volunteered to participate in this study. Institutional review board permission was obtained prior to the study and students consented to voluntary participation in the study.

4. Objectives

The primary objective of the *IPE Challenge!* research project was to provide a unique and engaging interprofessional learning experience for students in a variety of professional programs. The researchers sought to better understand the strengths and weaknesses of the tool related to student learning by gathering data through voluntary written anonymized pre-game and post-game surveys (see Appendix C) and discussion related to the following objectives:

1. Students will identify and understand their role as healthcare professionals as well as the roles of others on the healthcare team.
2. Identify through survey responses how utilizing an active learning approach in a game environment positively impacts attitudes toward interprofessional education.

The questions used during gameplay in this study aligned with the Interprofessional Education Collaborative (IPEC) Core Competency Domain 2: Roles and Responsibilities.³ Game questions focused on the patient populations and diagnostic groups served as well as the varied responsibilities of each profession so that students may begin to understand the roles that each profession assumes as part of the healthcare team.

5. Required materials

The *IPE Challenge!* game was created using a customizable game board template, printable question cards, a set of dice, colored game pawns and game tokens, and standard twenty-five cent coin tubes. The game board template, question cards and game instructions are available upon request by email from the authors. The dice, pawns, game tokens, and coin tubes are available online at coin supply websites or Amazon.com.

6. Activity description

In order to prepare for gameplay, the researchers had to create the previously described board games and gather supplies (game tokens, coin tubes, dice, and game pawns). The preparation time was approximately 3 h once the competency domain and professions to be included were identified. The researchers developed question cards from the results of a faculty survey of each discipline's roles and responsibilities.

IPE Challenge! participants formed interprofessional teams and began play with an empty “silo” (coin tube). Three to four teams would play on one game board. Each “turn” consisted of rolling the dice, moving the game pawn around the board and answering a themed question related to the profession square on which the team landed. Question themes focused on profession-specific skills, educational requirements and interprofessional roles and responsibilities in patient care. For example, when a team landed on a square labeled “Radiologic Technology”, they were required to answer a question related to that profession in order to earn a Radiologic Technology (black) game token. Players collected color-coded game tokens from each profession and symbolically filled their interprofessional silos by the end of the game. Teams who were not currently participating in their “turn” were instructed to actively listen as some answers or discussions that occur based on the question asked may be helpful later in the game.

Team members not taking a turn were responsible for asking the team currently having their “turn” the question based on where the team landed on the board (e.g. when a team landed on the “Nursing” square, they answered the question from the nursing perspective). Gameplay lasted for the duration of a scheduled class time allowing for approximately 5 min for game set up at the beginning of class and approximately 15 min at the end of class for cleanup and discussion. Researchers who were also program faculty for two of the represented profession populations took loose notes as they observed each of the games being played simultaneously in a large classroom. Following gameplay, focus group discussions took place to reflect on the game and lessons learned through gameplay. Questions asked of participants during the debriefing and focus group discussion were: 1) What went well with the game? 2) What did not go well or are there opportunities for improvement? 3) What will you take away from the game?

7. Evaluation

Evaluation of the activity was completed using pre-game and post-game surveys distributed to all participants prior to and following game play. Examination of changes in student responses on survey questions from pre to post surveys were utilized to evaluate the impact of this game on attitudes toward interprofessional education. Due to the unique nature of the game utilized in this study, the researchers did not

Table 1
Pre and post survey questions and game evaluation.

Question	Survey	Mean ^a	Adjusted p value	Standard Deviation
My current attitude toward working with others within my discipline is:	PRE	3.92		0.28
	POST	3.86	1.00	0.53
My current attitude toward working with others from other disciplines is:	PRE	3.69		0.63
	POST	3.86	0.12	0.53
My previous experience working with others within my discipline is:	PRE	3.67		0.49
	POST	3.86	0.26	0.53
My previous experience working with others from other disciplines is:	PRE	3.50		0.67
	POST	3.86	0.06	0.53
I feel knowledgeable about my discipline of practice.	PRE	3.38		0.65
	POST	3.43	0.08	0.85
I feel knowledgeable about other healthcare providers' job duties and who plays which role in the care of a patient	PRE	3.00		0.58
	POST	3.50	0.00002**	0.52
I feel knowledgeable about requirements of practice for various healthcare disciplines	PRE	3.04		0.66
	POST	3.14	0.02**	0.53
I feel I support others within my discipline	PRE	3.54		0.52
	POST	3.71	0.54	0.47
I feel I support others from different disciplines	PRE	3.31		0.63
	POST	3.71	0.02**	0.47
I feel I am a team player in my everyday work.	PRE	3.69		0.48
	POST	3.71	0.61	0.47
Patient care would be greatly increased if each member of the healthcare team knew more about each member's role on the team	PRE	3.77		0.44
	POST	3.79	0.47	0.43

Post-Game Evaluation			
Question		Mean ^a	Standard Deviation
This game assisted me in gaining knowledge about other disciplines		3.43	0.76
This game assisted me in understanding my role in the healthcare team		3.07	1.14
This game created a good teamwork environment where we could learn from each other		3.57	0.65
This game was not beneficial to my interprofessional education.		1.50	0.65

**Statistical significance (p < .025) was found between pre and post surveys on knowledge of other healthcare profession's roles, requirements for practice, and support for other disciplines.

^a Mean values are mean response scores from a 4 point Likert-scale with 4 being “Extremely Positive/Strongly Agree” and 1 being “Extremely Negative/Strongly Disagree”.

utilize a validated survey tool as one could not be found to incorporate both student attitude and game evaluation. The surveys utilized for this study were created just for the evaluation of student attitudes toward interprofessional learning with the *IPE Challenge!* game as well as evaluation of the game itself and were not validated prior to the study. The study had a survey response rate of 100%. Researcher observations during game play and group discussions provided valuable insight into the effectiveness of the tool. Statistical analysis of the quantitative data collected from the surveys was conducted utilizing Microsoft Office Excel 2010. The researchers performed a “t-Test: Two Sample Assuming Unequal Differences” test utilizing the Microsoft Office Excel 2010 data analysis toolpack to determine the statistical significance on the raw Likert scale score data from each survey following input of the data into an Excel spreadsheet. A Bonferroni correction on the alpha was obtained to determine confidence in statistical significance at the p < 0.025 level. Mean scores and standard deviations were also obtained (see [Table 1](#)).

Table 2
IPE challenge! game evaluation.

Question	n	Student Discipline	Strongly Agree%	Agree%	Disagree%	Strongly Disagree %	Overall Agreement
This game assisted me in gaining knowledge about other disciplines	29	OTA	75	17.86	7.14	0	89.47%
	15	RADT	66.67	26.67	6.67	0	
	13	RESP	57.14	28.57	14.29	0	
This game assisted me in understanding my role in the healthcare team	29	OTA	64.29	32.14	3.57	0	89.47%
	15	RADT	60	40	0	0	
	13	RESP	50	21.43	14.29	14.29	
This game created a good teamwork environment where we could learn from each other	29	OTA	85.71	14.29	0	0	96.49%
	15	RADT	93.33	6.67	0	0	
	13	RESP	64.29	28.57	7.14	0	

Significant differences in student perceptions pre and post-game play were noted in the areas of knowledge of roles ($p < 0.00001$), requirements of various professions ($p < 0.02$), and support for other professions ($p < 0.02$). Many instances of interprofessional collaboration were observed during gameplay. Students from various professions shared experiences and clarified their roles in patient care delivery. Multidisciplinary student groups were observed discussing questions even when it was not their turn to play. Students asked each other questions and continued open discussions when additional information was needed related to other professions. The researchers, who also served as instructors and facilitators, were called upon to clarify game directions only, and did not help teams answer game questions.

Quantitative data collected from the post-game survey indicated that 89.47% of participants from the three professions agreed that the game assisted them in gaining knowledge about other professions. More specifically, 89.47% of participants responded that the game helped them understand their roles on the healthcare team and 96.49% of participants agreed that the game created a good teamwork environment enabling them to learn from one another (see Table 2). Overall, the majority of students (87.72%) felt that the game was beneficial to their interprofessional education.

8. Impact

A majority of study participants agreed that the *IPE Challenge!* game was effective in promoting increased knowledge about other professions, understanding roles of the healthcare team, and creating an environment of teamwork. Joseph and Diack⁴ found a similar result with the majority of students feeling that their knowledge of various roles in health care had improved as a result of playing an interprofessional education game. This game format provided an adaptable educational method for introducing, evaluating, and reinforcing information related to interprofessional education. A major strength of this educational game is its flexibility in application to interprofessional learning for a variety of target audiences. Participants stated that the discussions generated as a result of game play were an additional benefit of the game.

This game format was readily accepted and the researchers believe

Appendix A

Examples of Questions Used in the IPE Challenge Game

Players were asked by opponents the following questions based upon which profession square they landed upon the game board. Players simply needed to answer yes or no. Opponents would reveal correct answer and award that profession's token if correct answer was provided by the player.

Questions:

- Students must pass a national board examination to practice
- Students must pass a state board examination to practice
- Practitioners must retake a board examination periodically.

it to be a useful tool for future IPE initiatives. Another strength is the game's adaptability to audiences based on their level of professional training and/or interprofessional skills. Game questions could be developed by skill level such as introductory, intermediate or advanced depending on the audience.

Limitations of this study include the limited participant population, non-validated survey tool and limited diversity in education amongst participants. The study included 57 students which makes extrapolation to a larger population not possible. Likewise, with only three professions represented, there were many times that none of the students could speak to or discuss questions related to the other professions not represented simply due to a lack of knowledge or diversity in educational backgrounds. The survey tools were also brand new tools created just for this study and lack any validation. This IPE pedagogy also requires somewhat significant time investment from the educator for creation of the game board, gathering of supplies, and creation of question cards. However, once a standard format for question cards is created, educators can easily modify it for additional questions. Adaptation of the game could include questions focused on case studies that require student to identify team member roles in different healthcare scenarios. Game questions could also focus on topics relevant to all healthcare professions such as ethics or informatics. Additionally, questions related to other competency domains (Values & Ethics, Interprofessional Communication and/or Teams & Teamwork) could be integrated to adapt the game for different purposes.³ The adaptable game template allows educators to substitute different professions on the game board depending on the area of focus for the activity.

In conclusion, the results of this study indicate the use of a game format can be an effective tool when used to promote student learning of interprofessional roles and responsibilities. Student participants across professions overwhelmingly agreed the game had a positive impact on their attitude toward interprofessional learning. However, further research is needed using validated surveys with larger populations and including additional professions, in order to explore future applications of this approach in interprofessional education and practice.

State license is required to practice in most states.
 State certification is required to practice
 Continuing education is required to practice.
 A physician's referral is required to treat patients/clients
 Administers medications
 Performs injections
 Performs medication reconciliation
 Performs patient/client education
 Practitioners in this profession work in neonatal care
 Practitioners in this profession work in pediatrics
 Practitioners in this profession work in adolescent care
 Practitioners in this profession work in adult care
 Practitioners in this profession work in wound care
 Practitioners in this profession work in infectious disease
 Practitioners in this profession work in gerontology
 Practitioners in this profession work in psychiatry/psychology
 Practitioners in this profession work in oncology
 Practitioners in this profession work in cardiac care
 Practitioners in this profession work in orthopedics
 Practitioners in this profession work in pain management
 Practitioners in this profession work in stroke care
 Practitioners in this profession work in traumatic brain injury care
 Practitioners in this profession may work in OB/GYN
 Practitioners in this profession work in occupational health
 Practitioners in this profession work with patients with developmental disorders
 Practitioners in this profession work in general hospitals
 Practitioners in this profession work in emergency rooms
 Practitioners in this profession work in outpatient settings
 Practitioners in this profession work in rehab centers or rehab hospitals
 Practitioners in this profession work in elementary schools
 Practitioners in this profession work in home healthcare
 Practitioners in this profession work in group homes
 Practitioners in this profession work with long term care
 Practitioners in this profession work in hospice

Appendix B. IPE CHALLENGE!

Game Directions

PURPOSE: To learn about the roles and responsibilities of various professions in the healthcare environment.

OBJECTIVE: Collect as many profession tokens into one silo as possible during the time limit or collect one token from every profession to win the game.

PLAYERS: At least 2, preferably from different professions.

SETUP: Timed game – decide on a time (or a time may be given to you). Start the clock. Proceed to HOW TO PLAY. Untimed – Proceed to HOW TO PLAY

The IPE challenge cards should be shuffled and placed face down in the game area. The individual silos of different professions can be placed directly in the middle or off to the side of the board. Each player should have one of the empty silos placed directly in front of him or her. Each player should pick up a pawn and place it on the start square.

HOW TO PLAY: Player directions: Roll the dice to see who goes first. All players will start at the corner labeled start. The player with the highest roll will go first. On your turn, roll the dice. Decide which direction you would like to go. You may only go in one direction (you cannot use part of your role in one direction and then move backwards for the remainder of your role). When you land on a profession, ask the player to your right to draw an IPE Challenge card. Inform the player which profession you landed on. The other player will read the question from the top of the IPE Challenge card. You will answer the question based on the profession you landed on.

As an example: You land on nursing. The player to your right draws a card and reads the question or statement to you "Practitioners in this profession must have at least a Bachelor of Science degree to practice." You answer "No". Being a nursing student, you have encountered nurses that only have an associate of science degree so this statement is not true. You can choose to share this information with the group as a supportive statement to your answer. The player reading your card will look at the row for Nursing on the card and will confirm that the correct answer is "No" based on the checkmark being in the no column. You would gain a red token to place into your silo. Play would move to the next player on your left. You will now be the card reader for that player. Play continues in this clockwise motion.

*If a dispute regarding a question arises, a player representing that profession can begin the discussion at the table as to why a certain answer is correct. The ultimate judge in the case will be an instructor or professor overseeing gameplay or the student who can produce a copy (either paper or electronic format) of the scope of practice for the profession in question.

Special squares:

GO AGAIN – Simply put, roll the dice and go again.

FREE profession – If you land directly on this spot at the end of your roll, the player to your right will pick up an IPE challenge card. You must give them a profession that you would like to learn more about. He or she will then read the question and you will answer according to the profession you named. You cannot change your mind on professions after you have heard the question.

CHANCE – Roll the dice. If you roll an odd number, you can take one opponent's token. If you roll an even number, you lose one of your tokens and must place it back into the matching colored silo. You may only gain 2 tokens from this method. If you are caught gaining a 3rd token in this manner, you will forfeit all tokens in your possession and be placed back on the start square.

WINNING THE GAME: If you are playing a timed game, whoever has the most tokens when the time is up wins. If you are not playing a timed game, whoever collects one token from each profession first wins.

Appendix C. IPE CHALLENGE!

IPE CHALLENGE! Pregame Survey

Demographics: (Circle answer that best answers each question or completes each statement)

I am a: student-undergraduate student-graduate faculty member staff/support

My major/discipline of practice: _____

I currently work in the healthcare environment: true false

Type of healthcare environment: Hospital/urgent care Long-Term Care Outpatient Facility
Physician Office Other: _____

Current member of a professional organization? Yes No

How many interprofessional education simulations or other interdisciplinary activities have you participated in?

Directions: Please select your response using the scale below that best identifies your beliefs for each statement.

4- Extremely positive, 3- Somewhat positive, 2- Somewhat negative, 1- Extremely negative

- | | | | | | |
|--|---|---|---|---|-----|
| 1. My current attitude toward working with others within my discipline is: | 4 | 3 | 2 | 1 | N/A |
| 2. My current attitude toward working with others from other disciplines is: | 4 | 3 | 2 | 1 | N/A |
| 3. My experience working with others within my discipline is: | 4 | 3 | 2 | 1 | N/A |
| 4. My experience working with others from other disciplines is: | 4 | 3 | 2 | 1 | N/A |

Directions: Please select your response using the scale below that best identifies your beliefs for each statement.

4- Strongly Agree, 3- Agree, 2- Somewhat Disagree, 1- Strongly Disagree

- | | | | | |
|---|---|---|---|---|
| 1. I feel knowledgeable about my discipline of practice. | 4 | 3 | 2 | 1 |
| 2. I feel knowledgeable about other healthcare providers' job duties and who plays which role in the care of a patient. | 4 | 3 | 2 | 1 |
| 3. I feel knowledgeable about requirements of practice for various healthcare disciplines | 4 | 3 | 2 | 1 |
| 4. I feel I support others within my discipline | 4 | 3 | 2 | 1 |
| 5. I feel I support others from different disciplines | 4 | 3 | 2 | 1 |
| 6. I feel I am a team player in my everyday work. | 4 | 3 | 2 | 1 |
| 7. Patient care would be greatly increased if each member of the healthcare team knew more about each member's role on the team | 4 | 3 | 2 | 1 |

Comments:

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