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Abstract

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Keywords

Critical thinking, jigsaw, case development, social determinants of health

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Collaborative Learning and Critical Thinking: Use of the Jigsaw Learning Activity in Occupational Therapy Teaching

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ABSTRACT

Collaborative team learning prepares future practitioners using well-crafted, guided collaborative learning activities. Collaborative learning distributes responsibility across team members as they engage socially to build knowledge and learner skills. Critical thinking is a learner skill that is fostered through challenging the team of learners' assumptions through ill-defined, complex real-life cases that defy easy solutions. The ability of occupational therapists to create effective discharge plans has been found to positively alter hospital recidivism. By offering a Jigsaw Case focused on discharge planning at several points in time across the service delivery continuum of care, a team of learners engaged in collaborative learning. We offer a complete Jigsaw Case experience supported by the literature of best practice that faculty can use as an example to tailor their own case based on circumstances and contexts.

Introduction

Collaborating on interdisciplinary teams is the hallmark of the 21st century practitioner and will become even more essential as healthcare progresses into unknown future systems of care. To be prepared future practitioners, students need to experience well-crafted, guided collaborative learning activities. Collaborative learning is a term used to describe an approach to learning where students work in groups to achieve a common academic goal (Gokhale, 1995). Collaborative learning distributes responsibility across team members as they engage socially to build knowledge and learner skills. According to Huang et al. (2014), collaborative learning includes group discussion to solve problems, which involves personal accountability and interdependence to construct knowledge. As with any interdisciplinary healthcare team, not all members can individually know everything about one client's situation. Collaborative learning allows

individuals to utilize one another's knowledge, resources, and experience to accomplish a task together. Skills that evolve in collaborative learning include the art of persuasion, critical thinking, teamwork, locating and synthesizing information, communication, and decision making when there might not be one correct answer. By catalyzing innovative team solutions, students can experience transformative learning (Mezirow, 1997).

One collaborative learning method is the Jigsaw (Aronson & Patnoe, 1997). A Jigsaw experience involves students working in groups to develop a plan and address issues presented through use of a case. In a Jigsaw Case, students are first placed into expert groups. The focus of the content for each expert group is predetermined by the faculty who developed the case. Each expert group constructs knowledge around one specific assigned aspect of the Jigsaw Case. Expert students are then divided into integrated groups, drawing one member from each expert group. Students then share their expert knowledge that applies to the problem, and the best solutions are put forth from the knowledge that has been acquired and debated.

The Jigsaw method has been used in nursing, pharmacy, medical, and interprofessional education (Buhr et al., 2014; Hadley et al., 2018; Kumar et al., 2017; Phillips & Fusco, 2015; Walker et al., 2015). The commonality across Jigsaw Case studies is the use of two sets of groups for learning: expert and integrated. Comparison of three studies demonstrates the versatility of the Jigsaw. One Jigsaw Case study used an acute stroke case and asked student learners from four different disciplines to prepare as a team to counsel a patient (Hadley et al., 2018). In another, medical students interviewed 10 different long-term care facility team members, then educated peers on the team roles (Buhr et al., 2014). The third provided a wide variety of timely evidence about a recent medication prescription controversy and had pharmacy teams reach a consensus about patient care (Phillips & Fusco, 2015). Learners were assessed for acquired knowledge, as well as their attitudes toward learning through the Jigsaw process. Overall, learners have appreciated this new approach (Kumar et al., 2017). However, further research on both the short- and long-term impact of the Jigsaw method to promote the clinical effectiveness of interdisciplinary teams is needed.

Although it is unclear whether critical thinking skills can be taught and whether they are discipline-specific (Hale, 2018), the Jigsaw is one intentional method that seeks to incorporate critical thinking into collaborative learning through reflection and debate of ideas. Debate occurs across group members as elements of the case bring to light different assumptions and points of view. Debate, as a strategy to teach critical thinking skills, requires peers to make their thinking explicit and to justify and defend decisions that can then be challenged (Bain, 2004; Chun & Lee, 2016; Latif et al., 2018). Personal elaboration of knowledge is another learning strategy folded into collaborative learning that builds critical thinking as peers explain and connect concepts for one another (Brown et al., 2014; Lang, 2016). Use of case studies can center the debate on health disparities and bias (Hall, 2015; Williams et al., 2008) while helping students develop "habits of mind" to "interpret information in the face of equivocal or conflicting data" (Huang et al., 2014, pp. 95-97).

In healthcare education, case studies are one tool to promote critical thinking and exploration of complex, real-time examples of the multifaceted lives of clients. According to Paul and Elder (2016), “critical thinking is the art of analyzing and evaluating thinking with a view to improving it (p. 4).” The case studies, which provide an opportunity for critical thinking to occur, need to be thoughtfully created and provide space for depth based on realistic contexts. Case studies with extensive layers of social determinants of health (SDH) reflect the lives of those served in the healthcare system and are thus recommended for learners. Such case studies also appear to lend themselves to the Jigsaw method, where divergent perspectives are sought (Allen & Toth-Cohen, 2019; Berg et al., 2019). Social determinants of health include health behavior, as well as social and physical determinants such as policy, economic, education, social, health, and neighborhood characteristics (Office of Disease Prevention and Health Promotion, 2018).

A portion of the guidelines proposed for case development described by Berg et al. (2019) were used to develop a case for a Jigsaw learning activity in an occupational therapy (OT) program. The specific recommendations that were followed included: (1) build reflective prompts and responses about personal assumptions, biases, and health beliefs into courses; (2) add a critical thinking element: how did the case challenge your thinking?; (3) enlist a range of SDH descriptors that realistically alter OT approaches and outcomes; (4) embed clients in the household, neighborhood, and local community; (5) add realistic current local events that could impact the client and case; and (6) offer sequels to a case with unanticipated outcomes. The Jigsaw activity provided an opportunity for students to collaborate, engage in critical thinking, and reflect on the experience. The purpose of this article is to describe the Jigsaw process and offer one comprehensive case example applicable to OT practice.

Description of Jigsaw Activity Process

The Jigsaw Case Experience was implemented during the second-year curriculum at one Midwestern OT program. The case was specifically developed by faculty to foster critical thinking around the assumptions, beliefs, and points of view regarding a case purposefully complicated by multiple SDH. The case described an individual, Isabelle, with chronic health complications situated in a realistic community context. Guidelines proposed by Berg et al. (2019) were followed to ensure that the case adequately met the educational objectives of the experience. Learner objectives included (1) applying foundational knowledge to a case specific to occupational performance; (2) analyzing self and peer values, assumptions, and beliefs toward SDH and the impact these have on the OT process; and (3) identifying the role of OT and community partnerships in discharge planning to tackle complex health needs. The focus of the experience was on developing discharge recommendations at two different points in time.

The first step in case development involved faculty knowledge of regional news impacting the health and well-being of the community to provide a realistic context and immersion of the case in current and historically related events. A regional population health issue was identified within a specific housing complex that had been in the local news for the past year. Faculty identified resources ahead of time to be used by the

students, including key informant advocates who lived or worked in the specific housing complex, agency-based service providers in local proximity to the housing complex, an OT practitioner in acute care and inpatient rehabilitation who treated clients with similar diagnoses, and other resources related to the diagnoses. Details of the case were developed and divided into seven categories of expert knowledge. An interim inpatient treatment note and discharge summaries from two care settings were developed (see Appendices for all notes).

Prior to distribution of the case, students were educated in the elements of critical thinking. Students were challenged to think of this as a way of constructing new knowledge, to withhold judgment, and to consider alternatives when the evidence and the situation were unclear. Divergent views would be sought while assumptions were withheld or challenged. With critical thinking, there is no one wrong or right answer. The purpose of the Jigsaw is to explore the situation from all angles and write a justifiable conclusion that integrates the information that is known.

An integral part of raising awareness of critical thinking is to write reflections about how the Jigsaw challenged assumptions, values, and beliefs that may have influenced thoughts and actions. This develops a “habit of the mind” to consider multiple viewpoints of how people live a life that may be different from one’s own (Hall et al., 2015). The first personal reflection, prior to the Jigsaw being introduced, promoted general critical thinking where students could choose to respond to any number of prompts, such as: What is OT’s value to society? What is OT’s role as perceived by society? What does society expect from OT? How do we get there? We are encountering more diverse people with chronic conditions; are we prepared? How do we prepare? How do we respond to: “We are most successful as occupational therapists working with those who are most like us”? How do you know what you think you know? The prompts used during the initial reflection were based on the principles used in Fink’s Taxonomy of Significant Learning (2013).

Overview of the Class Sessions

The Isabelle case was fabricated by faculty; however, the community situation and resources included were real. Isabelle was initially presented to the students through client factors, including diagnoses of diabetes, retinopathy, neuropathy, a below-knee amputation, and phantom limb pain. Her residential zip code and the specific housing complex where she resided were also included. Her primary occupation was a childcare provider at home for her family, and her occupation goals were provided (see Table 1). One interim inpatient treatment note and discharge summary was given to the students (Appendix A). Students were challenged with developing discharge recommendations for Isabelle in their integrated teams.

Table 1*Objective and Case Details***Jigsaw Case Part 1**

The **objective** of this Jigsaw Case is to engage in critical thinking to integrate social determinants of health into health outcomes and discharge planning. The occupational therapist will have access to expert information gathered to help design the best discharge plan possible with Ms. Isabelle.

Case Details

Ms. Isabelle, mother of 2, age 41

Type 1 Diabetes Mellitus (DM), on an insulin pump, fragile = hard to control blood sugars.

Near vision acuity is 20/80, has some peripheral vision blind spots due to retinopathy; peripheral neuropathy in both lower extremities; leg circulation severely compromised. Has received emergency glucose from first responders 3 times in past month.

Cognition is intact.

Associate degree in early childhood education.

Isabelle owned her own daycare center for 10 years, has worked in the past as a daycare teacher, and currently cares for niece along with own children. Recently admitted to hospital for chronic wounds failing to heal on right lower leg that resulted in below-knee amputation (BKA).

Feels sad about her medical situation and loss of leg.

Based on her medical history, she has a distrust of the medical system working in the best interest for her and her family.

She is completing inpatient rehabilitation and is preparing to go home.

Inpatient Rehab Occupational Therapist:

Ms. Isabelle admitted following BKA of right lower extremity. OT referral to assess and treat. Isabelle seen by occupational therapist and physical therapist for 2-week inpatient rehab stay. See detailed interim progress note.

Her goals:

Return to family and resume life as before amputation

- Provide childcare for the family
- Take care of her parents
- Cook for the family
- Supervise homework of 8- & 12-year-olds

Decrease family assistance needed for routine chores and care of self

Ambulate with prosthetic device and not need a wheelchair

Improve her health to retain her left leg and eyesight

After reading the case, students wrote a second personal reflection focused on their reaction to Isabelle's hospitalization. The items below prompted students to think about their assumptions, biases, and views regarding her responsibility for her own health.

Take a moment and write down reflections you have about this case:

- Assumptions you have
- Health beliefs that you have
- What is your point of view, and where has this come from?
- Foundational knowledge that you bring to this case

Once these initial reflections were completed, the class discussed foundational knowledge they already possessed, such as the OT Practice Framework (American Occupational Therapy Association, 2020), the Person Environment Occupation Performance Model (Baum et al., 2015), environment, theory, therapeutic approaches (adapt/compensate, remediate, prevent, promote), and inpatient rehabilitation experiences from Level I fieldwork or other observations. The initial case was then reviewed with the entire class through use of a PowerPoint presentation, analyzing a single sentence at a time. Modeling questions by faculty occurred, such as questions relevant to the first statement: "This is a 41-year-old mother of two children." Each sentence of the case was then presented in isolation for students to develop questions, the answers to which would influence their discharge plans for Isabelle.

At the conclusion of the presentation, students were evenly divided into expert teams in one of the following areas: (1) the client, (2) people in the household, (3) the physical home dwelling, (4) the neighborhood, (5) the geographic community (zip code), (6) community agencies, and (7) a local health clinic team member. The goal for each expert team was to discover all there was to know in their content area and to ensure that each student expert had command of this information (see Table 2).

Table 2

Details Provided to Each Expert Team

Group 1: Isabelle (You will represent Isabelle in the integrated group, her client factors, and how they influence her occupations).

Preparation for this assignment could include the following dependent on your expert group:

- Visit to the neighborhood, neighborhood/community scan, community resources and amenities.
- Watch the documentary *The Pruitt-Igoe Myth*.
- Watch YouTube or talk to someone living with diabetes with same list of chronic conditions.
- Talk to LifeWiseSTL and other community agencies in the zip code.
- Read *For the Sake of All, Segregation in St. Louis*, and the *Ferguson Report*.
- Read archives of *St. Louis Post-Dispatch* newspaper about Clinton-Peabody Housing Complex.

Group 2: *Household/Family** (You will be the expert in your integrated group about the family and her responsibilities at home).

*Isabelle group also received this information to know her living situation

- People living in the home consist of Isabelle and partner Frank's children, ages 8 and 12; when the 12-year-old was 10, he was shot in the leg while playing outside by someone randomly shooting from a passing car.
- Isabelle's sister is pregnant and also has a 2-year-old baby who was born prematurely and is followed by First Steps and Nurses for Newborns. Isabelle provides childcare for the 2-year-old, and this is still the plan even when new baby arrives.
- Grandparents live with Isabelle and Frank. Isabelle's father has chronic obstructive pulmonary disease (COPD) and still smokes.
- Isabelle's brother, age 40, lives in their neighborhood. He had a stroke 2 years ago and has not returned to work. He uses alcohol and other means of self-medication. Isabelle invites him to dinner once a week.

Group 3: *Home dwelling* (You will be the expert in your integrated group about anything in the two paragraphs below, i.e., health insurance, renter/landlord relationship, bus transportation costs).

- No working phone; no internet/Wi-Fi access; one unreliable car that father uses for transport to work six days a week, 8 AM–6 PM, if there is enough money for gas. Otherwise, bus transportation adds time to both ends of his commute. Father has a minimum-wage job; jailed in the prior year for a domestic violence incident. Isabelle's family is on Medicaid; her parents, the grandparents, are on Medicare. Money is tight with the priority of rent, utilities, and food.
- Family rents a second-floor walk-up three-bedroom, one-bathroom apartment and routinely traps mice in their apartment. There was recently a fire in the apartment above them. There is still some residual smoke and water damage in Isabelle's apartment as a result of the fire. The family's faith is strong, and they attend weekly services at St. Anthony's, which has a supportive congregation and offers neighbors meals two weeks out of each month.

Group 4: *Immediate neighborhood* (Take a drive and do a neighborhood scan; find out what community resources are close to the Clinton-Peabody neighborhood).

- Isabelle and her family live in the Clinton-Peabody housing complex (63103 & 63104). About 1,000 people live in 31 buildings there, south of downtown St. Louis. This is a close-knit community that is supportive of Isabelle's family and often provides rides and dinners when need is greatest; there is also a neighborhood watch. There are several abandoned buildings on their block. Missouri Attorney General filed a lawsuit on behalf of Clinton-Peabody residents against the St. Louis Housing Authority.
- Since January, Isabelle has only allowed her children to play briefly outside. She does not feel it is safe for them to play outside by themselves, especially since the shooting. In July, police exposed a drug trafficking ring within the Clinton-Peabody neighborhood resulting in 15 arrests.

- Complete a neighborhood/ community assessment:
 - Access to public transportation
 - Access to grocery store by public transportation
 - Healthcare clinics in the community
- Local Clinton-Peabody contact:
 - A key informant interview has been arranged with Mr. and Mrs. Tamm. Two students will interview and bring information back to expert group.

Group 5: Broader geographic community (family lives in zip code: 63104).

- 2-1-1 United Way requests for help June 2017–June 2018

28% living in poverty	28% of calls for housing and shelter
7% Unemployed	28% of calls for utilities
11% received high school diploma	10% of calls for household items and clothing
63% rent housing	35% of calls for assistance with rent
- Look at broader picture here using public databases on library website, public policies, and beyond to understand the region in which they are situated. You are responsible for a population viewpoint of the health statistics of the region and the zip code. Read the *For the Sake of All* (FSOA) report and visit exploreMOhealth.org.

Group 6: Community agencies

- LifeWiseSTL 1321 S 11th St., St. Louis, MO 63104: Contact Health & Wellness coordinator at LifeWiseSTL
 - Website: *Through holistic programs and services, we promote empowerment and growth in individuals and families. We help the economically disadvantaged achieve economic independence, self-sufficiency, and a path out of poverty.*
- Other agencies to explore:
 - Isabelle's family participates in St. Louis Children's Hospital Victims of Violence Program
 - 12-year-old son goes to City Faces
 - Explore Flourish St. Louis

Group 7: Physician in local health clinic who follows Ms. Isabelle and her family. She is followed for foot ulcers, hypertension, and diabetes care. Clinic employs one community health worker who checks on the family monthly and offers coaching, social support, advocacy, and navigation of healthcare system. You will be contacted by the discharge planning team. How often do you see Isabelle? What is the role of the clinic with Isabelle and her family?

- Top four diagnoses seen in this adult practice: depression, diabetes, COPD, high blood pressure
- Top social needs the clinic sees in the neighborhood include: dental services, bed bug extermination, rodent problems, prescription coverage from August to December, transportation, house cleaning/help in the home, paying bills/utility costs, personal hygiene, meal replacement (Boost, Ensure), coats, clothing and other personal items, mental health counseling/therapy

Students were asked during their first expert team meeting to identify their learning needs and resources, including evidence-based literature, population health databases, people they knew in the area impacted by these regional issues, and community resources based on their expert group assignment. Students were encouraged to visit the neighborhood; complete a neighborhood/community scan; locate community resources and amenities in walking distance (e.g., grocery store, bus stops, pharmacy, health clinic); watch documentaries about the history of housing complexes in the city; interview key informants such as someone with diabetes, amputation, or other chronic conditions; read regional reports on the history and current state of segregation in the community; talk to agencies that serve people living in the housing complex; and read archives of local newspapers about regional issues related to this housing complex. Students were provided time during class sessions to engage in their learning activities.

During the next phase of the Jigsaw experience, the expert teams were divided up to create integrated teams representing each expert group's perspective. The integrated teams were charged with writing the OT discharge recommendations for Isabelle (see Table 3). The focus of the first hour of this session was to make three discharge recommendations for the client based on the information located and shared, along with rationale and justification of recommendations. At the beginning of the second hour, the students received an update on the case (including information regarding hospital recidivism occurring within five days of discharge) and spent the next hour developing three revised discharge recommendations based on the new case information.

Table 3

Instructions Provided to Integrated Teams

Jigsaw Case Part 2

Integrated group discussion process

Experts are assigned to an integrated group to make OT discharge recommendations. Identify strengths and challenges that are impacting OT discharge planning. Compare multiple approaches to meet Isabelle's needs and challenges, use expert information to inform your decisions.

OT discharge plan #1

Offer three OT discharge community recommendations with rationale/justification for your priorities and approaches. Groups 1–6 will each put three recommendations on a PowerPoint slide for class discussion.

After discharge #1 plans are complete, integrated groups receive further information about the Isabelle case.

OT discharge plan #2:

Extension of the case: Ms. Isabelle returns to the hospital within five days with bacterial pneumonia and drainage from her surgical site. She complains of phantom limb pain that disturbs her sleep all night. She is finding it difficult to get around at home with the walker and is feeling very self-conscious about the loss of her lower leg. She has not left the apartment in five days. She has fallen three times in her home. Endurance to activity is poor, with shortness of breath from minimal activity. She has not done her home exercise program, nor purchased the reacher or tub mat. Family is currently without electric power. It is a hot St. Louis autumn. Air quality is continually unhealthy & poor, and mold counts are high.

OT referral: Assess and treat. Her long-term goals remain the same. What will occupational therapist do differently this time in preparing for discharge?

OT discharge recommendations #2

Offer 3 OT discharge community recommendations with rationale/justification for your priorities and approaches. Groups 7–13 will each put 3 recommendations on a PowerPoint slide for class discussion

The entire class will come back together for discussion; review of discharge recommendations at time 1 and time 2. Discussion about challenges, approaches, and solutions. Which cues in case were most significant to you? Did groups select different approaches? Why? Critique other suggested approaches (had you ruled these out, and why?). Any unanswered questions?

An OT clinical expert attends and answers student questions.

All groups reassembled during the next class session with a practicing acute care and inpatient rehabilitation occupational therapist in attendance to answer questions about the case. This brought a further element of realism to the role of OT in discharge planning for Isabelle. Half of the integrated groups presented their plans for discharge time one, and the other half presented their discharge time two recommendations on a PowerPoint slide to the entire class for comparison and discussion.

Finally, students completed one last personal critical thinking reflection about assumptions and beliefs brought to the case that this Jigsaw learning experience challenged. Prompts for the final reflection included: How have your professional knowledge, skills, and attitudes been challenged, and how will you apply this to clinical practice? Identify some next steps along your professional/civic path. What assumptions did you make and why did you make them? How does this experience change the conversations you have now with other cases? How did your initial assumptions about Isabelle change over the Jigsaw Case process? Reflect on your own critical thinking process...did engaging in this process help you to consider your assumptions and biases? How does this experience change your approach for other cases? How will you apply this Jigsaw experience to clinical practice? How can therapists create teams in the workplace (whether you practice in a traditional or community health setting) to stay

connected to societal health challenges? Based on the discharge class discussion and after seeing discharge recommendations at time one and time two, what were some of the differences between the discharges? Projecting that hospital recidivism might happen under her living conditions, how would you have rewritten your original discharge plan? Who will help this family coordinate resources, phone calls, healthcare visits, transportation, childcare, and other basic survival needs?

Assessment

One method of assessment of this Jigsaw experience occurred through faculty observations, made by the authors, during the process. During the experience, faculty visited with the expert groups and integrated groups as they worked through the process. Faculty observed (1) initial resistance from students about the uncertainty posed by the Jigsaw, with many questions about the charge and what their role would be. Although there were 13 students in each expert group, they sought validation of their approaches from other expert groups. (2) Discomfort with not knowing the full picture: students were concerned that they did not know everything about the case and were frustrated getting just one piece of information; students went around to other groups to read other parts of the case. Students were reminded that, in a clinical setting, they will not know everything there is to know and must rely on team members to fill in the gaps, and even if they know something, there may not be time to necessarily explore the information in depth. (3) Depth of exploration of topics related to the context often needed to be facilitated by faculty. Students were told to think about, for example, multiple reasons why Isabelle has had first responders to her house three times in the past month. Faculty facilitated and encouraged depth of exploration during the expert meeting. This was further reinforced during the content expert class session with the practicing clinician when students were able to see other groups' recommendations and learn more about the complexity of the clients the occupational therapist treats on a regular basis. The practicing occupational therapist was also able to identify factors influencing the case that the students had not yet identified, such as the process and eligibility requirements to receive social security disability insurance (SSDI) for someone with an amputation and potential barriers to receiving funding for durable medical equipment.

The authors conducted an informal, in-class summative evaluation at the end of the session. The students responded to prompts provided by faculty. Despite the initial resistance observed during the group meetings, overall feedback of the session from the students was positive and indicated a need for similar experiences in other courses. Students felt that the experience facilitated collaboration through only having certain pieces of information, they felt that the experience was realistic and extremely valuable, and they enjoyed getting new information partway through the experience. The students appreciated having the practicing occupational therapist attend to give them feedback as they shared their discharge recommendations, especially in this type of learning experience where there is not just one correct answer. The students felt the case information was different from cases they had received in other courses and wished they had more opportunities to explore cases at a deeper level. Additional methods of evaluation (manuscript in preparation) included examination of the discharge

recommendations developed at the two time points and the student reflections to prompts provided by faculty posted on the course management site. This experience was an in-class assignment and was not graded.

Discussion

Participation in a collaborative learning experience prepares students for their future roles in clinical practice and fosters critical thinking. Healthcare professionals who do not engage in critical thinking to challenge their own assumptions and biases have been shown to perpetuate health disparities (Williams et al., 2008). Implicit bias has been shown to affect interactions with, and decisions made for, clients and their families, treatment adherence, and health outcomes (Hall et al., 2015). Frenk et al. (2010) urged health education to keep pace with the rapidly changing healthcare system to prepare practitioners for teamwork with critical thinking as a core competency. One of OT's strengths is determining realistic discharge plans along the continuum of care (Rogers et al., 2016). Rogers et al. (2016) concluded that to lower readmissions, occupational therapists are directed to focus on caregiver training, home safety, assistive technology, cognition and medication management, and interprofessional team consultations. These discharge skills were reinforced in the Isabelle case.

From the critical thinking literature, there is support for offering students more than one case for skill development, or multiple-episode cases (Allen & Toth-Cohen, 2019; Hong & Yu, 2017; Shin et al., 2015). Shin et al. (2015) found that three case simulations significantly increased critical thinking skills over one or two simulations. Although this Jigsaw was seemingly one case, there were two episodes along the healthcare continuum when discharge decisions needed to be made for Isabelle. There is also research support for offering specific guided reflective questions to foster clinical thinking. Both Hale et al. (2018) and Terrien et al. (2016) integrated such a guide, and they found significantly higher critical thinking skills using guided reflections compared to free-thought reflections. As a Jigsaw Case companion, students engaged in three reflections using guiding questions to challenge students' epistemologies (Razeghi et al., 2018). This Jigsaw Case devoted one class session to the specific introduction of and preparation for engaging in critical thinking (Allen & Toth-Cohen, 2019; Velde et al., 2006; Vogel et al., 2009). Allen and Toth-Cohen (2019) recommended explicit coaching on critical thinking for generalization to other cases and progressive expectations of the student to independently apply the skill of critical thinking as one would in a clinical situation.

There is no Accreditation Council for Occupational Therapy Education (ACOTE) standard for the development or application of critical thinking skills (ACOTE, 2018), although other healthcare professions include this in their competency frameworks (Huang et al., 2014). "To promote habits of mind and a culture among students that will reinforce the notion that how one gets to the answer is as important as the answer itself" is one of the approaches advocated for when teaching critical thinking (Huang et al., 2014, p. 97). Huang et al. (2014) presented consensus statements around critical thinking for faculty development, assessment, and teaching in the hope of guiding students from novice to master in knowledge, skills, and attitudes.

Limitations

This was only one case presentation, albeit with multiple episodes, while the evidence supports that multiple case exposures are required to practice the skills of critical thinking (Allen & Toth-Cohen, 2019; Hong & Yu, 2017; Shin et al., 2015). In-class time devoted to this one case included four class sessions, including an introduction to critical thinking. Increased time devoted to learning by cases in small groups rather than the traditional lecture is a concern for all faculty (Li et al., 2014; Lian & He, 2013; Tayyeb, 2013). Strategically determining realistic SDH to foster critical thinking in students without reinforcing stereotypes is a challenge for any case. Race was purposefully absent for Isabelle's family, and some groups had very challenging discussions about the significance of racism for this case.

Future directions involve development of additional Jigsaw Cases. This case has been extended into a skilled nursing facility (SNF) after the second hospital stay, with more discharge planning for Isabelle and family going home from the SNF (see Appendix B). Other opportunities for future use of the Jigsaw experience could include an interprofessional component, adding students from other disciplines likely to be encountered in future practice (medicine, nursing, pharmacy, physical therapy, community health workers, and social work). Future work will include more formalized assessment of the impact of the experience on student critical thinking skills and the continuity of learning. The role of collecting this data could be assigned to an assistant to the instructor or other faculty member to limit potential bias.

Implications for Occupational Therapy Education

The Jigsaw approach is one instructional method that can be used in OT education to promote collaborative learning. This approach can be especially useful to demonstrate the complex lived experiences of our clients by moving beyond the hospital setting and addressing community implications. Students learn about potential barriers to community reintegration and continuation of services by seeing the direct implications of things like no phone/internet service, no funding for adaptive equipment, and delays in the approval process for resources (i.e., SSDI). By design, the experience is realistic by immersing the case in the actual community, knowing only one part as the expert, relying on team members for information, and addressing recidivism to force further discussion about alternative discharge planning that includes more consideration of the social determinants of health.

Faculty can assess the feasibility of discharge recommendations and further assess student readiness for Fieldwork and entry-level practice. Students can be challenged to address the client's need at different points in the continuum of care (discharge from inpatient rehabilitation vs. SNF). This process can also assist with identification of community resources and needs (accessible transportation, neighborhood safety, affordable childcare, school system services, etc.) and provide an opportunity for students to gain community advocacy skills.

Conclusion

This paper described the use of the Jigsaw as a collaborative learning experience using a complex, ill-defined sequential case. By including the case in its entirety here, we offer a comprehensive example for educators seeking to use this teaching and learning approach. Educators will need to personalize the context to their local region and partner with an area clinician for realistic healthcare system responses to cases such as Isabelle's. Using Jigsaw Cases is one method to prepare students for the uncertainties to be encountered in clinical practice. The Jigsaw experience provides an opportunity for students to utilize critical thinking as an approach to understanding the influence of social determinants of health as they relate to clinical cases and future clients. As a profession, we need to develop competency standards around critical thinking. We need to promote and evaluate intentional collaborative learning experiences, such as the Jigsaw, to prepare our students to develop the habits of mind necessary to practice in an evolving healthcare system.

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Appendix A

Interim Inpatient Progress Note and Discharge Note

Isabelle

DOB: 9/9/1971

DX: BKA

Isabelle admitted following BKA of her R lower extremity.
OT referral: Assess and treat for 2-week inpatient rehabilitation stay.

Client long-term goals:

Return to family and resume life as before amputation.

- Provide childcare for the family
- Take care of her parents
- Cook for the family
- Supervise homework of 8- & 12-year-olds

Decrease family assistance needed for routine chores and care of self.

Ambulate with prosthetic device and not need a wheelchair

Improve her health to retain her left leg and eyesight

Rehabilitation progress

Client participated in 12/12 OT sessions this first week on rehab unit. Her progress has been good.

Functional mobility: She requires stand-by assistance (SBA) for all transfers for balance and confidence except requires maximal assistance (Max A) for transfers in/out of bathtub. Tub bench recommended. Currently, she uses a walker for short distances and has practiced using a wheelchair for longer distances in the community. Isabelle requires maximal assistance (Max A) to go from floor sit to stand and is dependent in any transfer when holding a doll (childcare simulation).

Activities of daily living (ADLs): Independent in dressing, bathing (after tub transfer), and skin integrity monitoring of L lower extremity.

Instrumental activities of daily living (IADLs): She is independent in cooking, dishwashing, and laundry in the clinic facilities. Continuing to problem-solve meeting the physical demands of childcare for home safety.

Self-management of fatigue and high blood sugars, which reduce her endurance throughout the day, requires verbal cues.

Client Education

Client and her mother receiving ongoing skilled instruction in wrapping R residual limb to prepare for prosthesis, transfers, and lower body hygiene and ADLs. Modifications to home to accommodate a wheelchair were discussed and additional adaptive equipment recommended such as reacher, non-skid mat for tub floor, and sturdy chair at diaper changing table. Client/family received instruction in a home exercise program for upper extremity strengthening that included TheraBand and free weights. Client able to demonstrate exercises correctly.

Current discharge recommendations

Outpatient prosthetic training once her wound has healed.

OT discharge home. Continue home exercise program. Obtain recommended adapted equipment. Client followed 2x per week for outpatient physical therapy and weekly wound clinic. No direct OT services recommended at this time.

What are your discharge recommendations for Isabelle?

Discharge from inpatient rehabilitation

Isabelle

DOB: 9/9/1971

DX: BKA

Client rehab goals:

Return to family and resume life as before amputation.

- Provide childcare for the family
- Take care of her parents
- Cook for the family
- Supervise homework of 8- & 12-year-olds

Decrease family assistance needed for routine chores and care of self.

Ambulate with prosthetic device and not need a wheelchair

Improve her health to retain her left leg and eyesight

Course of rehabilitation

Client participated in 21/21 sessions on rehab unit. Her progress has been good, and she has met all rehab inpatient goals. She requires SBA for all transfers for balance and confidence. Bathing is minimum assistance (Min A) for transfers wheelchair <--> bathtub. Currently she uses a wheelchair for mobility. She can propel on level surfaces with some difficulty maneuvering around tight spaces. She is independent in cooking in the clinic kitchen. Fatigue and high blood sugars reduce her endurance throughout the day.

Client Education

She and her mother received skilled instruction in wrapping R residual limb to prepare for prosthesis, transfers, and lower body hygiene and ADLs. Modifications to home to accommodate a wheelchair were discussed and additional adaptive equipment recommended such as reacher and non-skid mat for tub floor. Family received instruction in a home exercise program for upper extremity strengthening that included TheraBand and free weights. Client able to demonstrate exercises correctly.

Discharge recommendations

Discharge home. Continue home exercise program. Obtain recommended adapted equipment. Client followed 2x per week for outpatient PT and weekly wound clinic. No direct OT services recommended at this time.

What are your discharge recommendations for Isabelle?

Appendix B

Jigsaw Case Part 3: Discharge from a SNF

For another step to this case, students individually write a third discharge plan. Isabelle has been at an SNF for the past month, and students receive this discharge note from the OT at the SNF.

Name: Isabelle DOB: 9/9/1971 Primary Dx: Bacterial Pneumonia, R BKA

Physician: Dr. Dallas

S: Client reports she is pleased with the outcome of her OT treatment, however states, "I still don't feel as strong as I used to and I am nervous about what it will be like at home." She reports she is returning to a first-floor apartment in Clinton-Peabody Housing Complex with 1 step to enter. She has limited assistance from her partner, Frank, and her parents who reside with her and her children (ages 8 and 12). She reports her bathroom is small, has a tub/shower combo, and can be difficult to navigate. She currently owns a front-wheeled walker and a manual wheelchair, however no other adaptive equipment/durable medical equipment.

O: Client participated in 20/20 OT sessions from admissions to discharge addressing ADL and IADL performance.

ADL/IADL status on Evaluation	Current ADL/IADL status
Grooming: Min A w/ wheeled walker	Grooming: Independent w/ wheeled walker
Lower extremity dressing: Min A	Lower extremity dressing: Independent
Bathing: Mod A	Bathing: Set-Up
Tub transfer: Mod A	Tub transfer: Min A
Toilet transfer: Mod A	Toilet transfer: Independent w/ wheeled walker
Diabetes Management: supervision, requiring direct verbal and visual cues	Diabetes Management: Independent
Child Care: Mod A	Childcare: [lift from crib, maneuver on diaper changing table, carrying child] Min A
Cooking: Mod A	Cooking: Independent at wheelchair level

Client education provided in wrapping R residual limb in preparation for prosthesis, as well as sensorimotor re-education for phantom limb. Client able to care for her residual limb independently. Wounds are healed. Client received education on increasing endurance through ADL performance as well as a home exercise program and is able to complete independently.

A: Differences in admission and discharge status of ADL/IADL performance show good progress. Continued deficits in endurance as well as tub transfers present; however, client is at a functional level ready for discharge with supports in place. Client will require continued assistance for tub transfers and childcare routines. Family is agreeable to provide. All treatment goals have been met, and client is ready for discharge.

P: Discharge to home. Notification of discharge to primary care doctor and community health worker to resume care.

What are your discharge recommendations for Isabelle?