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Examining Change in Confidence: A Unique Approach to Interprofessional Education Evaluation

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Examining Change in Confidence: A Unique Approach to Interprofessional Education Evaluation

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Abstract

INTRODUCTION Measuring student confidence is integral to evaluating student perceived ability regarding interprofessional collaborative practice. The purpose of this study was to examine change in confidence after an introductory interprofessional education assignment using Bandura's self-efficacy framework.

METHODS A retrospective pre-post design assessed change in student confidence, targeting the strength dimension of self-efficacy beliefs. Students enrolled in health discipline-specific courses in two sequential years participated in an introductory embedded case-based IPE assignment. Sixteen statements were developed to assess students' confidence for specific Interprofessional Education Collaborative (IPEC) sub-competencies consistent with student learning outcomes. Descriptive statistics, paired sample t-tests (comparing pre-post), analysis of variance and independent samples t-tests (comparing across disciplines and the two years) were used in the analysis.

RESULTS Data from 203 participants provided a useable response rate of 80.6%. The percent of students indicating an increase in their confidence for the different IPEC sub-competencies ranged from 38.9% for "Encourage ideas and opinions of other team members" to 82.3% for "Explain the roles and responsibilities of other professionals." Differences in mean change in confidence was found among nine sub-competencies when comparing across the disciplines. In addition, students in Year 1 reported larger increases in confidence for nine sub-competencies compared to Year 2 students.

DISCUSSION Results give insight to student perceptions for strategic formative assessment and IPE assignment design. A retrospective pre-post design provided a novel means of examining change in confidence that avoids response-shift bias, while providing students the opportunity to explicitly self-report change or lack of change in confidence. Smaller increases in confidence in Year 2 compared to Year 1 were unexpected and may be due to the Year 2 requirement that teams discuss and agree upon team rules. Although counter-intuitive, the potential for reducing the amount of conflict may have contributed to less of an increase in confidence, as confidence can be gained from not only being well prepared, but also overcoming adversity (mastery experience). Each Year 2 student also was required to write a reflection regarding team ground rules and their implementation. This may have helped students realize greater complexities of successful interprofessional collaboration and their own limitations to achieve it.

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Implications for Interprofessional Practice

- IPE researchers may consider using a retrospective pre-post design as an alternative to the more common quasi-experimental design when using self-report measures of psychological dimensions such as confidence. A key advantage is the reduction of response shift bias.
- IPE instructors can obtain helpful information regarding learning outcomes and assignment design by examining differences in change in confidence across various interprofessional collaboration behaviors. Instructors can use RPP as a formative assessment to monitor changes in student confidence.
- Taking this approach, students are offered opportunities to explicitly reveal areas where they believe change has occurred or not occurred and to experience meaningful learning through self-reflection of personal growth.

Confidence in one's ability to engage in interprofessional interactions is recognized as a personal factor necessary for interprofessional collaboration (Henneman, Lee, & Cohen, 1995). With high levels of confidence, including confidence in social interactions, being prevalent among many of today's young adults (Twenge, 2006), helping students to acknowledge where they perceive either an increase or decrease in confidence could prove useful when helping students to address their professional growth and goals. Providing students the opportunity to reflect on and self-assess skills and behaviors important to interprofessional practice (IPP) offers a means of comparison that helps to determine their self-efficacy (Resnick, 2013).

We examined students' perceived change in confidence regarding specified Interprofessional Education Collaborative (IPEC) sub-competencies (Interprofessional Education Collaborative, 2016) using Bandura's (1977) self-efficacy framework. Self-efficacy appraisal has been shown to contribute to and predict achievement (Cervone, 2000). Self-efficacy is the perception of one's ability to perform an action and is informed by self-reflection of accomplishments, vicarious learning, verbal persuasion, and physiological feedback (Bandura, 1986). Self-efficacy beliefs are measured according to the three dimensions of generality, magnitude, and strength (Bandura, 1977), with two of these, magnitude and strength, potentially being highly correlated (Cecil & Pinkerton, 2000; Lee & Bobko, 1994). Generality

refers to the generalizability of behavioral expectations across contexts (Bandura, 1977). Magnitude measures one's expectations in terms of ability to perform a behavior at a specific level of difficulty. This has been operationalized by asking if respondents can perform a particular activity (Lee & Bobko, 1994) and by rank ordering activities based on difficulty level (Cecil & Pinkerton, 2000). Strength, a key dimension of self-efficacy, measures one's confidence or belief that a behavior can be performed successfully (Bandura, 1977). We propose that measuring student confidence can serve as an important means to evaluate changes in student perceptions of ability in regards to specified IPEC sub-competencies.

Literature Review

Interprofessional practice (IPP) has been put forth as one promising solution to improving quality of care and health outcomes (Center for the Advancement of Interprofessional Education [CAIPE], 2011). Interprofessional education is considered to be a primary means to facilitate IPP through the development of respect, positivity, effective communication and teamwork among pre-professionals (CAIPE, 2011).

While self-report measures of IPE effectiveness are plentiful in the areas of attitudes, perceptions and beliefs (Fike et al., 2013; Heinemann, Schmitt, Farrell, & Brallier, 1999; Leucht, Madsen, Taugher & Petterson,

1990; Lindqvist, Duncan, Shepstone, Watts, & Pearce, 2005; Parsell & Bligh, 1999), only recently has confidence been studied in the context of IPE and IPP. These studies include a single-item confidence measure to gauge behavior change following IPE (Evans, Mazmanian, Dow, Lockeman, & Yanchick, 2014) and confidence as a qualitatively reported learning outcome (Eccott et al., 2012). Hagemeyer, Hess, Hagen, and So-rah (2014) developed multiple items to measure student beliefs about, and perceived ability and confidence in, patient and healthcare team interactions and compared pre-post scores across medicine, nursing and pharmacy using a quasi-experimental design. Others have developed a multi-item scale to measure self-efficacy in interprofessional learning among pre-licensure health professional students, measured as confidence (Mann et al., 2012). In presenting their measure, the authors note the opportunity to use it to study change as a result of IPE interventions in general with the implication that these applications would employ an experimental or quasi-experimental design. In contrast, we chose to develop a measure designed to examine change in self-efficacy relevant to a particular IPE and employed a study design unique to IPE.

The retrospective pre-post (RPP) design was used which is especially well-suited for self-report of perceived change (Howard, Schmeck & Bray, 1979; Nakonezny & Rodgers, 2005). We report here our approach to, and results of, a study measuring change in students' perceived confidence in interprofessional collaboration resulting from participation in an introductory IPE. A tailor-made approach was taken with participants responding to statements adapted from IPEC sub-competencies relevant to the specific introductory IPE assignment they completed together.

Interprofessional Education Assignment

The IPE assignment was embedded in select courses at a single university over two consecutive years. An embedded approach was used to accommodate logistical needs and to facilitate broader discipline involvement. This approach also provides the opportunity to ground the educational content in each student's discipline while still providing the integration of the other disciplines. In Year 1, the assignment was completed among teams of students in nursing, pharmacy, speech, language and hearing science, and social work. In Year

2, a Dietetics course was included in lieu of the Social Work course due to logistical issues. Nursing and pharmacy were first-year students in their respective programs (Bachelors in Nursing and Doctor of Pharmacy). Speech, language and hearing science, and dietetics students were seniors in a pre-professional program and social work students were a mix of both undergraduate and graduate students.

The assignment was based on problem- and case-based teaching strategies that are well suited for IPE due to the inherent interaction among learners. The instructor-designed case involves a Native American college student who has diabetes and experiences a cerebral vascular accident. This assignment design is also consistent with Petri's (2010) concept analysis whereby interprofessional collaboration is described as an interpersonal and problem-focused process. The assignment integrated a cultural component that served as a shared curricular concept across courses and as context from which to build the IPE experience. Cultural competency has been proposed to serve as a strategic IPE context (Hamilton, 2011). Commonalities between cultural competency and IPE learning outcomes, such as those related to effective communication, and increased trust and respect for differences are pertinent (Hamilton, 2011).

The embedded assignment addressed the IPE competencies of Roles and Responsibilities, Values and Ethics for Interprofessional Practice, Interprofessional Communication, and Teams and Teamwork (Interprofessional Education Collaborative, 2016). Student learning outcomes for the assignment were: 1) communicate one's roles and responsibilities clearly to other professionals; 2) evaluate personal assumptions/beliefs regarding unique contributions of each discipline; 3) critically reflect upon your knowledge of the unique contributions of the different disciplines and how individual accountability can be maintained while working interdependently; and 4) apply principles of successful teamwork to an IPE experience (Year 2 only).

Because the assignment was students' first exposure to IPE, it was considered an introductory experience. Within their own discipline's course and prior to the IPE, students received IPP and IPE content regarding discipline-specific roles and responsibilities. Assignment components considered essential for success

included the face-to-face interactions, group processing, individual and team accountability (D'Eon, 2005), critical reflection (Halm, Evans, Wittenberg, & Wilgus, 2012; Mezirow, 2000) and dialogue (Mezirow, 2000). Students were assigned to interprofessional teams and were expected to arrange face-to-face meetings outside of class, providing a level of interpersonal and logistical challenge. Because there were more pharmacy and nursing students, most of these students were placed on teams with one other student from their own course (and profession). Otherwise, students were unlikely to be acquainted with the other members of their assigned team. Student teams were charged with developing a patient-centered and culturally sensitive plan-of-care that incorporated pertinent roles and responsibilities from each discipline represented, another potentially challenging endeavor.

The assignment was comprised of three parts: (1) An individual pre-meeting assignment, (2) an assignment for completion within the team, and (3) an individual written assignment. The individual pre-meeting assignment entailed the development of a discipline-specific plan-of-care.

The team meeting assignment included identifying team members to fulfill specific roles necessary for successful completion of the project, e.g. leader/facilitator, note-taker, timekeeper, and taskmaster. Rules regarding participation and decision-making were developed within student teams (Year 2 only). Students shared their discipline-specific roles and responsibilities and pre-prepared plan of care with their teams. Subsequent team discussion topics included culturally sensitive approaches to care, unique contributions of each discipline, identification of other disciplines with which the team would like to consult if it was possible, and how individual accountability can be maintained while working interdependently. Additional discussion points for Year 2 only were the development of team patient/family-centered goals and the identification of overlapping roles among disciplines and possible implications for such overlap. Team integration of the plan of care into one document was completed.

The last assignment component was an individually written two-part assignment submitted for a grade. Part 1 (team accountability) entailed the written plan-of-care developed collaboratively by the team. Part

2 (individual accountability) entailed guided critical self-reflection questions. These questions focused on challenges encountered with the team process and how they were resolved and changes in assumptions. Consistent with the Year 2 student learning outcome of applying principles of successful teamwork, individual reflections on the team process were required which included a description of team rules developed to address fair and/or equitable participation and decision-making, specific contributions of each team member and how each team member demonstrated fair and/or equitable participation (or not). Critical self-reflection of personal changes compared pre and post assumptions regarding the unique contributions of each discipline. Each student then selected one of these disciplines and explained how their experience prior to this IPE assignment shaped their assumptions. Students also reflected upon how their new knowledge about unique contributions of each discipline would impact their professional practice and why it mattered personally to them.

Methods

Study Design

The study was determined to be exempt by the university Institutional Review Board. A retrospective pre-post (RPP) design (without control) first proposed by Campbell and Stanley (1963) was used to assess change in student confidence. While using a traditional pre-post design with control is necessary to examine the impact of IPE on the end outcomes of collaborative practice and patient care (Institute of Medicine [IOM], 2015), RPP offers a valid method to study self-reported change (Klatt & Taylor-Powell, 2005; Nakonezny & Rodgers, 2005). Indeed, it is used in program evaluation (Klatt & Taylor-Powell, 2005) and professional development evaluation (Allen & Nimon, 2007). RPP reduces response shift bias that can threaten traditional pre-post validity (Howard, Schmeck & Bray, 1979) by controlling for the change in one's frame of reference. To limit recall bias, within two weeks of completion of the IPE assignment, students reported their current confidence level (Post) and their confidence level prior (Pre) to their participation in the IPE assignment. A questionnaire was self-administered as a paper copy in class with the exception of the social work students whose course was online only. For those students, the questionnaire was exchanged electronically.

Sampling Frame and Data Collection

Data were collected from two different cohorts of students in the two consecutive years in which the IPE assignment was completed. The sampling frame included all students enrolled in the participating courses in nursing, pharmacy, social work, dietetics and speech, language and hearing science during two sequential spring semesters at a single university. Chosen based on availability of faculty and relevant course content, students varied in their years of education, ranging from juniors to seniors. Study participation was voluntary and de-identified data were analyzed only for those students who provided written consent. To each questionnaire, a numeric code was assigned indicating student gender, profession represented by the course, and a random number to allow for de-identified use of data per consent.

Questionnaire Development

To develop the questionnaire, we began with the IPE core competencies to ensure the assessment was relevant to the assignment (Interprofessional Education Collaborative, 2016). Sixteen statements were developed to represent sub-competency statements from all four topical areas of the Interprofessional Collaboration Competency Domain and from the assignment student learning outcomes, lending content validity. With our examination of confidence, we targeted the dimension of self-efficacy beliefs referred to as strength. This is the individual's confidence in performing the behavior (Conner & Norman, 1998). Sub-competencies that were multi-barreled were split. For example, the Roles and Responsibilities sub-competency statement, "Explain the roles and responsibilities of other care providers and how the team works together to provide care" was split into: "Explain the roles and responsibilities of other professionals" and "Explain how the team works together to provide care." Wording was changed to reflect the second person ("one's" became "your"). In some cases, only portions of the competency statements were used. For example, the Teams/Teamwork competency statement: "Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care" was focused to say: "Share accountability with other professions for outcomes relevant to health care." Last, one statement included in the evaluation instrument was interpreted from a Teams and Teamwork sub-competency

to capture students' confidence to "convince others of the value of working in interprofessional teams."

A 10-point rating scale was used with endpoints labeled (1=Not at all confident, 10=Fully confident). Using the 1-10 unipolar ratings scale provided opportunity for more variance in responses than a 5-point Likert scale and omitted a mid-point. It also provided a greater potential for detecting change (Wittink & Bayer, 2003). Questionnaire format permitted students to indicate their *Pre* and *Post* confidence ratings for each sub-competency statement on the same page, adjacent to each other. This allowed students to show if, and in what areas, they believe they experienced changes in their confidence.

Data Analysis

All statistical analysis was completed using via SPSS^R. Frequencies were used to first examine the data, to clean the data set, and then to describe the sample. One respondent left the entire survey blank, providing only qualitative feedback used for assignment improvement. Three different respondents scored three separate sub-competencies (one *Pre* and two *Post*) as "0" on the 1-10 scale and two students left blank responses to the *Pre* and *Post* sub-competency that reads, "Constructively manage disagreements among healthcare professionals." These were omitted from the analysis.

RPP is designed to capture respondents' *Pre* and *Post* scores and therefore, a paired sample t-test was used to compare these scores. Analysis of variance was used to examine if there were differences across disciplines, and the independent samples t-test was used to compare mean difference scores for the sub-competencies across disciplines and across the two years. Whereas students have reported gains in confidence from other IPE experiences (Eccott et al., 2012), it is possible confidence could decrease as a result of IPE as students realize collaboration with peers from other disciplines is more difficult than once thought. Changes in confidence between the two years of students were compared due to the notable differences in the IPE experience across the two years. All t-tests were completed as two-tailed.

Post-IPE Qualitative Evaluation

Evaluative qualitative comments from student participants were gathered on the same questionnaire as the

16 sub-competencies to inform IPE assignment revision. The two questions used were: “Comment on what went well with this interprofessional assignment” and “Please offer suggestions on how to improve the interprofessional assignment.”

Results

The response rates were 77.7% (108/139) and 85.0% (96/113) for Years 1 and 2, respectively (with one in Year 2 left completely blank and unusable). Thus, the total useable response rate was 80.6% (203/252). (Table 1) Females represented 83.7% (170/203) of the students providing useable responses.

Table 1. Study Response Rates as a Percentage by Discipline (Frequencies in Parentheses)

	Year 1	Year 2
Nursing	100 (42/44)	91.2 (31/34)
Pharmacy	91.1 (41/45)	79.2 (42/53)
Speech, Language & Hearing Science	80.8 (21/26)	85.7 (18/21)
Social Work	16.7 (4/24)	n/a
Dietetics	n/a	100 (5/5)
Total	77.7 (108/139)	85.0 (96/113)

Descriptive statistics for the sixteen sub-competencies using the 10-point scale are summarized here. (Table 2) Pre scores ranged from 1 to 10 for all but two sub-competencies with means ranging from 5.05 to 7.46 (SD ranging from 1.73 to 2.14). Post scores had only three sub-competencies using the full possible range of 1 to 10 with means ranging from 7.41 to 8.64 (SD ranging from 1.37 to 1.66). The change in confidence students reported ranged per sub-competency from -5 (decrease) to 9 (increase). Looking at percentages of responses showing a change in confidence (Post minus Pre), 0 to 6% of students indicated a decrease in confidence while 38.9% - 82.3% of students indicated an increase in confidence. The sub-competencies with the largest percentage of students noting an increase in confidence were, “Explain the roles and responsibilities of other professionals” and “Use the unique and complementary abilities of other members of the team to optimize patient care.” The only sub-competency where there were no students reporting a decrease in confidence was, “Explain how the team works together to provide care”; all others show a small number of students reporting a decrease in confidence.

The sub-competencies with the greatest change in mean scores reported (Post minus Pre) were those that read: “Explain the roles and responsibilities of other professionals” (2.46 mean increase) and “Explain how the team works together to provide care” (1.98 mean increase). The former sub-competency regarding roles

and responsibilities also had the largest range of change scores (-5 to 8) and the most variance in responses with Pre ratings. Those with the least change reported read: “Encourage ideas and opinions of other team members” (0.81 mean increase) and “Build positive interprofessional working relationships” (1.01 mean increase).

Comparisons were made across disciplines involved in the IPE Assignment. (Table 3) Looking across the three disciplines with adequate representation for the analysis (nursing; pharmacy; and speech, language, and hearing science), results reveal significant differences in mean change in confidence. Social work and dietetics were excluded due to their much smaller sample sizes. Differences were found for nine of the sixteen sub-competencies used to measure confidence in these behaviors (F omnibus significant at $p < .05$, $p < .01$).

Because of modifications in the IPE assignment made from Year 1 to Year 2, mean changes in confidence were examined across the two years. Students in Year 1 reported, on average, larger increases in confidence compared to their Year 2 counterparts. This was statistically significant ($p < .05$) for nine of the sixteen sub-competencies. (Table 4) Although looking across disciplines and years also resulted in nine sub-competencies showing statistically significant differences in change in confidence, these were mostly mutually exclusive lists with only three sub-competencies overlapping (“Convince others of the value of working in interprofession-

Table 2. Descriptive Statistics of Items Measuring Confidence for Interprofessional Collaboration Behaviors

Note: Rating scale offered numbers 1-10 with anchors labeled as “Not at all confident” (1) and “Fully confident”

	Pre Mean (SD)	Post Mean (SD)	Mean Change in Confidence Scores (Post- Pre)	Range of Change in Confidence Scores	% Reporting Decrease in Confidence (n)	% Reporting Increase in Confidence (n)
Values/Ethics for Interprofessional Practice						
Respect the unique perspectives (values, beliefs) of other health professions	7.45 (2.07)	8.64 (1.38)	1.19	-1 - 7	1.5% (3)	51.7% (105)
Roles/Responsibilities						
Explain the roles and responsibilities of other professionals	5.05 (2.14)	7.53 (1.36)	2.46	-5 - 8	2.0% (4)	82.3% (167)
Explain how the team works together to provide care	6.02 (1.99)	8.01 (1.24)	1.98	0 - 8	0 (0%)	55.2% (112)
Forge interdependent relationships with other professions to improve care and advance learning	6.21 (2.04)	7.76 (1.47)	1.55	-3 - 8	4.4% (9)	63.0% (128)
Use the unique and complementary abilities of your profession to optimize patient care	6.38 (1.87)	7.78 (1.41)	1.40	-3 - 7	1.0% (2)	62.1% (126)
Use the unique and complementary abilities of other members of the team to optimize patient care	5.98 (2.00)	7.84 (1.43)	1.86	-2 - 8	2.0% (4)	72.0% (146)
Communicate your roles and responsibilities clearly to other professionals	6.58 (1.73)	8.05 (1.34)	1.46	-4 - 6	2.5% (5)	67.0% (136)
Communicate with team members to clarify each member’s responsibility in executing components of a treatment plan	6.48 (2.07)	7.98 (1.51)	1.50	-3 - 8	3.4% (7)	62.1% (126)
Engage diverse healthcare professionals who complement your own professional expertise to meet specific patient care needs	5.82 (2.01)	7.67 (1.52)	1.85	-3 - 8	3.0% (6)	69.3% (140)
Interprofessional Collaboration						
Build positive interprofessional working relationships	7.46 (1.85)	8.47 (1.37)	1.01	-3 - 8	6% (12)	48.8% (99)
Choose effective communication tools (e.g., technologies) to facilitate discussions and interactions that enhance team function	6.80 (2.05)	7.86 (1.57)	1.06	-3 - 8	3.4% (7)	48.3% (98)
Communicate information with healthcare team members in a form that is understandable, avoiding discipline-specific terminology when possible	6.58 (2.09)	7.89 (1.46)	1.31	-2 - 9	1.5% (3)	57.5% (115)
Encourage ideas and opinions of other team members	7.41 (1.93)	8.22 (1.49)	0.81	-3 - 7	3.0% (6)	38.9% (79)
Teams and Teamwork						
Convince others of the value of working in interprofessional teams	6.44 (1.90)	8.05 (1.54)	1.61	-4 - 9	3.0% (6)	65.5% (133)
Constructively manage disagreements among healthcare professionals	6.14 (2.12)	7.41 (1.67)	1.27	-3 - 7	2.0% (4)	56.2% (113)
Share accountability with other professions for outcomes relevant to health care	6.42 (2.11)	7.61 (1.61)	1.18	-5 - 6	3.9% (8)	57.1% (116)

Table 3. Significant Differences in Mean Change in Confidence (SD) Across Disciplines(10). Years 1 and 2 combined.

Note: Social Work and Dietetics student not included due to large differences in sample sizes.

Rating scale offered numbers 1-10 with anchors labeled as Not at all confident (1) and Fully confident (10). Analysis of variance F-omnibus test. Years 1 and 2 combined.* $p < .05$; ** $p < .01$

	Nursing	Pharmacy	Speech, Language, Hearing Science
Explain the roles and responsibilities of other professionals*	2.01 (1.89)	2.39 (1.90)	3.16 (1.75)
Explain how the team works together to provide care*	1.42 (1.62)	2.01 (1.73)	2.64 (1.72)
Forge interdependent relationships with other professions to improve care and advance learning*	1.18 (1.90)	1.39 (1.73)	2.28 (2.04)
Use the unique and complementary abilities of your profession to optimize patient care*	1.10 (1.57)	1.60 (1.44)	1.92 (1.55)
Use the unique and complementary abilities of other members of the team to optimize patient care*	1.42 (1.65)	1.74 (1.75)	2.46 (1.70)
Communicate with team members to clarify each member's responsibility in executing components of a treatment plan*	1.06 (1.67)	1.44 (1.94)	2.03 (1.69)
Engage diverse healthcare professionals who complement your own professional expertise to meet specific patient care needs**	1.30 (2.00)	1.24 (1.70)	2.69 (2.10)
Convince others of the value of working in interprofessional teams*	1.19 (1.73)	1.49 (1.69)	2.13 (1.98)
Choose effective communication tools (e.g., technologies) to facilitate discussions and interactions that enhance team function*	0.93 (1.57)	0.78 (1.33)	1.59 (2.05)

Table 4. Significant Differences in Mean Change in Confidence (SD) Across Years

Note: Rating scale offered numbers 1-10 with anchors labeled as Not at all confident (1) and Fully confident (10).

Independent Student *t*-test.

* $p < .05$; ** $p < .01$

	Year 1	Year 2
Respect the unique perspectives (values, beliefs) of other health professions**	1.51 (1.84)	0.82 (1.31)
Use the unique and complementary abilities of other members of the team to optimize patient care**	2.27 (1.79)	1.4 (1.64)
Build positive interprofessional working relationships**	1.32 (1.98)	0.65 (1.45)
Convince others of the value of working in interprofessional teams**	1.96 (1.96)	1.21 (1.74)
Constructively manage disagreements among healthcare professionals**	1.57 (1.75)	0.94 (1.40)
Share accountability with other professions for outcomes relevant to health care*	1.41 (1.67)	0.93 (1.64)
Choose effective communication tools (e.g., technologies) to facilitate discussions and interactions that enhance team function*	1.33 (1.79)	0.75 (1.43)
Engage diverse healthcare professionals who complement your own professional expertise to meet specific patient care needs*	2.17 (1.84)	1.48 (1.98)
Encourage ideas and opinions of other team members.*	1.06 (1.61)	0.53 (1.23)

al teams,” “Use the unique and complementary abilities of other members of the team to optimize patient care,” and “Choose effective communication tools (e.g., technologies) to facilitate discussions and interactions that enhance team function”).

Qualitative written comments from Year 1 students were examined to inform revision of the IPE for Year 2. Themes identified regarding what students believed went well with the assignment were: gaining knowledge about what other disciplines do and how they will work together in the future, appreciating good group dynamics (including meeting face-to-face and communicating well) that promoted idea generation and use of individuals’ contributions, and appreciating being able to meet new people. One student wrote, “I learned about what other professions can contribute and I think I will really be able to use this in my career,” capturing an example of knowledge gained. Another student noted, “I liked how my group was able to take all our ideas from our different disciplines and combine them in a comprehensive care plan that was best for the patient.” Other comments affirmed the individual and team portions of the assignments, with one student noting, “I think having a team portion as well as an individual portion of the assignment was helpful so the professors could see how well the team collaborated as well as how you think as an individual.”

Several themes were identified from the student suggestions for improvement. Many suggestions were logistical in nature including students wanting faculty to pre-arrange the face-to-face meeting times, allocate more in-class work time, and lengthen the timeframe for the assignment. Other suggestions were to provide an example of a completed patient plan of care and to include medical students in the IPE. Two types of complaints were shared as well. These related to perceptions that some students were not prepared for the face-to-face meetings or capable of speaking to what their discipline could offer toward the case. Another type of complaint was students’ perceptions that faculty were not consistent with expectations, exemplified by a student noting, “It seemed they [faculty] were not on the same page.”

Discussion

We examined student confidence for interprofessional collaborative practice sub-competencies within the context of an introductory, yet potentially challenging, IPE Assignment. While not true for all, for most sub-competencies an increase in confidence was reported by a majority of students, a finding similar to the only other multi-item study examining change in confidence

in IPE-related behaviors (Hagemeier, et al., 2014). That study involved a course on interprofessional communication rather than a single embedded assignment, but like our study, these colleagues developed items based on their course learning objectives and the IPEC competencies. Hagemeier and colleagues (2014) measured change using a quasi-experimental design and a Likert-type agreement scale in contrast to the RPP design and 10-point unipolar rating scale of the present study. The latter approach provided opportunity for student participants to intentionally indicate the perceived change (or lack of change) in confidence they experienced as a result of the IPE. It cannot be concluded as to how much IPE must be experienced to change student confidence, or whether or not the RPP design approach is better suited to measure this construct. Participants in the previous study were first or second year students and thus, results may have been influenced by response shift bias, something RPP helps to avoid. Future applications and comparisons will help to explore this further.

Similar to the present study, two other IPE studies had Bandura's concept of self-efficacy as a theoretical framework to establish (Mann et al., 2012) and test (Williams, Beovich, Ross, Wright & Ilic, 2017) a multi-item scale, but the scale does not yet appear to have been used to examine change with either a pre-post or RPP design. Scale development by Mann and colleagues (2012) was done by drawing upon the literature and experts in the field, rather than relying on IPEC Competencies, having chosen them to represent IP practice-related attainments more broadly. A recent cross-sectional study used this new scale to compare self-efficacy across undergraduates in public health, social work and paramedic practice, and no differences were found across discipline (Williams et al., 2017). In contrast, our findings reveal differences when we looked at change; perceived changes in confidence were found across disciplines after a specific IPE Assignment. Also, disciplines included in each study comparison were different and the other study's participant involvement in IPE varied enough to be deemed unquantifiable by the authors (Williams et al., 2017).

Differences noted across disciplines in the present study may be due to a number of variables. Students were in different years in their programs and one discipline was completing their pre-professional degree rather than a

professional degree. In addition, the IPE assignment was embedded in these discipline-specific courses, which in spite of assignment requirement standardization each year, students could have been prepared differently through other non-IPE course content.

The IPEC sub-competencies most impacted by the IPE assignment appear to be students' confidence to "explain the roles and responsibilities of other professionals" and "explain how the team works together to provide care." This is a significant area to impact early in a program of study when one considers that not being aware of other professionals' roles and competencies is viewed by professionals as a major barrier to interprofessional collaboration (Supper et al., 2014). This finding is consistent with two of the four learning objectives of the IPE assignment. Students were required to interact with those from other disciplines to not only develop a plan of care in response to a patient case, but to discuss their discipline-specific roles and to critically reflect on new knowledge gained about those roles.

Based on IPE Faculty Team observations and student feedback after Year 1, the Year 2 IPE assignment was modestly revised. The changes were intended to help student teams prevent or minimize interpersonal conflict. These changes included adding a teamwork-based student-learning outcome that prompted the addition of guidance regarding working in teams to assignment content and required team ground rule discussion and reflection. Student feedback also prompted the faculty to intentionally self-identify as an IPE Faculty Team. Faculty role modeled teamwork by increasing the visibility of each faculty member within all of the courses and increasing faculty debriefings throughout the assignment period to ensure fidelity to the assignment instructions. Other changes included the extension of the length of time for completing the assignment and providing students more advance notice to reach out to their teammates.

Because of the IPE assignment changes, confidence ratings were compared across the two years to examine whether these changes may have impacted the students' experience enough to impact confidence. While attempting to "improve" the assignment from Year 1 to Year 2, less gain in confidence was subsequently reported. Looking at mean change in confidence scores, students in Year 1 reported a greater increase in confi-

dence for every IPEC sub-competency when compared to students in Year 2. Is it possible that by attempting to reduce interpersonal conflict within teams, students had less opportunity to overcome adversity, which would have provided gains in self-efficacy through mastery experiences as described by Bandura (1986)? Can these real world challenges help to build needed confidence to work interprofessionally? Or could it be that reflecting on team ground rules and their impact on teamwork provided enough insight that students realized more complexities of successful interprofessional collaboration?

Implications

Study implications are: (1) those related to measuring confidence and the use of the RPP design and (2) the educational context of student confidence. From a measurement standpoint, results reveal near full use of the rating scale and more variance for Pre ratings with smaller variance and modest ceiling effects for Post ratings. This finding is consistent with extensive study of young adults being very confident in their social interactions (Twenge, 2006) and other research into student confidence in the context of IPE (Hagemeyer et al., 2014). Is this level of confidence based in reality? While a few students indicated a net loss in confidence (Post compared to Pre), by far the majority indicated a net gain in confidence with their ratings. Is it simply the difference between the perceived Pre and Post that matters? Could it be that this self-report of improved confidence reveals an optimism about their future participation in interprofessional practice or does it simply reveal a naiveté about the complexities of team problem-solving and collaboration in healthcare? As Bandura has argued, “tenacious self-efficacy” is required to believe in one’s ability to influence others in the face of opposition for the purpose of innovation (Bandura, 1995, p. 13). Hence, those students who indicated their confidence for interprofessional practice greatly increased may be more likely to initiate and persevere to master the behaviors in question. Greater insight is needed regarding current health professional students’ confidence and its impact on learning designed to foster innovation in interprofessional practice.

We used a design (RPP) that is novel to interprofessional education evaluation, with only a few others using it

(Archibald, Trumpower, & MacDonald, 2014; Schmitz et al., 2017). Comparing to previous examinations of IPE-related self-efficacy or confidence, our study appears to be the first to use RPP to examine confidence in interprofessional practice competencies or behaviors. Use of the RPP design avoids needing to ask students about their confidence at a time when they are less informed about what to anticipate, thus avoiding response-shift bias (Howard et al., 1979).

The RPP design offers certain advantages for students and instructors. It provides students the opportunity to explicitly reveal areas where they believe change has occurred or not occurred and offers the opportunity for meaningful learning through self-reflection of personal growth. Instructors can use RPP as a formative assessment to monitor changes in student confidence. This could be used to adjust instructional content and promote congruence in light of observed skills and behaviors. In addition, due to the unique contributions of qualitative data, we propose that future use of the confidence measure include an invitation to students to provide explanation as to why they scored sub-competencies for Pre and Post confidence the way they did. This critical self-reflection has the potential to provide insight into what has contributed to perceived change (or lack thereof) in confidence. Using the RPP approach among students longitudinally, at key stages of their education and training (e.g., first clinical experience), can provide opportunity for use as a formative assessment and provide useful insights regarding the development of confidence.

Beyond measurement and study design, we argue for the need to further examine student confidence and its relevance to IPE assignment design and formative assessment. Capitalizing on students’ potential overconfidence while exposing students to the realities and challenges of interprofessional practice may be accomplished through case studies that focus on conflict management, professional interaction, and leadership rather than direct patient care. Team-related issues of power struggle and lack of clarity of responsibilities are foci for consideration. Our findings that show a greater increase in confidence in Year 1 compared to Year 2 may support providing students with real-world (rather than case-based) collaboration complexities during their IPE experiences. Barriers to true collaboration are likely to be experienced when they enter the health-

care system as professionals needing to collaborate to provide optimal patient care. These barriers may be due to organizational hierarchies and the “silo culture” of some practices that are more difficult to emulate outside of case studies, but also include attitudinal issues and interpersonal conflicts that can occur within all teams. Contrary to our intent, our attempts to aid the teamwork experience in Year 2 may have provided less opportunity to build confidence by needing to overcome fewer or less difficult adversities.

Limitations

Although there are advantages to using the methodological approaches already highlighted under methods, limitations exist. These include a potential for recall bias that can be present with retrospective as well as prospective designs (Hassan, 2005), but also social desirability (Klatt & Taylor-Powell, 2005). In addition, RPP may be seen as less rigorous since pretest and posttest data are collected at the same time, and there is no control group. Sub-competencies were drawn from the Core Competencies for Interprofessional Collaborative Practice (Interprofessional Education Collaborative, 2016) and were chosen specifically due to relevance to the IPE assignment student learning outcomes, supporting construct validity and yet they were not tested prior to use in this study. A 10-point scale was used to provide greater variance as we examined differences in scores, consistent with previous work (Mann et al., 2012). However, also like previous research that asks health science students to rate confidence (Mann et al., 2012), mean scores were somewhat high, suggesting possible ceiling effects for some participants. Measurement error may have been introduced if any students interpreted the 1-10 scale to represent a grade going up to 100%, resulting in fewer participants using the full scale and instead focusing on (passing grade) numbers beginning at 7 or 8. Last, findings from our study are limited to the sampling frame of enrolled students from the disciplines included and the IPE assignment at a single university. Inclusion of students from other disciplines, such as medicine, may offer a change in team dynamics that could be valuable.

Future Research

The “strength” dimension of self-efficacy, i.e. confidence (Bandura, 1977; Conner & Norman, 1998), was examined in this study. Future research could explicitly examine the “magnitude” or difficulty level of IPEC sub-competencies. Efficacy expectations lie not only on a performance continuum from easy to extremely difficult (Bandura, 1977), but may also be influenced by the level or experience of the student or practitioner. In addition, the “generalities” dimension (Bandura, 1977) could be studied to examine how students can envision taking skills from certain contexts, e.g. group/team assignments, and applying them to others, i.e. interprofessional practice.

Conclusion

An approach novel to IPE evaluation was used to examine student change in confidence for interprofessional collaborative competencies surrounding an introductory team-based and case-based IPE assignment. A retrospective pre-post design is a useful alternative to the more common quasi-experimental design when measuring change in confidence, as it prompts students to reflect on perceived change and avoids response shift bias. Differences in the amount of change in confidence were found among the three most represented disciplines and between Years 1 and 2 with only a small number of students reporting decreases in confidence. IPE instructors can obtain helpful information regarding learning outcomes and assignment design by examining differences in change in confidence across various interprofessional collaboration behaviors. Taking this approach, students are offered opportunities to explicitly reveal areas where they believe change has occurred or not occurred and to experience meaningful learning through self-reflection of personal growth.

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