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ORIGINAL ARTICLE



## Examining collaborative leadership through interprofessional education: findings from a mixed methods study

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### ABSTRACT

Collaborative leadership is essential as recent trends in healthcare service delivery necessitate interprofessional collaboration and care. Interprofessional education (IPE) efforts, therefore, have to prepare students for this type of leadership. The purpose of this study was to understand how students' perceptions of leadership change as a result of embedding a collaborative leadership model, the Social Change Model (SCM) of leadership, in an IPE course. Data were collected from 30 students participating in an interprofessional course through two interprofessional course reflections, pre/post leadership posters and poster reflections, and a pre/post survey. Results from paired sample t-tests suggested students significantly improved in their perceptions of leadership efficacy. These data also indicated improvements to the three group-level values of the SCM: collaboration, common purpose, and controversy with civility. Findings from the qualitative data suggest that students learned to view leadership as more of a team effort than the actions of a single individual and as more of a process than a role. Findings also revealed the benefits and challenges of using a visual process of poster development as a way of examining students' changes in perceptions of leadership over the course of the semester. Implications are discussed in relationship to the utility of the SCM in promoting students' shifts in conceptualizations of leadership that emphasizes collaboration and helps prepare students to engage in these ways within interprofessional teams in their practice.

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### Introduction

Leadership is essential for interprofessional collaboration and care (Brewer, Flavell, Trede, & Smith, 2016; Reeves, Macmillan, & van Soeren, 2010). Recent trends in healthcare service delivery have necessitated a shift from more traditional models of leadership, where leadership is viewed as a position obtained by one person (Brewer et al., 2016; Yammarino, Salas, Serban, Shirreffs, & Shuffler, 2012), toward more collaborative models of leadership (e.g., shared leadership, collective leadership; Brewer et al., 2016; Yammarino et al., 2012). Shared leadership has been defined as leadership that emerges from the “distribution of leadership influence across multiple team members” (Carson, Tesluk, & Marrone, 2007, p. 1218). Similarly, collective leadership has been described as a process whereby individuals share leadership roles based on the unique circumstances of the collaborative team (Friedrich, Vessey, Schuelke, Ruark, & Mumford, 2009). In these more collaborative models of leadership, leadership is “viewed as a ‘we’ or collectivistic phenomena that involves multiple individuals assuming (and perhaps divesting themselves) of leadership roles over time in both formal and informal relationships” (Yammarino et al., 2012, p. 382). This evolution of leadership from a position to a shared process is in response not only to the increased accountability interprofessional teams have for patient outcomes, but also in response

to the multifaceted and co-occurring needs of patients (Reeves et al., 2010) as well as the growing complexity in decision-making regarding how best to address these needs (Yammarino et al., 2012).

Recently, Brewer et al. (2016) conducted a scoping review to understand how leadership has been conceptualized within the context of interprofessional education and care. This review documented a trend toward more collaborative models of leadership, characterized by a focus on interpersonal relationships and the notion that all individuals within interprofessional teams can serve as leaders at different times and in different ways. For example, perhaps an interprofessional team consisting of a doctor, pharmacist, and social worker is working to support a child and their family with complex health needs. At times, the doctor may need to lead the team in decision-making related to urgent healthcare needs of the child. At other times, though, the pharmacist may need to take on more leadership related to educating the team and the family about medication management. And yet, at other times, the social worker may need to take on more leadership in helping the team understand different social factors that may also be impacting the client's health and impacting the family's ability to follow through on their child's care plan. This notion of different members of an interprofessional team serving as leaders at different stages of care fits well with the

underlying values and principles of interprofessional education and practice (Brewer et al., 2016).

Like other competencies needed for interprofessional practice, learning about collaborative leadership through interprofessional education (IPE) experiences is critical. Collaborative leadership is one of the six competency domains promoted through the Canadian Interprofessional Health Collaborative (Canadian Interprofessional Health Collaborative [CIHC], 2010) framework. It also is one of the sub-competencies within the Interprofessional Education Collaborative (Interprofessional Education Collaborative [IPEC], 2016) teamwork core competency. Leadership development within IPE also is the central topic of a recent book (e.g., Forman, Jones, & Thistlewaite, 2014), and there have been numerous studies conducted that examine leadership within the context of interprofessional care (e.g., Forsyth & Mason, 2017; Garber, Madigan, Click, & Fitzpatrick, 2009; Willumsen, 2006). A recent review paper also identified leadership as an important mechanism for how interprofessional teams influence client outcomes and service experiences (Sims, Hewitt, & Harris, 2015). There also are descriptive accounts of how leadership experiences have been incorporated in coursework (e.g., Neill, Hayward, & Peterson, 2009; Nurius, Coffey, Fong, Korr, & McRoy, 2017; Pecukonis et al., 2013) and faculty fellowship programs (e.g., Robins, Murphy, & Zierler, 2016), as well as articles that focus on the importance of student leadership in IPE (e.g., Hoffman, Rosenfield, Gilbert, & Oandasan, 2008).

Despite this, collaborative leadership is not easy to actualize in practice (Reeves et al., 2010). Complex patient needs, different roles and responsibilities among a variety of care providers, along with historical tensions stemming from timing of professional socialization and the “professional hierarchy within healthcare,” all impact leadership within interprofessional teams (Reeves et al., 2010; Sims et al., 2015, p. 212). As such, calls continue for more research on leadership within the context of IPE and interprofessional care (Brewer et al., 2016; Reeves et al., 2010), and specifically research on how best to promote collaborative leadership through IPE. This study aimed to address this gap in the research. In particular, we were interested in answering the research question: How do students’ perceptions of leadership change as a result of embedding a collaborative leadership model, the social change model (SCM) of leadership, in an IPE course?

### **Social change model of leadership**

The SCM is a values-based collaborative leadership model (Komives & Wagner, 2009). More specifically, the SCM is grounded in seven core values organized into individual, group, and community domains. The three individual values are commitment, consciousness of self, and congruence. These values refer to dedication toward collective effort and action, being reflective of oneself and what drives one’s behavior, and acting in a manner by which one’s beliefs and actions align, respectively. The three group values include collaboration, common purpose, and controversy with civility. Collaboration focuses on working with individuals in a way that maximizes individual and collective strengths. Common

purpose refers to working with others to achieve a shared and collective goal. Controversy with civility refers to the fact that conflict will happen in collaborative efforts, but that these conflicts must be handled through thoughtful dialogue. The last value, and the only community value, is citizenship. This value focuses on acting together on behalf of the community to achieve social change. The SCM also emphasizes that anyone can develop leadership capacity, and the value framework provides a useful tool for students to reflect on their strengths and areas for growth in this critical interprofessional skill (Iachini, Cross, & Freedman, 2015; Komives & Wagner, 2009; Wilson, 2012).

Studies that have utilized the SCM have mostly been conducted with undergraduate students, exploring relationships between students’ perceptions of the SCM values and variables such as spirituality, hope, self-efficacy, and engagement (Buschlen & Dvorak, 2011; Lane & Chapman, 2011; Rosch, Anderson, & Jordan, 2012; Stonecipher, 2012). The SCM also was used as a framework in a study that examined differences in observer and self-reported ratings of leadership (Rosch et al., 2012) and in another study that explored factors related to educators’ use of the model (Wilson, 2012). A more recent study qualitatively examined how the SCM was incorporated and applied within a graduate-level social work program evaluation course (Iachini et al., 2015). No study to date has examined the incorporation of the SCM into an IPE course. For this study, we were interested in how students’ perceptions of leadership changed as a result of embedding the SCM in an IPE course.

### **Background**

Students enrolled in a interprofessional service-learning elective course, Addressing Childhood Obesity through Community Approaches, at the University of South Carolina during the fall semester of 2015. The course was designed as a fourteen-week course primarily for undergraduate and graduate students in health science professions (i.e., social work, pharmacy, public health, nursing, medicine, etc.), but the course is an open elective available for any student from any program to enroll. This course has been offered since Fall 2012. During the specific semester examined for this study (e.g., Fall 2015), social work, pharmacy, public health, and a business student were enrolled in the course.

Leadership was embedded in this course through three specific mechanisms. First, there was a webinar and two classes explicitly dedicated to a discussion of the SCM (Komives & Wagner, 2009). Second, as part of their service-learning, students were organized into interprofessional teams (3–5 students per team) and implemented a four-week health promotion curriculum within an afterschool program at two elementary schools. As part of this health promotion curriculum, students taught a lesson on collaborative leadership to these elementary students. Finally, during the entire semester, students were asked to reflect on their efforts within their interprofessional teams and how collaborative leadership manifested itself as they worked together. It is important to note that the service learning part of this course overlapped with the in-class component of the course. As such, there

were four weeks where students came to class and then also went to the afterschool program on a different day to implement the curriculum.

## Methods

Our study utilized a sequential, mixed methods design with qualitative posters and reflections nested between quantitative pre- and post-tests. This allowed the research team to examine insights from multiple sources of data (Creswell, 2003).

## Sample

Thirty students took the course in Fall 2015. Of those, twenty-seven provided demographic data. Students ranged in age from 20 to 36 years old with a mean age of 22.9 years old. See Table 1 for additional demographic characteristics. Please note, since there were multiple data sources and some missing data, the sample size varies for each data collection tool. Across all measures, between 27 and 30 students provided data for this study.

## Data collection

Paper-and-pencil pre-tests were distributed during the first day of class. The post-survey, which assessed the same constructs as the pre-survey, was completed by students online during the final week of class. The survey assessed each of the seven dimensions associated with the SCM (Dugan &

Komives, 2010). Nine items assessed consciousness of self, seven items assessed congruence, six items assessed commitment, eight items assessed collaboration, nine items assessed common purpose, 11 items assessed controversy with civility, eight items assessed citizenship, and ten items assessed change. Students were asked to respond to all items on a scale from 1 = Strongly Disagree to 5 = Strongly Agree with higher scores being more desirable. This scale has been found valid and reliable in other studies with college students (Dugan & Komives, 2010; Gehrke, 2008). In addition, the survey also asked students to report on their perceptions of collaborative leadership efficacy. This scale consisted of 4 items, and asked students to respond on a 4-point scale with 1 = Not at all confident to 4 = Very confident. This scale has been found valid and reliable in another study with a sample of college students (Dugan & Komives, 2010). Table 2 provides the Cronbach's alpha for each scale.

As part of the course and course assessment, students individually completed a leadership poster and reflection at the beginning and at the end of the semester. The initial poster assignment asked students to create an interactive multimedia poster using the program Glogster that visually represented what leadership looked like to them (n = 30). Once they created this poster, students were asked to reflect and answer a series of questions in a brief written reflection to accompany their poster. The first poster reflection asked students to consider 1) When creating your leadership poster, what was your thought process? How did you decide which items to include or exclude? and 2) What skills or traits are represented [in their poster]? (n = 28). At the end of the semester, students created a second poster representing what leadership looked like to them at that point (n = 27). The second poster reflection asked students to briefly reflect on 1) How has your vision of leadership changed over the semester? and 2) What leadership skills do you think are most important for success as a leader in your profession?

Students also completed two interprofessional reflections as part of the course and course assessment. The first reflection was completed after the conclusion of the service-learning part of the course, and asked students to briefly (no more than 400 words) describe what they learned about leadership during their experience working in an interprofessional team to implement the health promotion curriculum (n = 29). The second reflection was completed at the end of the semester and asked students to briefly (no more than 400 words) reflect on a) How this interprofessional course impacted their personal growth? b) How this interprofessional course impacted

**Table 1.** Demographic characteristics of study participants (n = 27).

| Demographic Characteristics        | Percentage |
|------------------------------------|------------|
| Type of Student                    |            |
| Graduate                           | 70.4       |
| Undergraduate                      | 29.6       |
| Sex                                |            |
| Female                             | 77.8       |
| Male                               | 22.2       |
| Race                               |            |
| White                              | 40.7       |
| Black or African-American          | 33.3       |
| Asian American or Pacific Islander | 11.1       |
| Other                              | 14.8       |
| Hispanic/Latino Ethnicity          |            |
| Yes                                | 7.0        |
| No                                 | 93.0       |
| Program of Study                   |            |
| Pharmacy                           | 55.6       |
| Social Work                        | 25.9       |
| Public Health                      | 14.8       |
| Business                           | 3.7        |

**Table 2.** Paired t-test results for SCM values and leadership efficacy.

| Variable                  | Pre-test |     |                  | Post-test |     |                  | t (df)    | p (one-tailed) |
|---------------------------|----------|-----|------------------|-----------|-----|------------------|-----------|----------------|
|                           | M        | SD  | Cronbach's alpha | M         | SD  | Cronbach's alpha |           |                |
| Consciousness of Self     | 4.13     | .46 | .87              | 4.15      | .51 | .81              | .29 (24)  | .388           |
| Congruence                | 4.41     | .40 | .83              | 4.47      | .51 | .91              | .56 (25)  | .289           |
| Commitment                | 4.76     | .26 | .78              | 4.85      | .21 | .81              | 1.36 (25) | .093           |
| Collaboration             | 4.44     | .36 | .78              | 4.67      | .40 | .91              | 2.76 (25) | .006*          |
| Common Purpose            | 4.40     | .41 | .87              | 4.69      | .37 | .92              | 3.52 (25) | .001*          |
| Controversy with Civility | 3.89     | .55 | .64              | 4.06      | .37 | .58              | 2.13 (27) | .021*          |
| Citizenship               | 4.51     | .52 | .94              | 4.69      | .44 | .94              | 1.58 (25) | .064           |
| Leadership Efficacy       | 3.28     | .53 | .77              | 3.51      | .38 | .72              | 2.62 (24) | .008*          |

\*p < .05

their future professional practice? and c) How did this inter-professional course affect their views on leadership? (n = 29).

### Data analysis

Quantitative pre- and post-survey data were analyzed descriptively and using paired sample t-tests. Qualitative analyses were used to delve further into the findings of the quantitative analyses, specifically to understand how students' perceptions of leadership changed as a result of embedding the SCM into the course. Students' posters, poster reflections, and reflections about the overall interprofessional education experience were analyzed using MaxQDA software (VERBI GmbH Berlin, Germany).

A provisional first-cycle coding scheme (Saldana, 2009) was developed by the first author, with a "start-list" of the seven values of the SCM, imagery in posters, and other key concepts from the literature, such as leadership and teamwork. A graduate student not enrolled in the course assisted in coding the posters and reflections, and the second author then reviewed coding and worked with the first author to refine the coding scheme.

The second author then utilized an in vivo coding approach to identify codes (Charmaz, 2006). Focused coding (Charmaz, 2006) and further evaluation of codes among the first and second authors were used to identify the study's 'trinity' of three major codes, a pre-writing strategy suggested by Saldana (2009, p.186). These included the codes a) the poster/reflection process, b) change in understanding leadership from beginning to the end of the course, and c) students' reflections on their own leadership strengths and weaknesses. Axial coding (Charmaz, 2006) was performed by the second author to differentiate and organize sub-codes within these three major codes. In this process, we determined that only two of the three major codes were the best fit for the present manuscript given the research question guiding the study: the poster/reflection process and changes in understanding leadership from beginning to the end of the course. The third theme, students' reflections on their own leadership strengths and weaknesses, appeared more suited to considerations about future course design rather than answering the research questions presented herein. As such, the decision was made to only report on the two codes that related to the research question our team sought to answer. To promote trustworthiness and rigor throughout this process, ongoing debriefing between analysts was used to address discrepancies, clarify concepts, and refine codes based on consensus (Hill et al., 2005; Sandelowski & Barroso, 2003).

### Ethical considerations

All study procedures were approved by the Institutional Review Board at the University of South Carolina (IRB00000240). There were three data collection sources for this study, including a pre-post survey, a leadership poster and reflection, and two interprofessional reflections. Completion of the surveys was voluntary. The leadership poster and reflection, along with the two interprofessional

reflections, were assignments that students completed as part of the course and were secondary data analyzed in this study.

## Results

### Quantitative data

Table 2 provides the results of the paired t-test analyses. In relation to the three individual values of consciousness of self, congruence, and commitment, along with the community value of citizenship, there was a small improvement, albeit not significantly, from the beginning to the end of the semester. Students experienced statistically significant improvement in relation to each of the three group-level values of collaboration, common purpose, and controversy with civility. Students also reported statistically significant improvement in perceptions of leadership efficacy.

### Qualitative data

#### The poster/reflection process

As previously noted, students created posters representing what leadership looked like to them at the beginning and end of the semester. Each poster was accompanied by a reflective paper. In addition, students completed two brief reflections on their interprofessional learning experience. Here, we looked at posters and reflections (both poster reflections and interprofessional reflections) from both points in time.

The students' representations of leadership in posters took a number of forms. The most frequent inclusions were words (e.g., "commitment," "integrity"), quotes or phrases (e.g., "Together we can do great things"), and real-life people (e.g., athletes, civil rights leaders, presidents). Posters also included other imagery such as cartoon depictions of people and animals, joined hands, and videos.

The analysis of poster reflections, specifically, revealed the benefits and challenges of using this visual process of poster development as a way of examining students' changes in perceptions of leadership over the course of the semester. In terms of benefits, students' descriptions of their thought processes in developing the posters indicated that the visual aspect of this task helped bridge student understanding of the concept of leadership itself, lending clarity to the connections between concrete examples of leadership role models and the traits or characteristics those role models possessed. For example, some students commented:

At first it was difficult for me to come up with an idea of how I was going to create my poster and clearly present my idea of what leadership looks like. ...I tried to think of individuals I considered to be leaders and what traits/characteristics I felt they portrayed. I then thought of how best to present such traits/characteristics. I decided which items to include or exclude based on which seemed the most important to me. (Social Work Student, Poster Reflection 1)

I choose the three great leaders - Abraham Lincoln, Nelson Mandela, and Martin Luther King, Jr because all three leaders had to overcome obstacles to implement their vision and no matter what the distraction was they all stood up for what they believed. (Pharmacy Student, Poster Reflection 1)

The epiphany here is that it seems that leaders often become a symbol instead of just a person. This leader “image” or status is what amplifies the person’s qualities and makes good movies, but their stories always began as personal decisions and actions that brought them this status. (Student—Discipline not reported, Poster Reflection 1)

The challenge of this approach focused mainly on the struggle of how to synthesize students’ views on leadership across varied levels of abstraction. Some students, for example, used photos of exemplars and symbols, yet others used spacing and words to portray their views. As such, identifying patterns among these various artistic means could be a downside to this approach.

### *Changes in understanding leadership*

Poster reflections and reflections on the overall interprofessional education experience from the end of the semester were analyzed to examine changes in students’ perceptions of leadership over the course of the semester. Two sub-codes emerged. The first was that students learned to view leadership as more of a team effort than the actions of a single individual.

At first, [in the poster] I portrayed a leader to be someone who carried a team. From this course, I have learned that as long as each person in the group leads the group in their own way, not one designated person is responsible for carrying the whole team on their shoulders. (Pharmacy Student, Poster Reflection 2)

My vision of leadership has changed immensely over the completion of this course. My original definition of leadership was very narrow, I thought that leadership was only one person in charge of a group of people who was responsible for keeping the group on task. After completing this interprofessional course my ideas about leadership and how it is in the workplace began to change. I think that interprofessional teams are a great definition of leadership, and that is how I formatted my second Glogster poster. In my first poster I mainly just listed different skills that I thought were beneficial to leaders. In the second poster, post interprofessional course, I decided to keep the same skills but elaborate on how those skills should be used to create a team. My idea of leadership has shifted from individualistic to a more holistic approach. (Social Work Student, Poster Reflection 2)

Prior to this course, I would have defined leadership with images of individuals who have lead others to success. ...The images that I used in my final poster represent leadership to me by showing that there is no leadership without a cohesive team. (Social Work Student, Poster Reflection 2)

My vision of leadership has changed over the semester in that I don’t need a defined position to know that I am a leader. In my first Glogster, I thought I was a leader because of the leadership positions I held and how I created a legacy on campus, but with this experience I realized leadership is not about a certain position. Leadership is how you inspire, guide, and interact with others to reach a common goal. (Social Work Student, Poster Reflection 2)

The group-level concepts in the SCM played heavily in student descriptions of collaboration, teamwork, partnership, and working together (all captured within our original provisional codes). This was evident even during the first IPE reflection, after students had completed the service-learning component of the course, as one participant describes the concept of collaborative leadership:

I learned that leadership does not mean that one individual takes on the role of the leader or dominant member of the group. From my experience working in an interprofessional team implementing the intervention, every member of the group was a leader. During each session, each member of the team was a leader at some point as each team member was responsible for a certain part of each session. I really learned how collaborative leadership works from this experience and I hope to apply what I learned to other teams I work with as a profession. (Social Work Student, IPE Reflection 1)

Another student described thoughts at the end of the course:

Honestly, this interpersonal course helped me grasp a better understanding on leadership. Before this course, I thought of a leader as one who stood out and led other individuals only. But I learned that leaders come in a variety forms and play many roles. We are all leaders in our own unique way (Public Health Student, IPE Reflection 2).

Controversy with civility was also prominent in participant accounts of working through conflict as a team.

In my previous experiences working in groups, making decisions can be challenging at times, because sometimes it may seem as if your idea or concern is not being considered as part of the group. However, working in this interprofessional group allows me not only to voice my concerns or ideas, but I felt like the group listened to what each member had to say and came to a consensus as group. (Pharmacy Student, IPE Reflection 2)

This course impacted my personal growth, as I learned that I could both lead our groups successfully as well as follow directions from my teammates to help reach our goals each week. I also learned that positive reinforcement from team members is a great way to better the team. For example, one week after class, we discussed how we could improve as well as each person’s strengths while working with the children. I think each person receiving positive criticism from our teammates really made us stronger and more confident in each other week to week (Pharmacy Student, IPE Reflection 2).

Common purpose was also noted, following the service-learning course component.

Each individual was held accountable for their shared responsibilities and was expected to carry out the common purpose of the group. ...People had different suggestions about how certain activities should be carried out or in what order. However, once the rationale for the suggestions was presented, as a group we choose the option that would most benefit the group’s aim. (Pharmacy Student, IPE Reflection 1)

The second prominent sub-code (which sometimes overlaps with the first) was that students learned to view leadership as more of a process than a role. Thus, while the first sub-code focused on the number of actors involved in leadership, the second sub-code focused more on the actions or processes used in leading.

I now see leadership as a process and a collaborative effort between a group of individuals instead of one individual taking a dominant role. (Social Work Student, Poster Reflection 2)

In my first poster, this was very static, created by “the” leader in order to move the crowd or group into action. As for the current poster, I included a reciprocal symbol for motivation that depicts the fluid nature of motivation passing from one individual to the next, just like leadership. (Student—discipline not reported, Poster Reflection 2)

The interprofessional IPE course has had a positive impact on my views of leadership. I have realized that being a good leader is not

only about being a position to make final choices and to inspire others. I have learned that being a leader is also about doing the little things when people are not going to notice or doing things not for recognition for others, but because it will be for the benefit of the team. (Social Work Student, IPE Reflection 2)

Less prominent sub-codes included students expressing increased clarity about what leadership is, as well as increased understanding of traits represented by leadership.

It should be noted that individual-level concepts of the SCM were also present in student descriptions of changes over time. In particular, some students described the importance of commitment in their evolving understanding of leadership. This example follows completion of the service-learning component of the course.

I've learned that this process is much more difficult than I anticipated. Social change does not occur because someone tells you that it's what's necessary for your betterment. It happens when you make it a part of your daily routine and commit to making it a lifestyle change. (Student—discipline not reported, IPE Reflection 1)

It is notable that some students began describing SCM concepts and processes of change in their initial IPE reflections—immediately after the service-learning component of the course. This suggests that the change process may evolve rapidly over the course of the semester and may be attributable to various course components, including service-learning aspects, didactic content, and small-group work.

## Discussion

This study sought to understand how embedding the SCM within an IPE course influenced students' perceptions of leadership over the course of a semester. Overall, the findings of the study provide preliminary support that students' perceptions of leadership changed as a result of inclusion of this collaborative leadership model. In particular, both the quantitative and qualitative findings revealed that students' perceptions regarding all three group-level values – collaboration, common purpose, and controversy with civility – changed through this course. Students self-reported higher perceptions of these values and their overall leadership efficacy. They also described the ways in which their view on leadership changed with regard to these constructs. Specifically, the students' reflections demonstrated a shift in their understanding of leadership that is consistent with changes in the conceptualization of leadership noted recently in the IPE literature – students went from a more individualistic perspective to a more collectivist perception of leadership that focuses on the fact that different individuals can lead at different times and in different ways (Brewer et al., 2016; Yammarino et al., 2012). This is important, particularly as challenges to interprofessional care can often relate to territoriality and power dynamics among professionals on interprofessional teams (e.g., Axelsson & Axelsson, 2009; McDonald, Jayasuriya, & Harris, 2012; Reeves et al., 2010; Sims et al., 2015). Teaching students about collaborative leadership models within IPE courses can help promote shifts in conceptualizations of leadership that emphasize collaboration and prepare students to engage and work productively within interprofessional teams

in a way that minimizes these dynamics and challenges when they enter professional practice (Reeves et al., 2010; Sims et al., 2015)

Students' perceptions regarding the three individual-level values and the community value did not, however, show significant improvement over time. Because the SCM is a collaborative leadership model, and the applied service-learning experience in this course involved collaborative interprofessional teams, this finding is not surprising. This course emphasized collective, group-oriented values. And, while students were asked to reflect on their individual values, discussion of these values was not necessarily central to class discussion and may explain why statistically significant improvements were not noted in these areas. Nevertheless, both group-level (e.g., collaboration, controversy, common purpose) and individual-level values (particularly commitment) were prominent in students' qualitative accounts of how their views of leadership changed during the course. It also is important to note that students' perceptions in these areas were already quite high to begin, leaving little room for growth. Perhaps these students already had exposure to leadership concepts in other areas of their program, and therefore came into this particular IPE course with a foundational understanding of leadership. We did not collect data on prior leadership exposure or experience in our study to know whether this might be the case with these students, but this may be something to consider assessing within future research on leadership in IPE. Different students, and even professionals, come to their experiences with diverse backgrounds and conceptions of leadership and about what it means to be a leader. Another important area to examine is how these experiences shape the ways students and professionals engage in leadership in their own practice.

Another important finding from this study is that students appeared to internalize the foundational elements of the SCM, as evidenced in their written reflections, and this internalization may have been solidified through the IPE service-learning experience. For example, one of the key tenets of the SCM is that leadership is not a position, but a team process. Students in this course noted how leadership is a collective effort that requires teamwork, and they used the service learning experience as a way to describe how their thoughts changed in this regard. Together, this finding may signal that inclusion of the SCM is important, but perhaps it is the combination of the SCM along with the service-learning experience that resulted in changes in students' conceptualizations of leadership. This is similar to the findings of Iachini et al. (2015) in relation to how students used the SCM to understand leadership through their service-learning experience in a program evaluation course.

The findings of this study also have implications for promoting leadership development and development of collaborative competencies in IPE experiences within higher education settings (Canadian Interprofessional Health Collaborative, 2010; Forman et al., 2014; Interprofessional Education Collaborative, 2016). For example, in this study, the process of developing posters was a useful tool in helping students reflect on leadership. Our findings revealed that the process of developing the posters was a way to encourage

students to reflect on their own understanding of leadership and to portray these concepts visually. Unique pedagogical and research tools like this may offer unique ways to capture and understand changes in multi-faceted IPE concepts such as collaborative leadership in higher education settings. They also might be used to understand the challenges associated with this type of leadership within the context of interprofessional teamwork (Reeves et al., 2010; Sims et al., 2015). In addition, this study adds to the current body of literature of how leadership can be embedded in coursework (e.g., Iachini et al., 2015; Nurius et al., 2017; Pecukonis et al., 2013) and demonstrates the potential impacts on leadership growth that can occur for students taking these types of courses. The design of this particular course and how the leadership content was infused through didactic and experiential components could serve as a model for others interested in promoting collaborative leadership development in higher education.

This study may provide fertile ground for continued research in this area of collaborative leadership within IPE. Future studies, for example, might utilize more rigorous research designs with a control group to understand the impact of embedding leadership content into an IPE course. Likewise, future research should examine the generalizability of these findings to different geographic regions and different types of colleges and universities. Research might also aim to explore and identify patterns in students' perceptions of leadership based on disciplinary affiliation and other demographic characteristics using the types of visual data collection tools used in this study to capture changes in these complex constructs. Future research also would benefit from more explicit exploration of the dynamics by which individual-level and group-level values are impacted in IPE coursework and exercises (e.g., didactic content, visual exercises, group interactions).

Limitations to this study must be noted. First, it is important to note that because the study utilized multiple data collection methods, there was variation in sample size, and the overall sample size for the study was small. This study also was conducted during one semester in one course at one university. The study data also were self-report, and the reflective papers were designed to be brief which limits the richness of the qualitative data we have. Additionally, while the quantitative and qualitative findings triangulate and support each other, we cannot pinpoint whether it was the SCM alone that led to changes in perceptions of collaborative leadership, or whether it was the inclusion of the SCM in tandem with the service-learning experience. We also had no control group, and therefore do not know if students' perceptions would positively change regardless of inclusion of the SCM. Also of note is that one of the subscales, controversy with civility, had lower reliability than the other subscales. While this scale has been administered in other studies with college students and demonstrated adequate reliability (e.g. Dugan & Komives, 2010), caution is warranted in interpreting the pre/post study findings related to this dimension of the SCM.

Overall, despite these limitations, this study provides preliminary support for the utility of the SCM within the context

of an IPE service-learning class. As IPE efforts aim to prepare students and professionals with collaborative leadership and other important interprofessional competencies (CIHC, 2010; IPEC, 2016), this model may provide one mechanism to prepare students for IPE service-learning experiences and help them identify and work through the challenges that can accompany leadership within this interprofessional approach to care (Reeves et al., 2010; Sims et al., 2015).

## Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the writing and content of this article.

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