Interprofessional Education: A 5-year Analysis of its Impact on Workplace Practice

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ABSTRACT

This exploratory study examined knowledge and skill transfer from campus-based interprofessional education to workforce collaborative practice. We were interested in learning whether and how health professions graduates implemented IPE knowledge, values, attitudes, and skills gained during their time at university to their professional practices. This mixed- methods study employed an alumni survey and facilitated focus groups. The survey used quantitative Likert-type rating scales with opportunities for participants to respond to open- ended questions.

Results show that participants in the intervention group rated their IPE skills significantly higher than the control group. No significant difference was noted between the intervention and control groups in

their current practice behavior ratings. Findings from the study suggested four (4) common themes: 1) interprofessional competencies learned while at university readily transferred to workforce practice; 2) alumni appreciated having learned IPE competencies and skills to prepare for future employment; 3) awareness of others' diverse perspectives and roles was advantageous to working on teams and with other professions; and 4) IPE aided in alumni's value for patient-centered approaches. Opportunities missed were also noted by participants. A prominent theme was having missed out on experiential opportunities with a broader range of professions because IPE was not a universal requirement of all health professions curricula. Overall, the study suggests that alumni value campus-based interprofessional learning and bring university acquired collaborative knowledge and skill into their work environments to the benefit of patients and practice teams.

INTRODUCTION

Interprofessional education (IPE) is designed to build students' competencies for eventual collaborative health practice through shared experiential activities. Since 2010, the World Health Organization (WHO) has urged higher education to prepare future health professionals to transition from traditional models of healthcare practice to collaborative approaches that capitalize on diverse and intersecting team member expertise (Lim & Noble- Jones, 2018). The U. S. Interprofessional Education Collaborative (IPEC) defines collaborative practice as when "multiple health workers from different backgrounds work together with patients, families, caregivers, and communities to deliver the highest quality of care" (Interprofessional Education Collaborative [IPEC], 2016, p. 8). Academic institutions throughout the globe have variably integrated IPE into curricular and co-curricular offerings to expose students to core competencies designed to improve cross-professional communication, teamwork, knowledge of each other's skills and scopes of practice, and value for person- centered, safe, and quality care.

IPE emphasizes other critical learning domains: the necessary interdependence of providers especially when working with complex health conditions and systems (Rahmen et al., 2021; Rød et al., 2021); adaptability and flexibility in sharing collective roles and responsibilities (Carney et al., 2019; Rahmen et al., 2021); critical thinking and openness to constructive feedback (Gonzales & Vodicka, 2021; Rød et al., 2021); humility in recognizing the strengths and limitations of one's professional knowledge (Wang et al., 2018); and empathy for others' perspectives including one's colleagues on the healthcare team (Goodman et al., 2021; Michalec et al., 2021). Skills for collaborative leadership are also built into IPE curricula. Collaborative leaders create opportunities for all members of the team to contribute to problem- solving and decision-making, optimizing the value of a psychologically safe environment for care (Edmundson & Lei, 2014; Orchard & Rykhoff, 2015).

University-based IPE studies report that participation in IPE activities, especially those that are scaffolded and longitudinal, advance students' cross-professional communication skills, teamwork behaviors, confidence, collegiality, and respect for one another's role on the team (Cohen Konrad et al., 2017; McNaughton, 2018;

Thistlethwaite et al., 2019). A growing body of findings further indicates that those exposed to IPE are better prepared for team-based collaborative practice when entering the workforce (Cohen Konrad et al., 2017; Cox et al., 2016). Lim and Noble-Jones (2018) commented that IPE is best initiated early in health professions education "to prevent the 'pigeonholing' phenomenon where students develop a stereotype towards different health professions, endangering their ability to work effectively across a multi-professional team" (p. 218). While students are initially and unexpectedly challenged by teamwork (Cohen Konrad et al., 2017; Schrader et al., 2018), with time and hands-on experience, they come to appreciate and respect its hard-won benefits. Most students come away from IPE activities with aspirations to be proactive team members who contribute to positive person-centered health transformation (Cohen Konrad et al., 2017).

Research identifies strengths and barriers to IPE competency and behavioral implementation in the clinical setting (Cohen Konrad & Browning, 2012; Nimmagadda & Murphy, 2014; Rubin et al., 2018; Matthews et al., 2012; Schrader et al., 2018). The development of cross-professional relationships that support both patient care and increase job satisfaction is among these cited strengths (Carney et al., 2019). Tenets of interprofessional core competencies establish a workforce culture that invites respectful input from all team members and fosters a culture of humility, inclusivity, and effectiveness on clinical teams (Carney et al, 2021; Schraderet al., 2018; World Health Organization [WHO], 2016). Studies further report that effective cross-professional communication reduces the risk of medical error and decreases patient risk factors, increasing safety and quality care (Cavanaugh & Cohen Konrad, 2012; Cohen Konrad & Browning, 2012; Pfrimmer, 2009).

Interprofessional education historian DeWitt Baldwin (2007) notes that "the task of teaching cooperation and collaboration in healthcare is not easy" (p. 32). Challenging factors include designated space and time for shared learning, and limitations imposed by workforce shortages, especially during and post-pandemic (Carney et al, 2019; Paradis & Whitehead, 2018). Increased specialization, reimbursement restrictions, and certain types of corporate management models are all factors that inhibit impetus to endorse interprofessional education and collaborative practice (Cohen Konrad & Browning, 2012; Gilles et al., 2020). According to Gilles et al., (2020) implementing and maintaining integrated and interprofessional care involves overcoming multiple and complex barriers including how health care is financed.

Disconnections between campus-based learning and clinical realities pose some of the most significant conceptual and implementation barriers to IPE. As collaborative workforce team-based care is evolving, there are inevitable inconsistencies between what students learn in IPE curricular and co-curricular activities and what methods and practices are applied in real- world settings (Rubin et al, 2018; Salfi et al., 2015). Hierarchical and top-down leadership can also derail interprofessional collaborative practice. It is difficult to enact practice change when power dynamics amongst team members are not explicitly addressed. Inequities and tensions, including 'more relevant' colleagues at theoretically increased hierarchies, limit full collaboration, therefore, preventing the fulfillment of the objectives of interprofessional learning (Carney et al., 2021; Ludwig & Kerins, 2019; McNaughton, 2018; Thistlethwaite et al., 2019).

Research to date has focused on students' IPE experiences in the classroom, service- learning, and simulation (Carney et al, 2019; Cox et al., 2016; McNaughton, 2018; Brandt et al., 2014). Much less research has investigated the impact and implementation of IPE competencies and skills when students transition to workforce practice (Brandt et al., 2014). Lack of practice impact/outcome data has myriad intersectional implications. It inhibits university impetus to prioritize IPE instead, relying on graduates to learn team skills once in clinical practice, a reliance that has uncertain outcomes given the variability of teamness across workplace cultures (Dow et al, 2013). Lack of transfer knowledge data can also have broader implications as it disincentivizes healthcare practice change despite decades of reports calling for practice reform.

Many health professions' accrediting bodies now require IPE standards and as such, knowing whether the benefits of IPE outweigh the costs is timely (Cahn et al., 2016). However, according to researchers like McNaughton (2018), at the workplace level, there is "virtual silence" on the long-term impacts of IPE on practice (p. 434). Brandt et al. (2014), Cahn et al. (2016) among others agree that concrete evidence of how IPE benefits practice remains unclear, and given continued ambivalence in both educational and practice domains, proof of IPE's value is critical.

This paper describes an exploratory study into the translation of campus-based interprofessional learning and demonstration of IPEC (2016) competencies to workforce practice. We were interested in learning whether and how health professions graduates were implementing collaborative knowledge, values, and skills learned during their time at university in their workforce practice. It should be noted that the study was conducted in 2020 during the height of the COVID-19 pandemic. Exigencies of the pandemic, its impacts on individuals and institutions influenced the course of the study and perhaps more importantly, how practitioners viewed the importance and critical value of teamwork.

METHODS

This mixed-methods study employed an alumni survey and facilitated focus groups. The survey used quantitative Likert-type rating scales with opportunities for participants to respond to open-ended questions. In combination, the survey and focus groups aimed to measure the implementation of IPE and its impact on professional practice.

Survey participants were diverted to a new Google Form upon survey submission which 1) provided an opportunity to enter a gift card raffle as an incentive to participate using the respondent's email address and 2) asked them if they would be interested in participating in a future focus group. These Google Form responses were not linked to their original survey responses in any way, maintaining the anonymity of the survey. The study was reviewed by the university's IRB (#19.11.20-010) and deemed exempt on December 9, 2019.

SURVEY METHODOLOGY

The quantitative sampling method utilized an exposure-based retrospective cohort approach with 'exposure' defined as participation in one of two university-specific IPE immersion activities: the interprofessional team immersion (IPTI), a semester-long, simulated case-based learning project, and/or Screening, Brief Intervention and Referral to Treatment (SBIRT), a year-long interprofessional leadership program, both of which took place during academic years 2015-2018. Participating alumni exposed to these activities made up the INTERVENTION GROUP which was compared to a stratified (by both profession and graduation year) random sample of non-IPE participating alumni who graduated between 2015- 2020, the CONTROL GROUP. An electronic survey administered via REDCap was sent to 386 Intervention and 386 Control group alumni between November 2020 and March 2021. The survey link was initially sent via email, however, due to low response rates, recruitment attempts to contact participants were next made via text and U.S. mail service over the 5-month period. These methods yielded only a handful of additional participants but given the COVID- 19 pandemic and occupation with a controversial national election, recruitment of healthcare providers to an online, voluntary survey was predictably difficult during this timeframe.

The survey's key outcome measures were questions related to a) the likelihood of working on teams and b) the quality of self-and-team rated skills/behaviors. Two validated tools were woven into the survey instrument: Interprofessional Care Competencies Assessment Scale-Revised (ICCAS-R) (Schmitz et al., 2017) and the Assessment for Collaborative Environments (ACE-15) (Tilden et al., 2016). Also included were adaptations of a leadership checklist from a federal health workforce training program follow-up survey (Association of University Centers on Disability [AUCD], 2021). In addition to using the leadership checklist with small adaptations to account for differences in the area being targeted (e.g. removing references to maternal and child health populations), faculty on the project also developed a unique interprofessional leadership checklist that described interprofessional leadership activities tied to the IPEC competencies. Examples of questions used in both leadership checklists can be found in Appendix A.

The survey also included qualitative, open-ended questions including: "In what way(s) has participating in IP programs at UNE influenced your current practice?" and "What were the key barriers, if any, to providing collaborative care at your clinical setting (for example, lack of institutional support, time, lack of training, work at single profession site)?" Simple thematic analysis was used to extract notable themes from open-ended response questions. These questions were analyzed via deductive and inductive coding approaches, respectively, by three members of the investigative team. For the 'influence practice' question, existing codes from several years of student survey responses for a similar question were used as a starting point for code generation, and additional codes were identified as needed. For the 'barriers' question, new codes were generated by each member during the analysis. Afterward, the team convened to develop a unified coding system and came to a consensus on any differences in coding. Each response was coded in as many themes as mentioned by the participant.

Survey data was exported to IBM SPSS Version 25 for analysis. After data cleaning and calculated variables were created, frequencies and descriptive statistics were run to examine the distribution of the data. Alpha of 0.05 and two-tailed tests were used throughout the statistical analyses, equal variances were not assumed. Chi-square/Fisher's exact tests examined the comparability of the intervention and control groups. Independent t-tests and Poisson regression were utilized to measure group differences for continuous dependent variables. Qualitative data was exported to MS Excel 2016 for coding.

FOCUS GROUP METHODOLOGY

Focus groups are a preferred method to enrich survey findings by asking participants to offer more in-depth information about their perceptions and attitudes related to a common experience (Kitzinger, 1995). Focus group participants were recruited through a question in the quantitative survey which asked if they were interested in contributing supplemental information to inform the survey study questions. Ten study subjects participated in focus group sessions and received a gift card as remuneration for their time.

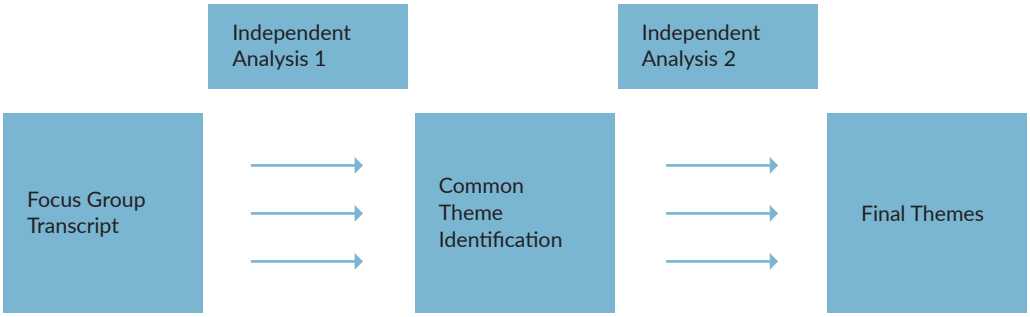
Two primary researchers and a graduate research assistant facilitated three, approximately 90-minute focus group sessions. Because the research took place during the 2020-2021 COVID-19 pandemic, the research team used a virtual format to conduct focus groups on ZoomTM using both structured and semi-structured interview formats. Participants were invited to respond to open-ended questions and were told that they could opt-out of answering any of the interview questions. Questions were asked verbally, but were also available in written format using the chat feature and via the closed caption option. Participants were provided information in advance as well as participant consent guidelines. Focus group open-ended questions included:

- Can you tell us about whether and how you're using the IPE competencies and skills in your workplace practice? (Teamwork; communication; values & ethics; roles & responsibilities).
- We're curious about which, if any, IPE activities or principles informed your current practices? (e. g. weekly events, interprofessional team immersion, Pain Clinic, or other)
- We know that not all UNE students had opportunities to participate in interprofessional learning activities. We're wondering however if as a provider, you've found yourself advocating for or leading efforts in support of IP teamwork? Patient-centered care?
- Now that you're in practice, we're interested to learn what team-based knowledge and skills we missed while you were on campus? Are there aspects of teamwork, collaboration, and communication that you wished you had exposure to?
- (Raise issues re: COVID if not mentioned during the interview). Can you reflect upon changes in

team-based practice, both good and bad, that occurred because of the pandemic?

The research team utilized the ZoomTM transcription option for the interviews, and each focus group session was recorded following consent from participants. Grounded Theory (Glaser, 1999) was used to inform thematic analysis of the focus group transcription narratives and to cull ideas for future hypotheses. Themes were independently determined by three members of the analysis team (coders), then aggregated across participants' responses resulting in five coherent themes. Throughout the process, no individuals were identified, though selected deidentified quotes were utilized. The coders separately read through the transcripts to document emerging categories. They collectively reviewed their findings returning to assure that all potential themes were explored and discussed (triangulation). Outlier themes were also documented and discussed. Verbatim transcript quotes were used to support the five established themes.

Figure 1. Qualitative Research Processes



RESULTS

Survey Results

There were 88 total survey respondents, but 4 were excluded due to not meeting the criteria of being employed. A total of 84 respondents were included in this analysis with 30 in the control group and 54 in intervention and an overall response rate of 11%. There were no significant differences between the intervention and control groups related to health profession, year of graduation, or IPE exposure prior to attending UNE. In order to determine if respondents had experience providing interprofessional care post-graduation, we asked if they would "characterize any of the clinical settings in which you've worked since graduation as providing interprofessional team-based care?" Overall, 86% of respondents said yes to this question and there was no difference between intervention and control groups (85% and 87% said 'yes' respectively) in this regard.

The survey included several tools to assess participants' skills and involvement in Interprofessional

Collaborative practice since graduation. One of the tools was the Interprofessional Collaboration Competency Attainment Scale-Revised (ICCAS-R). Each item on the ICCAS-R asks the respondent to rate their own interprofessional skills using a scale from 1 (Poor) to 5 (Excellent). The total scores for all 20 items were summed for each participant yielding the ICCAS Total Score. As identified in Table 1, t-test results indicate that participants in the intervention group rated themselves significantly higher (+6.7pts) on the ICCAS Total Score (p=.029, two-tailed) compared to the control group.

Table 1. ICCAS independent sample t-test results – Intervention vs Control

VARIABLE	GROUP	N	MEAN	t	SIG. (2-tailed)
ICCASTotal Score	Control	28	76.92	-2.236	.029
	Intervention	49	83.59		

There was no significant difference using independent t-tests between intervention and control group in their ACE-15 team behavior ratings (total ACE-15 scores were 45 and 44, respectively). Although this is a non-significant finding, it does suggest that higher confidence in one's own IPE skills may not ultimately translate to higher functioning teams or better collaborative environments in clinical settings.

Leadership and advocacy within the workplace were also examined. Several questions were asked to evaluate general leadership activities and leadership activities specifically related to developing and improving the interprofessional clinical environment. Poisson regression was used to examine the relationship between leadership activities and group status because the responses from the checklist tools were distributed as a count, not a normal distribution. The general leadership scale did not show a significant impact on the group ($p = .218$) using this methodology or using a standard t-test ($p = .353$). The Interprofessional leadership scale did show a difference between groups. As identified in Table 2, those in the intervention group reported significantly more IP leadership activities ($p = .004$) compared to the control group. On average, the intervention group reported almost 1.5 more IP leadership activities than the intervention group.

Table 2. Interprofessional (IP) Leadership Activities – Poisson Regression with Group Status

	B	df	SIG.
Group	.381	1	.004
Intervention			

Qualitative, open-ended questions in the survey were used to examine alumni perceptions of the influence of participation in IPE programs on practice and the barriers to translating knowledge and skills gained to the workplace. Many responses addressed more than one theme so percentages will exceed 100% if summed. When asked to reflect on 'the ways…participating in IP programs at UNE influenced…current practice,' alumni were most likely to mention improved communication skills (59 respondents total). About one-third of respondents to this question (34%) cited improved communication skills for working with other health professionals.

> "It helped me to recognize the benefit of being able to communicate easily with other professions. Effective communication with other disciplines allows for better decision making (for us as professionals and for the patient's care)."

Other key themes (cited by about 31% of respondents) are included below, with an exemplar:

- Increased knowledge of the roles and scope of other health professionals:

> "I feel I am stronger when working with hospitals, clinics, and psychiatry due to my broadened knowledge of the roles other health professionals play in a person's healthcare."

- Using collaboration skills daily in practice:

> "I work in a nursing facility and work with an interdisciplinary team all day, every day… I'm quite certain I use skills gained from this program on a daily basis." Improved understanding of the value to the patients of interprofessional care (e. g. patient-centered approach)."

- Improved understanding of the value to the patients of interprofessional care (e. g. patient-centered approach):

> "...helps me apply a multidisciplinary approach when working in the ER; allows me to work better in a team setting, and give better care to patients"

Additionally, about 1 in 5 respondents (22%) indicated they were more confident in their teamwork skills as a result of IPE training at UNE and 12% noted that IPE training impacted the degree to which they valued interprofessional teamwork in practice. Finally, a handful of respondents indicated that their IPE training provided an advantage for their career advancement or increased the likelihood of referring to and/or consulting with other providers.

When asked about the barriers to "providing collaborative care at your clinical setting", the most commonly cited was lack of time with 39% mentioning time (62 respondents total).

> "Time can be a constraint, as all members of the team have both shared and independent service responsibilities."

Interpersonal barriers mentioned by respondents included the following two considerations. First, communication issues/difficulties reaching other providers (19%).

> "Communication remains challenging between team members, especially with complex patients who are followed by multiple teams- it's not uncommon for families to feel frustrated with the lack of organization of communication"

Second, when a person or profession hindered team workplace team dynamics (16%).

> "Typically, the barriers I have faced have been related to professional cultural barriers... trust tends to need to be earned before true and effective collaboration can take place."

Billing and productivity requirements hindering teamwork, lack of opportunities to work interprofessionally and lack of institutional support were each mentioned by 5-10 respondents. These barriers relate to institutional or setting-specific obstacles.

> "The push for healthcare to be heavily revenue-based and highly valuing productivity is a large barrier to doing good IP work."

Alumni responses to the qualitative questions in the survey reinforce the quantitative findings of a high transfer of knowledge and skills to the workplace, particularly in communication and understanding roles/

scopes of practice. Nevertheless, significant barriers remain for transferring this learning to effective teamwork in the practice setting. This theme of interprofessional knowledge/skill transfer impeded by the realities of clinical work culture will be explored further in the focus group findings.

Focus Group Results

Focus group participants included alumni from Physician Assistant (1), Social Work (5), Occupational Therapy (3), and Dental Medicine (1) in spring 2021. Most of the focus group participants were in the Intervention Group although both groups were recruited using the same voluntary methods.

Qualitative findings gleaned from the focus groups fell into 5 common themes: 1. Importance of campus-based preparation; 2. IPE knowledge transfer to collaborative practice; 3. Focus on the patient; 4. Greater understanding of others' roles, responsibilities; and 5. Diverse perspectives.

IMPORTANCE OF CAMPUS-BASED PREPARATION

The importance of having participated in campus-based IPE offerings was mentioned by focus group members as preparing them for team-based practice. Some mentioned that teamwork skills were needed from the moment they stepped into the workplace. Campus-Based Preparation was a robust theme as noted by one participant:

> "…I appreciate the experience because I don't think I would have been as prepared for working collaboratively the way that we've had to move if I hadn't done that."

Another participant observed:

> "… we were given the opportunity in a safe place to have that working with people in the different professions with different perspectives and live the experience that they were all just human beings and that we can take that experience forward."

Some participants mentioned the value of having academic IPE training on their professional resumes. Many felt it gave them a career boost when applying for positions. Others commented that the IPE Honors distinction, an academic portfolio of designated IPE activities used at UNE, was something employers noticed and wanted to know more about.

KNOWLEDGE TRANSFER

The transfer of knowledge from campus-based preparation to the practice setting was an identified theme. This incorporated concepts such as the relational needs for both team and patient-centered care. Additionally, the necessity and frequency of interprofessional interactions were significantly noted. Related to knowledge transfer, one individual shared:

> "I know how to talk to people. I know how to coordinate, and I know how to work as a team. And that's the takeaway I got was that teamwork, you know, learning how to work as a team even when you don't know those people well."

Another participant shared:

> "...I definitely use the IP competencies on a daily basis.."

Participants spoke of needing team-based skills from the moment they began jobs in healthcare. Confidence in their ability to work with others and feel successful in their practice from day one of practice were added benefits mentioned by some participants.

PATIENT-CENTERED CARE

Despite focus questions not specifically asking about patients or patient-centered care, value for patient-centered care emerged from many focus group responses. Participants consistently equated interprofessional practice competencies with higher quality patient care. They noted that the intent of proficient team practice should center around the patient as well as on improving the care or service environment in which patients receive treatment or intervention. Participant comments supporting this theme included the following:

> "... we're looking for, and what the person wants ... what are the patient's goals and we put that together to get the outcome... it's just what happens every day ."

Being patient-centered involves critical thinking and problem-solving. As one participant observed about interprofessional values and ethics:

> "...made me think outside the box and just you know every patient as a whole."

ROLES AND RESPONSIBILITIES AND DIVERSE PERSPECTIVES

The fourth and fifth themes brought forth by focus group participants identified the importance of understanding others' roles and responsibilities and appreciating and respecting diverse perspectives in order to function as an efficient team in health care practice. Participants discussed the complexity of patient-centered care and the accompanying need to know what others do and how to best capitalize on complementary skills. Having respect for different expertise reduced hierarchical barriers known to impede true collaboration. Additional assets conveyed included valuing others' perspectives, curiosity, and the willingness to listen to different and sometimes contradictory opinions. These contributed to better patient care and increased individual and team morale. One participant shared:

> "Each discipline has their own goals and long term they're often the same - to promote their safety... so knowing what nursing is doing ... can really benefit each other that we are working smarter, not harder."

Another individual noted the intrinsic value of learning with and from each other:

> "... that I could learn from literally anybody. I don't know everything about everything and so it's really great to surround myself ... with different people who have different opinions and different skills."

Knowing about others' roles and scopes of practice also was valued helped, especially in specializations like pediatrics and geriatric care where interprofessional teams were the norm.

The importance of building cross-professional relationships and its role in teamness was threaded throughout the focus group narratives. Though it was implied more than it was stated, a few focus group participants stressed both the utility and value of relationship and partnership.

QUALITY IMPROVEMENT AND IDENTIFYING CAMPUS-BASED MISSED OPPORTUNITIES

In the spirit of quality improvement, it was important to the research team to learn what participants felt was missed during their campus-based preparation or content/experiences that would have added value to their transition from campus to practice. One participant indicated: "I wish I had more access to other professions' curriculum and knowing about what they were learning". Several others suggested that IPE should be required across health professions programs: "I guess I would have wished that some of the other departments or professions were more adamant about you having to do this." The desire to know more about each other's curricular content was also mentioned as information alumni would have wanted to learn.

We were impressed by the prominence of this interprofessional curiosity with several participants commenting how important their experiential learning opportunities with other professions whereas in preparing them for real-world work environments. Others mentioned that knowing others' roles helped reduce professional stereotypes and biases sometimes reinforced in uniprofessional identity formation that interfere with building essential workplace relationships. Some participants felt that learning with and from providers experienced in interprofessional settings fostered an understanding of health conditions and the social determinants that affect healing. Many commented that their compassion for others grew from these shared learning opportunities.

Participants also shared barriers they have encountered in working with colleagues who have not been exposed to the tenets of interprofessional competencies and collaborative practice skills. Discussing barriers to effective teamwork, one participant stated:

> "I can see in my experience versus colleagues that haven't been through [IPE] that they can be very defensive about their territories and turf.... Not having that openness to all other professions and viewpoints."

Another participant shared:

> "... there are those few people that have been really difficult because they don't really communicate, and they don't collaborate..."

Barriers to team-based practice were identified as both individual and systemic in nature. Participants commented that those not familiar with or trained in collaborative practice skills were often resistant to and perhaps disrespectful towards others, especially those seen as having less 'status' in the healthcare hierarchical structure. One participant observed that colleagues in higher/leadership positions expected those on the frontlines to utilize team approaches but considered themselves exempt from having to do so themselves. Systems hierarchy and privilege of certain professions over others whereas a thread in participants' narrative. In one case the missing roles of peer support and the patient/service user as valid members of the team were noted.

LIMITATIONS

Several limitations of this research are identified. First, the quasi-experimental design with group status was not randomly assigned. Participants in university intensive IPE offerings were self-selected, limiting our ability to make causal associations between their participation and any practice outcomes. Second, a relatively low response rate and small sample size ($n<100$) limit our ability to generalize these results to the greater university alumni population. The COVID-19 pandemic likely led to challenges with recruitment for both

survey and focus groups given that the target audience was healthcare workers, who were uniquely taxed by the pandemic. The pandemic may also have had unknown impacts on responses given the stressors it placed upon the healthcare system.

Third, in keeping with the trend of IPE to Collaborative Practice translational data, the quantitative survey included measures to self-identify the carryover of IP skills (Thistlewaite et al., 2019). The next anticipated study will extend these findings with a focus on gaining insights from employers on key interprofessional factors graduates bring to the workplace. Finally, the target audience was composed of newer healthcare practitioners (graduated < 10 years ago) with less practice experience, thus results may not reflect the experience of practitioners with greater depth and breadth of experience working collaboratively in teams.

DISCUSSION

The aim of our study was to determine whether and how knowledge, skills, and values learned from campus-based interprofessional learning activities translate to the workplace preparing graduates for contemporary collaborative healthcare practice. Alumni who participated in the study were vocal about benefits gained from university-offered IPE activities affirming that acquired teamwork skills were needed from the start of their professional careers. This appeared true whether or not they worked in settings explicitly designed to promote collaborative practice or participated in coherent interprofessional practice teams. Rather, participants appreciated that competencies attained were portable and implementable in all settings and with a variety of team constellations.

In particular, participants identified fluency in cross-professional communication and knowledge of and value for others' roles and expertise as aids to effective practice. This finding resonates with those from earlier studies (Lim & Noble-Jones, 2018; McNaughton, 2018) which highlighted the importance of collaborative learning throughout the program curriculum. Confidence and comfort in communicating across professions were found to be especially critical when working with complex health conditions. This stood out as a particularly valuable asset during the pandemic when all hands on deck were often not enough and practitioners had to take on care responsibilities not necessarily in their primary scope of practice. Strengths in critical problem-solving along with adaptability and flexibility, found to be positive qualities acquired through IPE in other studies (Rahman et al, 2021; Rod et al, 2021), were essential during these times of overwhelming healthcare demands. Alumni explained how they had capitalized on commonalities and differences in professional roles that enhanced team functioning, especially under stress.

Respect for others' knowledge was frequently noted by participants to reduce potential competition or contention between professional roles and levels. Similar to the findings of Lim and Noble-Jones' (2018), having participated in a collaborative learning culture seemed to translate well into the workplace fostering ease with others including those holding positions considered at a higher level. Despite these

findings, alumni also acknowledged continued hierarchical attitudes from professionals and administrators, especially those unfamiliar with interprofessional aims and competencies. Students and practitioners feeling marginalized and undervalued have been recognized in studies of interprofessional learning and collaborative practice (Garman, Leach, & Spector, 2006; Gergerich, et al 2019). Research suggests that role overlap is interpreted as an infringement on scope of practice rather than as an asset to shared roles and responsibilities (Fox & Reeves, 2015). Participants in this study noted that unacknowledged power and privilege have undermining effects that can be demoralizing and also impact the quality of patient-centered care, something they felt was a relatively underrated asset of IPE training. To reverse this trend participants recommended that IPE be required across academic and training programs to minimize power dynamics and professional biases.

Although alumni generally endorsed the benefits of campus-based IPE, they were not hesitant to point out possible improvements. Most felt that universities should integrate interprofessional competencies and pedagogies across all programs. Some felt let down that their programs did not universally promote interprofessionality as they could see the results on the floors of their settings as inefficiencies, fragmented care, and insufficient communication. They also conveyed that collaborative leadership skills were often byproducts rather than specific foci of interprofessional learning. Several participants commented on having the confidence to apply formal and informal leadership practices commensurate with IPEC competencies and values (IPEC, 2016) in their practices. More attention to qualities of collaborative leadership was suggested.

As noted in the limitations section, participants self-identified carryover of IP skills to their work environments (Thistlewaite et al., 2019). Although this is an important measure of IPE efficacy, more observation of competency application is needed. According to Dow et al. (2013), healthcare employers are pivotal drivers of healthcare transformation and interprofessional collaborative practice. Employers identify and prioritize core skills and competencies they seek in new hires. Knowing these priorities, educators might better prepare students for contemporary and preferred patterns of practice. In the best of worlds, educators and clinical managers/practitioners could work together to devise curriculum and measure outcomes that best serve future and current patients and health systems. “Bridging education and practice seems to have the most promise for graduating practitioners ready to practice and thrive in a new clinical environment” (Dow et al, 2013, p. 354). To achieve this, an intentional curriculum focused on building competencies and skills for teamwork is needed both in the university (next generation) and in workplace education and training (active providers) (Carney et al., 2019; Clay et al., 2013).

CONCLUSION

This exploratory study demonstrated that alumni valued campus-based interprofessional learning and brought collaborative skill sets into their work environments to the benefit of patients and practice teams. The next steps in improving content and IPE transfer will be to engage with employers to discern key

interprofessional competencies and qualities they are looking for graduates to bring to the workplace. Bridging the gap between the next generation of healthcare workers and healthcare employers offers the potential to strengthen IPE programming on campus, make it relevant to contemporary practice, and improve the overall quality of care for all people in clinical and community health settings.

References

Association of University Centers on Disabilities. (2021). FY 2021 training materials. https://www.aucd.org/template/news.cfm?news_id=12730&id=17

Baldwin, D. C. (2007). Some historical notes on interdisciplinary and interprofessional education and practice in health care in the USA. Journal of Interprofessional Care, 21(S1), 23-37. https://doi.org/10.1080/13561820701594728

Brandt, B., Lutfiyya, M. N., King, J. A., & Chioreso, C. (2014). A scoping review of interprofessional collaborative practice and education using the lens of the Triple Aim. Journal of Interprofessional Care, 28(5), 393-398. https://doi.org/10.3109/13561820.2014.906391

Cahn, P. S., Bzowyckyj, A., Collins, L., Dow, A., Goodell, K., Johnson, A. F., Klocko, D., Knab, M., Parker, K., Reeves, S., & Zierler, B., K. (2016). A design thinking approach to evaluating interprofessional education. Journal of Interprofessional Care, 30(3), 378-380. https://doi.org/10.3109/13561820.2015.1122582

Carney, P. A., Thayer, E. K., Palmer, R., Galper, A. B., Zierler, B., & Eiff, M. P. (2019). The benefits of interprofessional learning and teamwork in primary care ambulatory training settings. Journal of Interprofessional Education & Practice, 15, 119-126. https://doi.org/10.1016/j.xjep.2019.03.011

Carney, P. A., Vasquez Guzman, C. E., Taylor, C., Cole, D., Hollander-Rodriguez, J., Rose, T., & Wiser, E. (2021). Health professional students' observations about interprofessional collaborative practice during rural clinical rotations. Journal of Interprofessional Education & Practice, 25(1), 1-8. https://doi.org/10.1016/j.xjep.2021.100471

Cavanaugh, J. T., & Cohen Konrad, S. C. (2012). Fostering the development of effective person-centered healthcare communication skills: An interprofessional shared learning model. Work, 41(3), 293-301. https://doi.org/10.3233/WOR-2012-1292

Carney, P. A., Thayer, E. K., Palmer, R., Galper, A. B., Zierler, B., & Eiff, M. P. (2019). The benefits of interprofessional learning and teamwork in primary care ambulatory training settings. Journal of Interprofessional Education & Practice, 15, 119-126. https://doi.org/10.1016/j.xjep.2019.03.011

Cohen Konrad, S., & Browning, D. M. (2012). Relational learning and interprofessional practice: Transforming health education for the 21st century. Work, 41(3), 247–251. https://doi.org/10.3233/WOR-2012-1295

Cohen Konrad, S., Cavanaugh, J. T., Rodriguez, K., Hall, K., & Pardue, K. (2017). A five-session interprofessional team immersion program for health profession students. Journal of Interprofessional Education & Practice, 6(1), 49-54. https://doi.org/10.1016/j.xjep.2016.12.007

Cox, M., Cuff, P., Brandt, B., Reeves, S., & Zierler, B. (2016). Measuring the impact of interprofessional education on collaborative

practice and patient outcomes. Journal of Interprofessional Care, 30(1), 1-3. https://doi.org/10.3109/13561820.2015.1111052

Dow, A., Blue, A., Konrad, S. C., Earnest, M., & Reeves, S. (2013). The moving target: Outcomes of interprofessional education. Journal of Interprofessional Care, 27(5), 353- 355. https://doi.org/10.3109/13561820.2013.806449

Edmondson, A. C. & Lei, Z. (2014). Psychological safety: The history, renaissance, and future of an interpersonal construct. Annual Review of Organizational Psychology and Organizational Behavior, 1(1), 23-43. https://doi.org/10.1146/annurev-orgpsych- 031413-091305

Fox, A. & Reeves, S. (2015). Interprofessional collaborative patient-centred care: a critical exploration of two related discourses. Journal of Interprofessional Care, 29(2), 113-8. doi: 10.3109/13561820.2014.954284

Garman, A., Leach, D., & Spector, N. (2006). Worldviews in collision: conflict and collaboration across professional lines. Journal of Organizational Behavior, 27, 829- 849.

Gilles, I., Filliettaz, S. S., Berchtold, P., & Peytremann-Bridevaux, I. (2020). Financial barriers decrease benefits of interprofessional collaboration within integrated care programs: Results of a nationwide survey. International Journal of Integrated Care, 20(1), 10-10. https://doi.org/10.5334/ijic.4649

Gergerich, E., Boland, D., & Scott, M. A. (2019). Hierarchies in interprofessional training. Journal of Interprofessional Care, 33(5), 528-535.

Glasser, B. G. (1999). The future of grounded theory. Qualitative Health Research, 9(6), 836-845. https://doi.org/10.1177/104973299129122199

Gonzales, L., & Vodicka, D. (2021). Pandemic-Learned Measures for Engaging Families: To restore enrollment levels in public schools, the authors share four ideas for reassuring parents with genuine support. School Administrator, 78(7), 40+. https://link.gale.com/apps/doc/A672603396/ITOF?u=bidd97564&sid=summon&xid=ec 95a7e0

Goodman, C. W., Justo, J., Merrow, C., Prest, P., Ramsey, E., & Ray, D. (2021). An experiential learning collaborative on quality improvement for interprofessional learners. Journal of Interprofessional Care, 1-4. https://doi.org/10.1080/13561820.2021.1901673

Interprofessional Education Collaborative. (2016). Core competencies for interprofessional collaborative practice: 2016 update. Washington, DC: Interprofessional Education Collaborative. https://hsc.unm.edu/ipe/resources/ipec- 2016-core-competencies.pdf

Kitzinger, J. (1995). Qualitative research: Introducing focus groups. Bmj, 311(7000), 299-302. https://doi.org/10.1136/bmj.311.7000.299

Lim, D. A. F. N., & Noble-Jones, R. (2018). Interprofessional education (IPE) in clinical practice for pre-registration nursing students: A structured literature review. Nurse Education Today, 68, 218-225. https://doi.org/10.1016/j.nedt.2018.06.020

Ludwig, D. A., & Kerins, M. R. (2019). Interprofessional education: Application of interprofessional education collaborative core competencies to school settings. Perspectives of the ASHA Special Interest Groups, 4(2), 269-274. https://doi.org/10.1044/2018_PERS-SIG2-2018-0009

Matthews, R. L., Parker, B., & Drake, S. (2012). Healthy ager: An interprofessional, service-learning, town-and-gown partnership. Nursing

Education Perspectives, 33(3), 162-165. https://doi.org/10.5480/1536-5026-33.3.162

McNaughton, S. (2018). The long-term impact of undergraduate interprofessional education on graduate interprofessional practice: A scoping review. Journal of Interprofessional Care, 32(4), 426-435. https://doi.org/10.1080/13561820.2017.1417239 Michalec, B., Schneider, J. M., & Mackenzie, M. (2021). Teaching empathy in an interprofessional setting with a focus on decategorization: Introducing I-team. Journal of Interprofessional Education & Practice, 22, 100395. https://doi.org/10.1016/j.xjep.2020.100395

Nimmagadda, J., & Murphy, J. I. (2014). Using simulations to enhance interprofessional competencies for social work and nursing students. Social Work Education, 33(4), 539- 548. https://doi.org/10.1080/02615479.2013.877128

Orchard, C., & Rykhoff, M. (2015) Collaborative leadership within interprofessional practice. In Forman D., Jones M., & Thistlethwaite J. (Eds.), Leadership and Collaboration (pp. 71-94). Palgrave Macmillan, London. https://doi.org/10.1057/9781137432094_5

Paradis, E., & Whitehead, C. R. (2018). Beyond the lamppost: A proposal for a fourth wave of education for collaboration. Academic Medicine, 93(10), 1457-1463. https://doi.org/10.1097/ACM.0000000000002233

Pfrimmer, D. (2009). Teamwork and communication. The Journal of Continuing Education in Nursing, 40(7), 294-295. https://doi.org/10.3928/00220124-20090623-09 Rahman, R., Pinto, R. M., & Troost, J. P. (2021). Examining interprofessional collaboration across case managers, peer educators, and counselors in New York City. Social Work in Public Health, 36(4), 448-459. https://doi.org/10.1080/19371918.2021.1905131

Rød, I., Kynø, N. M., & Solevåg, A. L. (2021). From simulation room to clinical practice: Postgraduate neonatal nursing students' transfer of learning from in-situ resuscitation simulation with interprofessional team to clinical practice. Nurse Education in Practice, 52, 102994-102994. https://doi.org/10.1016/j.nepr.2021.102994

Rubin, M., Cohen Konrad, S., Nimmagadda, J., Scheyett, A., & Dunn, K. (2018). Social work and interprofessional education: Integration, intersectionality, and institutional leadership. Social Work Education, 37(1), 17-33. https://doi.org/10.1080/02615479.2017.1363174

Salfi, J., Mohaupt, J., Patterson, C., & Allen, D. (2015). Reality check: Are we truly preparing our students for interprofessional collaborative practice? Canadian Journal of Nursing Research, 47(2), 41-61. https://doi.org/10.1177/084456211504700204

Schrader, S., Jernigan, S., Niaman, N., & Zaudke, J. (2018). Determining the impact of an interprofessional learning in practice model on learners and patients. Journal of Interprofessional Care. 13, 1-8. https://doi.org/10.1080/13561820.2018.1513465

Schmitz, C.C., Radosevich, D.M., Jardine P., MacDonald, C.J., Trumpower, D. & Archibald, D. (2017). The Interprofessional Collaborative Competency Attainment Survey (ICCAS): A replication validation study, Journal of Interprofessional Care, 31(1), 28-34. https://doi.org/10.1080/13561820.2016.1233096

Thistlethwaite, J. E., Dunston, R., & Yassine, T. (2019). The times are changing: Workforce planning, new health-care models and the need for interprofessional education in Australia. Journal of Interprofessional Care, 33(4), 361-368. https://doi.org/10.1080/13561820.2019.1612333

Tilden, V.P., Eckstrom, E., & Dieckmann, N. F. (2016). Development of the assessment for collaborative environments (ACE-15): A tool to measure perceptions of interprofessional "teamness", Journal of Interprofessional Care, 30(3), 288-294. https://doi.org/10.3109/13561820.2015.1137891

Wang, Y., Liu, J., & Zhu, Y. (2018). Humble leadership, psychological safety, knowledge sharing, and follower creativity: A cross-level investigation. Frontiers in Psychology, 9, 1727-1727. https://doi.org/10.3389/fpsyg.2018.01727

World Health Organization. (2016). Framework on integrated, people-centered health services. Report by the Secretariat. Report No. A69/39. Retrieved from https://www.who.int/servicedeliverysafety/areas/people-centred- care/Overview_IPCHS_final.pdf

Appendix A

Example questions asked to assess general leadership practices (Leadership Activities) included the following:

- Have you participated as a group leader, initiator, key contributor or in a position of influence/authority?
- Have you served in a clinical position of influence?
- Have you taught or mentored in your own discipline?

Example questions asked to identify leadership related to an interprofessional clinical environment (IP Leadership Activities) included:

- "Have you provided input or information to other professions or disciplines?
- "Have you developed a shared vision and determined team-based roles and responsibilities on the clinical team?"
- "Have you advanced policies and programs that promote collaborative clinical practices and procedures with other disciplines, departments, or professions?