Preparing 21st Century Counselors and Healthcare Professionals: Examining Technology Competency and Interprofessional Education Comfort

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Abstract

Healthcare professionals are expected to work in interprofessional teams while also communicating distantly with these team members through telehealth platforms to improve patient care. This study sought to understand how comfort with technology, interprofessional education, and collaboration was perceived by graduate students in counseling, dental hygiene, nursing, and physical therapy. A quantitative investigation with N=111 students resulted in comfort with technology among all groups but there were significant differences among the allied health professions regarding positive professional identity and willingness to engage in teamwork and collaboration. The data revealed that both preparation, rationale for interprofessional work, and placement of interprofessional training in curricula might improve interprofessional training in these health professions.

Keywords

Author's Notes

The cost of health care is steadily increasing while simultaneously the pressure is being placed on healthcare systems to improve patient outcomes and lower cost (American College of Physicians, 2009). The already burdened system is now challenged to care for the 20 million newly insured Americans that have been insured through the Affordable Care Act, which increased access and expanded mental healthcare options (Commonwealth Fund, 2014). Innovative ways to manage the strain on the healthcare system are being developed with many harnessing the power of technology, such as, eMental health, electronic health records, telehealth and telemedicine, healthcare apps, and other health care related technology advancements (Chaudhry et al., 2006; Hillestad et al., 2005). With the advances in the use of technology in healthcare, provider comfort and competency with technology has become increasingly important. Along with the increase use of technological advancements, The World Health Organization (2010) also recommends interprofessional collaboration and the inclusion of mental health care partners on traditional and technology enhanced (i.e. telehealth) treatment teams. As noted by the Association of Academic Health Centers (Wartman, 2017), trends in 21st century healthcare is mismatched with the skills, competency, and knowledge of the health care professionals, including: team based care paradigms (i.e. interprofessional collaboration) and the use of technology in healthcare. This manuscript focuses on understanding the competency and knowledge of healthcare graduate program students' (HGPS), defined for this article as counseling and other allied healthcare students, comfort with technology, perceptions of interprofessional education, and interprofessional collaboration. Results can be used to inform revisions of current curriculum in the health professions that are already underway for most allied health professions (Verma, Patterson, & Medves, 2006), but are still emerging in professional counseling (Johnson & Freeman, 2014; Johnson, 2016).

Technology Competency

Technologies such as internet browsers, software, smartphones, tablets, and media players have become an integral part of society. A recent Pew Report showed that the digital divide among Americans is decreasing indiscriminate of age, race, or gender (Pew Research Center, 2014). While technology use has been on a steady increase since the early 2000s, the use of technology to access healthcare information and to have health care delivered via technology (e.g. telehealth) is more recent. A recent study found that more than half of smartphone users also accessed their phones to obtain health information in 2014 (Anderson, 2015). These same technologies are being utilized in healthcare settings to connect providers and improve patient care through the use of telehealth and telemedicine.

Telehealth and telemedicine have been utilized in healthcare for over 50 years (WHO, 2010) and while telehealth has proven to save time, money and lives over this time many professionals have resisted their use due to unfamiliarity and presumed discomfort. It is important to understand that while often interchangeable in conversation, telehealth and telemedicine have two different meanings (Doarn et al., 2014). Both terms indicate a means of breaking down geographic barriers for providers and patients but telehealth is a more general term and indicates the electronic transfer of medical information for patient care (Doarn et al., 2014). This transfer includes clinical, educational, and administrative uses and applications. Telehealth does not always encompass clinical care. Telemedicine, however, is specifically the use of technologies to deliver patient care. Both telehealth and telemedicine exchange information from one site to another via any form of electronic communication with the goal of improving patient health (American Telemedicine Association, n.d.). This type of communication can occur using two-way video, email, smartphones, wireless tools, and other telecommunications technologies.

As the healthcare system continues to embrace these technology-based platforms that connect patients and providers it is critical that providers ensure their literacy with these technologies (Browning, Tullai-McGuinness, Madigan, & Sruk, 2009). Technology literacy is defined as the ability to work independently and with others using technology tools to access, manage, integrate, evaluate, create, and communicate (Sharp, 2014).   Before telehealth and telemedicine can be utilized successfully, a basic comfort with technology is important (Browning, et al., 2009). Improving comfort with technology can occur during educational experiences and exposure, which is in line with social learning theory, which states learning best occurs through observation and modeling (Bandura, 1977). To date however there are limited studies seeking to understand healthcare graduate program students' (HGPS) basic comfort with technology (Edwards & O'Connor, 2011), with many studies assessing a technology based experience (Chow, Herold, Choo, & Chan, 2012), or experience with technology typically centered around e-learning (Wilkinson, While, & Roberts, 2009). With counseling students, the focus has centered around comfort with online counseling and satisfaction with e-counselor education (Dowling & Rickwood, 2013; Trepal, Haberstroh, Duffey, & Evans, 2007), none of which informs us on comfort with technology. This is an important inquiry because technology use is evident in every facet of healthcare, including mental health, integrated behavioral health care, and primary care. In integrated behavioral health care, where mental health providers collaborate with primary care provider's technology is used for consultations, assessments, and treatment; this interprofessional approach with technology saves time, money, and bridges the gap between primary and mental health care.

Interprofessional Education and Collaboration

Along with the importance of technology, the need to foster a culture of interprofessional collaboration is necessary for our students. The complex needs of today's patients require innovative best practice models. The Institute of Medicine recommended in 2001 that healthcare professionals work in interprofessional teams to address these complex and challenging needs (IOM, 2001). Students must learn the skills to work collaboratively and this begins with interprofessional education. The World Health Organization defined interprofessional education (IPE) as; "when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (2010, p. 13). Many professional educational organizations such as nursing, dental, medicine, pharmacy, and public health have put interprofessional education and collaboration as one of their main goals (ACGME, 2013; ACPE, 2011; AACN, 2006; AACP, 2004; ADEA, 2008; ASPPH, 2014; CACREP, 2008). The Interprofessional Education Collaborative (IPEC) was developed to give direction and focus to this topic (IPEC, 2016). They put forth four major competencies for interprofessional education, (1) Values and Ethics, (2) Roles and Responsibilities, (3) Interprofessional Communication, (4) Teams and Teamwork (IPEC, 2011). It is important that faculty model these competencies and provide students with real world situations and problems to solve together in a collaborative learning environment.

In the past, interprofessional collaboration was a process learned after graduation: students went from their silos in education to silos of practice and then discovered the benefits and necessity of interprofessional collaborative practice (Margalit et al., 2009). Most notably, the World Health Organization has said that there is now "sufficient evidence to conclude that effective interprofessional education enables effective collaborative practice" (WHO, 2013, p. 4). Current

interprofessional collaborative practice (IPC), has been defined as multiple healthcare workers from different backgrounds working together with patients, families, caregivers and communities to deliver the highest quality of care (WHO, 2010a). It has also been defined as a process involving communication and decision making to enable a synergistic influence of grouped knowledge and skills (Way, Jones, & Busing, 2000). Working collaboratively is necessary today to meet the needs of individuals with complex health issues and this imperative was recognized as far back as 2001 with the publication of the National Institute of Medicine's report, "Crossing the Quality Chasm: A New Health System for the 21st Century" (2001). The Affordable Care Act has implemented a variety of models of care that depend on integrated teams of providers to deliver superior care. There are many methods to accomplish IPC and IPE, one of the most innovative is using technology to bridge the gap between the need and availability of specific services.

Rationale

Interprofessional education and practice are imperative for developing competencies necessary and implementing strategies for our new health care environment. Knowing how to prepare students from different backgrounds to learn and then practice together is a necessary goal (Johnson, Haney, & Rutledge, 2015). As a first goal it is important to understand students' perception of interprofessional education, and interprofessional collaboration. This basic understanding of students' perceptions can lead to the development of innovative curricula across colleges (Zawawi & Elzubeir, 2012) and the impact will be seen in quality and cost-effective care for patients (WHO, 2013). Interprofessional education has been broached in counselor education, however, understanding how it is perceived by counseling students is rare (Johnson & Freeman, 2014). Social learning theory states that people learn behavior from their environment through observation, imitation, and modeling (Bandura, 1977). The theory

emphasizes that behaviors result from both the social interaction of people and their environments (Bandura & Jeffrey, 1973). This theory provides context to how counselors and other health care professionals can lack in areas, such as readiness for an interprofessional learning, simply because they have not had the experience. Counselors are typically trained in silos with counseling students and by counseling professors and may not have had the same exposure to other healthcare professionals during their graduate program. Based on existing literature in the field, the rationale, and theoretical framework, researchers sought to understand:

- Research Question 1: Which healthcare graduate program students (HGPS) showed a greater readiness for interprofessional learning?
  - Hypothesis: Counseling graduate program students will show the least amount of readiness for interprofessional learning.
- Research Question 2: Is there a difference between attitudes and perceptions of interprofessional education and collaboration held by HGPS?
  - Hypothesis: There will be no differences and HGPS will hold positive overall attitudes for interprofessional education and collaboration.
- Research Question 3: Is there a difference between comfort levels with technology among different HGPS?
  - Hypothesis: There will be no differences related to comfort with technology.

Method

A non-experimental correlational study was conducted. This design focuses on a systematic investigation of relationships among variables (Creswell, 2003). The limitation is that it does not identify direct cause-effect relationships (Creswell, 2003). The benefit of correlational designs is that they can typically assist in understanding the direction, degree, and strength of

relationships (Creswell, 2003). This particular study is a descriptive correlational design in which it was sought to describe the variables and the relationships that occur between and among them (Creswell, 2003). To that end an Analysis of Variance (ANOVA) was used to analyze the differences among group means in the sample of healthcare graduate program students (HGPS). Parametric test was chosen because of the usefulness when you have different variance amongst groups and more statistical power than that of non-parametric test. The primary goal was to understand the relationship between healthcare graduate program students (HGPS) and technology competence, interprofessional education and collaboration readiness.

Procedure

Student participants were recruited via an online interdisciplinary health promotions course they were enrolled in during the fall semester in 2014 at a southeastern public university. The course was chosen as the recruitment method because students in the course represented a variety of health related professional programs, including clinical counseling, dental hygiene, nursing, and physical therapy. Participation was voluntary, anonymous, and students completed the survey on a secure online website. An email was sent to all students enrolled in the course (N=114) once weekly for two weeks and $n = 111$ students responded to the invitation and completed the survey which closed after 30 days. Students completed the anonymous survey, which included a demographic questionnaire (seven items) and three surveys (Readiness for Interprofessional Learning Scale (RIPLS)- 19 items, Interdisciplinary Education Perception Scale (IEPS) – 18 items, Comfort With Technology (CWT) – 10 items via a secure online website (esurveyspro).

The response rate for the survey was 97% and the completion rate varied by survey, which was 98% for RIPLS, 91% for IEPS, and 95% for CWT.

Participants

Participants in this study included $N = 111$ students enrolled in a health related graduate level masters or doctoral program. Students included clinical counseling 15.3% ($n=17$), dental hygiene 6.3% ($n=7$), nursing 36% ($n= 40$) and physical therapy 42.3% ($n=47$). Descriptively, participants included a majority of female participants 83.7% ($n=93$) and a large number between the ages of 22 to 34 69.3% ($n=77$) with other ranges including 35 to 44 18% ($n=20$), 45 to 54 11.7% ($n=13$) and 55 to 65 .009% ($n=1$). Racially, most identified as White 85.5% ($n=95$) and other participants identified as Hispanic .018% ($n=2$), Asian .018% ($n=2$), Black .09% ($n=10$), and bi-racial .009% ($n=1$). Other information gathered about home location found most students identified being from a suburban area 44% ($n=49$) other areas identified were rural 22.5%($n=25$) and urban 32%($n=36$). The final demographic question asked participants to indicate how many years of field experience they have in their related profession and the majority had less than one year 38% ($n=42$), 2 to 5 years 32% ($n=36$), 6 to 10 years 13% ($n=14$), 11 to 15 years .06% ($n=7$), 16 to 20 years .05% ($n=5$), and 20 plus years .05% ($n=6$).

Instruments

Participants completed four questionnaires using a secured online website (esurveyspro). The first questionnaire included seven demographic questions. The demographic questions sought to gather information on the following: Age, sex, race, home location (rural, urban, suburban), years in the field, discipline, and previous experience of interprofessional education. These questions were chosen because of the need to describe the participants in the study.

Readiness for Interprofessional Learning Scale (RIPLS; Parsell & Bligh, 1999) is a nineteen-item scale (questionnaire 2). RIPLS uses a 5-point Likert scale, "strongly disagree (1)" to "strongly agree (5)" and is divided into four subscales, including: (1) Teamwork and

Collaboration (items 1-9, total possible score 45) a high score represents participant agreement with the importance cooperative learning; (2) Negative Professional Identity (items 10-12, total possible score) a high score implies that participants do not value cooperative learning with students in other health related professions; (3) Positive Professional Identity (items 13-16, total possible score 20) a high score indicates that participants value shared learning experiences; and (4) Roles and Responsibilities (items 17-19, total possible score 15) a high score indicates a distorted perception of one's own role and that of others in varying health care professions. This scale was used because it has been previously validated with students in various health professions and is widely used in assessing Interprofessional education readiness (Horsburgh, Lamdin, & Williamson, 2001). Table 1 documents the reliability of each subscale and the total scale, which was acceptable to good (Cronbach, 1951).

Interdisciplinary Education Perception Scale (IEPS; Luecht, Madsen, Taugher, & Petterson, 1990) is an eighteen-item scale that assesses participant attitudes towards persons in other professions. The IEPS uses a 6-point Likert scale, "strongly agree (6)" to "strongly disagree (1)" and includes four subscales: (1) Professional competence and autonomy (items 1,3,4,5,7,9,10, & 13) and a high score indicates that the participant believes his or her own profession is well educated and contributes significantly to the healthcare field; (2) Perceived need for professional cooperation (items 6 & 8) and a high score reflects the participants believe in the need to work collaboratively with other professions; (3) Perception of actual cooperation (items 2,14,15,16,17) and a high score indicates participants believe that their profession works well with other professions; (4) Understanding the value and contribution of other professions (items 11,12, & 18) where a high score indicates that the participant values other professions' contributions. The original study conducted by Luecht et al. (1990) found acceptable internal consistency reliabilities

(Cronbach, 1951) for the four subscales 0.872, 0.563, 0.543, and 0.518 respectively and a total

scale alpha of 0.872. Other studies using this measure with health care professionals and students

have found good construct validity and better or similar reliability (Goelen, DeClereq, Huyghens,

& Kereckhofs, 2006; Neil, Hayward, & Peterson, 2007). Reliability information for this scale is

included in Table 1.

Table 1
Instrumentation

Scale	Item numbers	Range of Possible Points	*N*	*M (SD)*	α
RIPLS	**1-19**	**19-95**	**109**	**47.65 (5.70)**	**.656**
Teamwork & collaboration	1-9	5-45	109	18.29 (5.09)	.843
Negative professional identity	10-12	3-15	113	12.24 (1.72)	.577
Positive professional identity	13-16	4-20	113	7.88 (2.24)	.734
Roles & responsibility	17-19 17R	3-15	113	9.21 (1.19)	.233
IEPS	**1-18**	**6-108**	**102**	**85.28 (7.83)**	**.856**
Professional competence and autonomy	1,3,4,5,7,9,10,13	8-48	105	38.59 (4.00)	.795
Perceived need for professional cooperation	6,8	2-12	111	10.27 (1.29)	.363
Perception of actual cooperation	2,14,15,16,17	5-30	108	24.71 (2.45)	.766
Values and contribution of other professions	11,12,18	3-18	108	11.77 (2.05)	.431
CWT	**1-10**	**5-50**	**106**	**35.52 (7.87)**	**.889**

Comfort With Technology (CWT) is a recently developed scale and has been used in other unpublished studies. The scale assesses the participants' comfort in using different forms of technology on a 5-point Likert type scale and item examples include, "I am comfortable using podcasts and podcasting" and "I am comfortable using a smartphone" (i.e. IPhone, Blackberry, Palm OS). A total mean score of 50 is possible and higher scores indicate higher levels of comfort using different forms of technology. The scale showed good internal consistency reliability (Cronbach, 1951) with an alpha of .889 with all 10 items.

Results

This investigation sought to understand the perception of interdisciplinary education and interprofessional collaboration and comfort with technology among healthcare graduate program students (HGPS). Data were collected using a secure website and were later exported to Microsoft excel (2010) and then migrated into and analyzed using IBM SPSS 20 software. A power analysis was calculated and a sample of 88 would be needed to obtain statistical power at the recommended .80 level (Cohen, 1988). Data was screened and it was determined that data cleaning was not necessary, as no corrupt or inaccurate records were found in the dataset.

Research Question One. Asked which healthcare graduate program students (HGPS) showed a greater readiness for interprofessional learning. It was hypothesized that Counseling graduate program students would show the least amount of overall readiness; and an ANOVA was utilized to answer the research question. Basic assumptions for running an ANOVA were checked. In terms of level of measurement, the dependent variable is measured using a continuous scale. The study participants meet the independence of observations assumption in that each observation (i.e. participant) could not have been influenced by any other observation (i.e. participant). Normal distribution was checked using a histogram and this assumption was violated; however, because

of the large sample size it did not prevent the use of an ANOVA (Tabachnick & Fidell, 2007, Chapter 4). Homogeneity of variance was checked using the Levene's test for equality of variances and the test was not significant, meaning this assumption was not violated.

The RIPLS total score, was utilized to answer this question. Dental hygiene had the highest total mean 51.14 (SD=9.31) indicating the most readiness for interprofessional learning, noteworthy is that Counseling had the second highest mean, above Physical therapy and Nursing. A one-way ANOVA found significant differences in the total RIPLS scale among the HGPS, F (3, 103) = 3.17, p=.02. A post hoc power analysis was conducted using the software package GPower (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size of 107 was used for the statistical power analyses of the four groups. The alpha level used for this analysis was $p < .05$. The post hoc analyses revealed the statistical power for this research question was .289, detecting a small effect (Cohen, 1977). Post hoc comparisons using the Tukey HSD did not show any significant differences at the .05 level between means in the total RIPLS scale and HGPS. A Tukey HSD test was used because the data met the assumptions of homogeneity of variances (Tukey, 1977).

To add additional clarity to the main findings, the four subscales were also utilized to understand in which areas of readiness different HGPS were prepared for. Results indicate higher means from dental hygiene 22.71 (SD=10.82) on the teamwork and collaboration subscale indicating that team work and collaborative learning is important. However, dental hygiene also had higher means in negative professional identity subscale 13.28 (SD=1.25) indicating less desire for cooperative learning. The subscale positive professional identity showed that counseling, dental hygiene, and nursing had means between 7.14 (SD=1.77) and 7.42 (SD=2.24) with physical therapy having the highest mean at 8.63 (SD=2.24) indicating that physical therapy students value shared learning experiences. The final subscale roles and responsibility had a low score of 8.00

(*SD*=1.00) for dental hygiene to 9.57 (*SD*=1.35) for nursing. A one-way ANOVA was conducted

for each of the four subscales (see Table 2).

Table 2
RIPLS HGPS means

	Counseling	Dental Hygiene	Nursing	Physical Therapy	Total	*F*
Teamwork & Collaboration	19.64 (6.93) (*n*=17)	22.71 (10.82) (*n*=7)	16.05 (3.39) (*n*=38)	19.00 (3.38) (*n*=45)	18.29 (5.12) (*n*=107)	5.44**
Negative Professional ID	12.70 (1.26) (*n*=17)	13.28 (1.25) (*n*=7)	12.40 (1.67) (*n*=40)	11.78 (1.82) (*n*=47)	12.24 (1.70) (*n*=111)	2.63*
Positive Professional ID	7.17 (1.97) (*n*=17)	7.14 (1.77) (*n*=7)	7.42 (2.24) (*n*=40)	8.63 (2.24) (*n*=47)	7.88 (2.25) (*n*=111)	3.32*
Roles & Responsibility	9.11 (1.05) (*n*=17)	8.00 (1.00) (*n*=7)	9.57 (1.35) (*n*=40)	9.10 (1.00) (*n*=47)	9.20 (1.19) (*n*=111)	4.07**
Total RIPLS	48.64 (7.35) (*n*=17)	51.14 (9.31) (*n*=7)	45.57 (4.96) (*n*=38)	48.46 (4.52) (*n*=45)	47.64 (5.74) (*n*=107)	3.17*

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

On the teamwork and collaboration subscale a one-way ANOVA found significant

differences among the HGPS, F (3, 103) = 5.44, p = .002. A post hoc power analysis was conducted

using the software package GPower (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size of

107 was used for the statistical power analyses of the four groups and the teamwork/collaboration

subscale. The alpha level used for this analysis was *p* <.05. The post hoc analyses revealed the

statistical power .368, detecting a medium effect (Cohen, 1977). Post hoc comparisons using

Tukey HSD test indicated that the mean difference (*M*=3.59 *SD*=1.40) for counseling and nursing

was significantly different at the p<.05 level. Additionally, Tukey HSD test indicated that the mean

difference (*M*=6.66, *SD*=1.98) for dental hygiene and nursing was significantly different at the

p<.00 level. Lastly, Tukey HSD test indicated that the mean difference (*M*=2.94, *SD*=1.06) for

physical therapy and nursing was significantly different at the p<.05 level. On the negative professional identity subscale a one-way ANOVA found significant differences among the disciplines, F (3, 107) = 2.63, p = .05. A post hoc power analysis was conducted using the software package GPower (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size of 111 was used for the statistical power analyses of the four groups and the negative professional identity subscale. The alpha level used for this analysis was *p* <.05. The post hoc analyses revealed the statistical power .262, detecting a small effect (Cohen, 1977). Post hoc comparison using the Tukey HSD test did not indicate significant differences among the disciplines at the .05 level. A Tukey HSD test was used because it met the assumptions of homogeneity of variances (Tukey, 1977). On the positive professional identity subscale, a one-way ANOVA found significant differences among the HGPS, F (3, 107) = 3.32, p= .02. A post hoc power analysis was conducted using the software package GPower (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size of 111 was used for the statistical power analyses of the four groups and the positive professional identity subscale. The alpha level used for this analysis was p < .05. The post hoc analyses revealed the statistical power .290, detecting a small effect (Cohen, 1977). Post hoc comparisons using Tukey HSD test indicated that the mean difference (*M*=1.21, *SD*=46) for physical therapy and nursing was significantly different at the p<.05 level. However, other disciplines did not differ significantly on the positive professional identity subscale. On the roles and responsibility subscale a one-way ANOVA found significant differences among the HGPS, F (3, 103) = 4.07, p = .00. A post hoc power analysis was conducted using the software package GPower (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size of 111 was used for the statistical power analyses of the four groups and the roles and responsibility subscale. The alpha level used for this analysis was *p* < .05. The post hoc analyses revealed the statistical power .320, detecting a medium

effect (Cohen, 1977). Post hoc comparisons using Tukey HSD test indicated that the mean score for dental hygiene (*M*=8.00, *SD*=1.00) was significantly different than the mean of nursing (*M*=9.57, *SD*=1.35) at the p<.05 level. However, other HGPS did not differ significantly on the roles and responsibility subscale.

Research Question Two. Is there a difference between attitudes and perceptions of interprofessional education and collaboration held by HGPS? It was hypothesized that there would be no differences and HGPS will hold positive overall attitudes for interprofessional education and collaboration. To answer this question an ANOVA was utilized with the IEPS total scale as the dependent variable. Basic assumptions for running an ANOVA were checked. In terms of level of measurement, the dependent variable is measured using a continuous scale. The study participants meet the independence of observations assumption in that each observation (i.e. participant) could not have been influenced by any other observation (i.e. participant). Normal distribution was checked using a histogram and this assumption was not violated. Homogeneity of variance was checked using the Levene's test for equality of variances and the test was not significant, meaning this assumption was not violated.

Physical therapy had the highest total mean score on the IEPS (*M*=88.50, *SD*=6.20). However, all HGPS had mean scores that were considered "positive overall attitude" based on the score. A one-way ANOVA found significant differences in the total IEPS scale among the disciplines, F (3, 100) = 6.07, p=.001. A post hoc power analysis was conducted using the software package GPower (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size of 101 was used for the statistical power analyses of the four groups. The alpha level used for this analysis was *p* < .05. The post hoc analyses revealed the statistical power for this research question was .396, detecting a medium effect (Cohen, 1977). Post hoc comparisons using Tukey HSD showed

significant mean differences among counseling and physical therapy (M= -7.63, SD=2.11, p=.003) and among dental hygiene and physical therapy (M= -8.21, SD=2.86, p = .02). A Tukey HSD test was used because the data met the assumptions of homogeneity of variances (Tukey, 1977).

For additional clarity the four subscales were included and results indicated higher means from physical therapy 25.31 (SD=2.25) on the professional competence and autonomy subscale indicating a high level of respect for their own profession and a sense that their profession significantly contributes to the healthcare field. Results indicated a higher mean from physical therapy (M=11.00, SD=1.00) on the second subscale perceived need for professional cooperation pointing toward a higher willingness to work cooperatively, however means among other professions hovered around a mean of 10. On the third subscale results indicated a higher mean for physical therapy (M=21.93, SD=2.56) on the perception of actual cooperation subscale. The fourth subscale results indicated a higher mean for physical therapy (M=30.34, SD=2.45) on the understanding the value and contribution of other professions subscale. Below are the results of one-way ANOVAs for each of the four subscales (see Table 3).

Table 3
IEPS HGPS means

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	Coun	Dental H	Nursing	PT	Total	*F*
Prof Comp &	22.11 (2.97)	22.71 (4.07)	24.20 (2.17)	25.31 (2.25)	24.23 (2.71)	7.79*
Autonomy	(*n=17*)	(*n=7*)	(*n=40*)	(*n=45*)	(*n=109*)	
Perceived Need	10.52 (1.28)	10.85 (.69)	10.43 (.94)	11.00 (1.00)	10.71 (1.03)	2.41
For Prof Coop	(*n=17*)	(*n=7*)	(*n=39*)	(*n=45*)	(*n=108*)	
Perception Act	20.40 (3.13)	19.71 (3.30)	21.43 (2.13)	21.93 (2.56)	21.38 (2.60)	2.41
Cooperation	(*n=17*)	(*n=7*)	(*n=39*)	(*n=43*)	(*n=106*)	
Understanding of	28.17 (3.14)	27.00 (13.26)	28.92 (2.96)	30.34 (2.45)	29.25 (2.96)	4.65*
Other Prof	(*n=17*)	(*n=7*)	(*n=39*)	(*n=43*)	(*n=106*)	
Total IEPS	80.86 (9.56)	80.28 (9.75)	84.97 (6.15)	88.50 (6.20)	85.50 (7.54)	6.07*
	(*n=15*)	(*n=7*)	(*n=37*)	(*n=42*)	(*n=101*)	

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

On the subscale professional competence and autonomy, a one-way ANOVA found significant differences among the disciplines, F (3, 108) = 7.79, p<.001. A post hoc power analysis was conducted using the software package GPower (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size of 109 was used for the statistical power analyses of the four groups and the professional competency/autonomy subscale. The alpha level used for this analysis was *p* < .05. The post hoc analyses revealed the statistical power .425, detecting a large effect (Cohen, 1977). Post hoc comparison using Tukey HSD test indicated significant mean differences among counseling and nursing (M = -2.08, SD=.71, p=.02), counseling and physical therapy (*M* =-3.19, *SD*=70, p=.00), and dental hygiene and physical therapy (*M*= -2.59, *SD*= 1.01, p=.05). A Tukey HSD test was used because it met the assumptions of homogeneity of variances (Tukey, 1977). On the subscale perceived need for professional cooperation a one-way ANOVA did not find

significant differences among the disciplines, $F_{(3, 107)} = 2.411$, p=.07. Post hoc comparisons were not computed because the ANOVA wasn't significant. On the subscale perception of actual cooperation, a one way ANOVA did not find significant differences among the disciplines, $F_{(3, 107)} = 2.42$, p=.07. Post hoc comparisons were not computed because the ANOVA wasn't significant at the .05 level. On the final subscale, understanding the value and contribution of other professions, a one-way ANOVA found significant differences among the disciplines, $F_{(3, 105)} = 4.65$, p=.004. A post hoc power analysis was conducted using the software package GPower (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size of 106 was used for the statistical power analyses of the four groups and the understanding of other professional's subscale. The alpha level used for this analysis was $p < .05$. The post hoc analyses revealed the statistical power .345, detecting a medium effect (Cohen, 1977). Post hoc comparison using Tukey HSD test indicated significant mean differences among Counseling and physical therapy at the .05 level ($M= -2.17$, $SD=.80$) and among dental hygiene and physical therapy at the .05 level ($M= -3.34$, $SD=1.14$). The other HGPS did not show significant differences.

Research Question Three. Is there a difference between comfort levels with technology among different HGPS? It was hypothesized that there would be no differences amongst HGPS and comfort with technology. This investigation sought to understand the different comfort levels with technology based on HGPS type an ANOVA was utilized to answer the research question. Basic assumptions for running an ANOVA were checked. In terms of level of measurement, the dependent variable is measured using a continuous scale. The study participants meet the independence of observations assumption in that each observation (i.e. participant) could not have been influenced by any other observation (i.e. participant). Normal distribution was checked using a histogram and this assumption was violated; however, because of the large sample size it did not

prevent the use of an ANOVA (Tabachnick & Fidell, 2007, Chapter 4). Homogeneity of variance was checked using the Levene's test for equality of variances and the test was not significant, meaning this assumption was not violated.

Higher means on the CWT scale indicates higher levels of comfort with technology. Results showed that counseling, dental hygiene, and nursing had almost the exact same mean scores 36.12, 36.71, and 36.94 respectively; physical therapy students were not far behind with a mean score of 34.02. A one-way ANOVA was used to test for differences in comfort level with technology among the different HGPS. Comfort levels did not significantly differ across disciplines, $F (3, 101) = 1.02$, $p = .386$ (see Table 4).

Table 4
Comfort with technology X HGPS

HGPS		*M*	*SD*
Counseling		36.1250	5.81808
Dental hygiene		36.7143	7.80415
Nursing		36.9459	8.32315
Physical therapy		34.0222	8.18393
	Total	35.5524	7.90932

Discussion

This research showed differences between professional students from various healthcare programs in their readiness for interprofessional learning and their perceptions of interdisciplinary education. As previously discussed, there has been a common effort by many healthcare professional organizations to promote interprofessional education and collaboration, and it is valued by most helping professions (Lapkin, Levett-Jones, & Gilligan, 2011). Finding ways to

optimize the placement of interprofessional courses in counselor education curricula might lead to improved readiness and attitudes toward interprofessional education. Additionally, technology is a valuable tool to help provide mental healthcare, especially to underserved groups, and at the same time promote interprofessional collaboration. This research showed that these interprofessional students, including counseling students, were comfortable with using various technologies.

Research question two addressed attitudes and perceptions toward IPE and the data revealed that all HGPS had positive attitudes related to IPE, which was hypothesized. The IEPS scale is more future focused in that it ask about your attitudes and perceptions toward IPE, unlike the RIPLS which ask about your current readiness to be involved in interprofessional education collaboration, which assist in explaining how Counseling students had similar results to other HGPS in research question two but in research question one when it asked about readiness for IPE counseling students had a lower mean than another group. This is helpful and notable in that counselor education students are just as receptive to IPE as other healthcare students. According to both the RIPLS and the IEPS, physical therapy as a group was stronger in both openness to teamwork and collaboration and in positive professional identity. The difference between physical therapy and the other professions was not large but this might indicate that PT is slightly ahead in interprofessional work compared to counselor education. PT students who choose to obtain further education go from a bachelor's degree to a doctoral degree and thus, they might feel a greater sense of professional identity, autonomy, and status as compared to the participants from counselor education (Plack & Wong, 2002).

When comparing this study's results to existing published data, a few important observations arose. In contrast to the findings from another study using the RIPLS (McFadyen,

Webster & Maclaren, 2006), scores on two of the RIPLS subscales were much lower in our sample: teamwork and collaboration and positive professional identity. Scores on negative professional identity were similar and they were higher on the roles and responsibility subscale in our data. This could possibly be due to the fact that our sample was made up of overwhelmingly young women with limited experience in their fields, whereas other samples included participants with more experience (Reid, Bruce, Allstaff & McLernon, 2006). In addition, our data was collected in a pilot course where students were working intentionally interprofessionally for the first time. Also, students worked on many group projects and may not have held positive attitudes toward the requirement to complete many group projects and this could explain lower scores on the teamwork subscale as compared to the McFadyen, Webster & Maclaren (2006) study. However, collaboration is an important aspect of the counseling profession (Ratts, Singh, Nassar-McMillan, Butler, & McCullough, 2016), so group work has its place within counselor education for good reason and can continue to encourage teamwork which is needed in interprofessional collaboration.

Another possible reason for the divergent results could be a symptom of the homogeneous sample of relatively young women. Imposter syndrome appears to impact women at a higher rate. Hence, the imposter syndrome might account for the higher scores on the RIPLS negative professional identity subscale. Imposter syndrome describes a phenomenon where young and/or inexperienced individuals perceive that they do not possess qualifications to complete tasks or jobs required of them (Kolligan & Sternberg, 1991). This is important for counselor education, because a large number of students are young women.

As hypothesized, in terms of the research question addressing technology, similar results were found amongst all HGPS. Modeling how to embrace technology and enhance our healthcare system in the counselor education classroom can continue to keep counseling students abreast of

the benefits of technology. Technology does not have to be complex to be a benefit; many providers as well as patients use smartphones to access helpful information and this use of technology is only going to increase (Anderson, 2015). Adding technology assignments in the classroom will help promote its effective use; counseling students can practice doing telemental health with their classmates even in an introductory techniques class (Fowler & Hoquee, 2016). It is critical that faculty become familiar with what is currently being done in clinical work and healthcare settings using technology and pass this along to our students. Observing and learning about a counselor educator using technology in their work with clients or in the classroom will model that behavior to the counseling students, which is in line with social learning theory. The overall positive views of IPE and technology from all the healthcare students, including counselor education students, bodes well for improving future professionals' clinical toolkits, especially in rural or underserved settings. It also is a positive indicator of counseling students' willingness to engage in IPE and technology-enhanced mental health services.

Implications

Healthcare is becoming more complex. Our population is aging and the Affordable Care Act has increased the numbers of people who are insured and seeking health care (Administration on Aging, 2014, Commonwealth Fund, 2014). To meet the needs of our population, knowing how to work together and how to make the best use of technology will be necessary. To date, interprofessional research is still growing and there are few studies about graduate students in intentionally developed interprofessional courses that include a behavioral health specialty group like counselors (Bridges, Davidson, Odegard, Maki & Tomkowiak, 2011). The profession of counseling does not require interprofessional education, unlike other healthcare disciplines but there are statements discussing interprofessionalism in our CACREP accreditation standards.

Counselor educators are adapting to the changing scope of healthcare, and further promotion of interdisciplinary study opportunities is important.

Modeling, experiential learning experiences, and other social learning theory tenets in relation to telemental health and interprofessional collaboration being incorporated in a counseling program will help counseling students feel more comfortable in interprofessional settings (Johnson, 2016). For example, bridging the gap between schools of education and schools of medicine to have joint courses is one option. Additionally, guest lecturers from outside of the counseling discipline can bring unique healthcare perspectives to introductory counseling courses. Counseling students can also be given the opportunity to shadow or intern at an integrated healthcare setting or one where telemental health is used. When counseling students observe their counselor educators collaborating with healthcare professionals from outside of counseling, they will learn its benefits and be motivated to do the same.

The benefits of intentional emphasis on interprofessional collaboration are seen in this study's data: physical therapy students held significantly higher means than counseling students on the Interdisciplinary Education Perception Scale (IEPS). Section 6F of the CAPTE accreditation standards for physical therapy require interprofessional courses to be implemented and the majority of programs had existing interprofessional courses before the mandatory requirement (APTA, 2017). The role of accreditation could explain the differences in this study data in terms of readiness and attitudes toward interprofessional education. CACREP has softer language in terms of interprofessionalism, namely just to engage if necessary, perhaps strengthening this language could be beneficial to counselor educators advocating for more IPE opportunities for counseling students.

Limitations

Study limitations include using a convenience sample, which is more at risk for under-representation in the sample. Underrepresentation and generalizability was a limitation in this study with the majority of the study population being White women. The lack of ethnic or gender diversity limits the ability to predict whether IPE and telehealth will be embraced more broadly. Another limitation of using a non-experimental study design is that it cannot find a cause and effect relationship. Lastly, there is risk of a Type 1 error because multiple ANOVAs were used, however, ANOVA typically is robust enough to protect against Type 1 errors. Additionally, a MANOVA was not utilized because the dependent variables were found not to correlate, and the research literature nor theory led to a research question focused on understanding patterns amongst the dependent variables and how they are related to healthcare students. The literature pointed to the first step being to understand the relationships amongst healthcare students and interprofessional education, collaboration, and technology competency independently; with the current projects contribution future research could investigate relationships amongst the dependent variables.

Future Research

While most providers are comfortable with the technologies used in telehealth such as smart phones, tablets, computers, and video conferencing they are not comfortable with the specific usage of telehealth. Studies have demonstrated that even the professional that was trained through a distant learning platform is unfamiliar and uncomfortable with the telehealth technologies (Nguyen, Zierler, & Nguyen, 2011). Without preparation and resulting increased comfort, the likelihood that counseling professionals will invest in telehealth is unlikely. Future research should go beyond a generalized sense of comfort with technology and begin or continue to train counseling students with specific telehealth technology.

It would also be helpful to continue to research other groups in the health professions. Differences between groups in this study were fairly minimal and perhaps because most of these groups were made up of allied health professions where collaboration is not unusual. Adding in other health professions groups such as physicians or physician assistants might add something to the understanding of both IPE and comfort with telehealth, especially as compared to students in counseling education programs.

The lower scores than previously documented on the RIPLS positive professional identity subscale might be explained by a lower sense of self-esteem and lack of experience in the field. Some data suggests that self-esteem, self-efficacy, locus of control, and emotional stability are good predictors of job satisfaction and performance (Judge & Bono, 2001). This study did not assess these variables, but the age of respondents and relative lack of field experience suggests that these other factors might be influential as well. Future research might do well to include these variables to factor them in or out because it might make sense that as the students take more IPL courses and develop more of their professional identity, scores will rise. We suggest a consideration of the placement of IP courses. Some might argue that it is good to introduce them early, as was the case in this study. One benefit of that is that students will become adapted to working interprofessionally. However, the cost appears to be that it might take longer to establish positive professional identity in one's own profession. Higher scores on negative professional identity might have arisen because this data was collected at the beginning of their interprofessional experience. Pedagogically and in terms of course sequencing, the results from this study seem to indicate that for the professions listed, it would be beneficial to organize the counseling program curriculum to optimize positive professional identity before introducing interprofessional experiences with other healthcare providers.

Conclusion

The combination of IPE and technology is a direct pathway to improving the communication and delivery of services in our mental healthcare and healthcare systems. Technology is growing immensely and although its use in healthcare is not new, there are many more types of health technology and telemental health technology in use today. A variety of providers, especially in rural environments, can use various technologies to obtain information and consultation in a shorter period than would take place otherwise. Mental health providers, for example, have used videoconferencing technology very successfully to provide more timely services or to reach underserved or vulnerable populations. Visits done this way have been shown to be very effective and cost saving to our healthcare system (Grady et al., 2011, Merrell & Doarn, 2014). While IPE and telehealth are gaining attention, universities that are preparing the professionals of tomorrow are struggling with equally innovative methodologies to bring various professional students together for meaningful collaborative learning endeavors with also incorporating telehealth technologies. This study supports the idea that students may need assistance in becoming comfortable with specific telehealth technologies. Finally, the study suggests that counselor educators might want to consider curriculum placement when moving toward encouraging interprofessional education.

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