

Curricular Revision and Assessment of Undergraduate Interprofessional Education



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Modern healthcare professionals must meet the demands of acquiring information at an escalating pace (Densen, 2011). This information overload adds complexity to the healthcare field requiring future providers to maximize efficiencies by practicing with a diverse array of healthcare providers (Koulopoulos, 2020). College students who desire a career in the health professions, begin their discovery of professional scope through their undergraduate programs. Currently, there lacks uniformity in undergraduate curricula in knowledge, skills and behaviors necessary for collaborative practice in future healthcare systems (Aldriwesh et al., 2022).

During a curricular review of the Bachelor of

Health and Exercise Science undergraduate program at Regis University, our development team sought a fundamental change in curricular design for students pursuing a health or professional graduate education to address the shift in healthcare practice. This development team thoughtfully considered the foundational knowledge, skills, and behaviors required by our learners to successfully matriculate to the next level of their careers. This article aims to share one university's blueprint and story of implementation.

Originally, our curriculum did not include any aspects of interprofessional education and lacked a longitudinal view of these learners' progression toward confidence working in teams. Students had not been introduced to future professional roles and did not work in teams within nor between undergraduate and professional programs. Finally, the Commission of Accreditation for the Exercise Sciences anticipated updating their standards to require internships, elevating our need to emphasize application of people skills and not only exercise science knowledge (Standards and Guidelines for Accreditation of Education Programs in Exercise Sciences, 2022).

Searching for theoretical-based studies from which to start, few articles could be found

(Aldriwesh et al., 2022; Brashers et al., 2016). Nationally established frameworks provided guideposts, yet many had limitations. The National Academy of Sciences suggested "all undergraduates have access to education in public health" (Hernandez et al., 2003). However, that decree omitted the reality that the road to health professional careers is often circuitous, as not all pre-medical/health students come from a public health degree program. The World Health Organization (WHO) compiled a critical report titled *Framework for Action on Interprofessional Education & Collaborative Practice* providing value, language and inspiration around the work (World Health Organization, 2010). Yet the undergraduate aspects of the report occurred primarily in countries other than the United States (Almàs & Barr, 2008; Areskog, 1994; O'Halloran et al., 2006). A consensus document from Health Professions Accreditors Collaborative produced an equally important document to guide this work, yet spoke primarily to the graduate or professional years of education (Health Professions Accreditors Collaborative, 2019).

In an article on the subject of interprofessional education at the undergraduate level, researchers suggested

Figure 1: Modified Kirkpatrick Model with suggested learner stages (Hammick et al., 2007)

Level of Learning	Description	Learner Timeline
Level 1: Reaction	Learners' views on the learning experience and its interprofessional nature.	Foundational Year
Level 2a: Modification of perceptions & attitudes	Changes in reciprocal attitudes or perceptions between participant groups. Changes in perception or attitudes toward the value and use of the team approaches to caring for specific client groups.	Foundational Year
Level 2b: Acquisition of knowledge & skills	Including knowledge and skills linked to interprofessional collaboration.	Foundational Year Graduate/PY 1
Level 3: Behavioral change	Identifies individuals' transfer of interprofessional learning to their practice setting and their changed professional practice.	Graduate/PY 1-2
Level 4a: Change in organizational practice	Wider changes in the organization and delivery of care.	Graduate/PY 2-4
Level 4b: Benefits to patients/clients	Improvements in health or well-being of patients/clients.	Post Licensure, Residency, Fellowship and Practitioner

students start their interprofessional preparation early, subsequently longitudinally building skills (Breitbach et al., 2020). Inspired with this value of learning at the undergraduate or foundational level together with an awareness of core competencies established for interprofessional education, a thoughtful intention toward established competencies in concert with collaboration between students became the spirit of the curricular revision (Interprofessional Education Collaborative Expert Panel, 2011).

One national model that visually included undergraduate/foundational learning and reiterated the long-term build included the Interprofessional Learning Continuum (IPLC) model developed by the Institute of Medicine (Cox, 2015). The continuum can be [found here](#) on page 29.

Applying the strategy “begin with the end in mind” we created a series of questions outlined in steps below, to help prioritize what to integrate into the undergraduate curriculum and how to best prepare our learners for the graduate/professional year (PY) phase of their Doctor of Physical Therapy (DPT) education and entry into interprofessional practice (IPP) (Covey, 1991).

Step 1: What knowledge, skills, and abilities do the newly licensed DPTs entering practice need to be prepared to successfully engage in interprofessional (IP), team-based care?

Step 2: What foundational learning experiences are needed for the undergraduate students in pre-health and pre-medicine programs in effective leadership, teamwork and inclusivity to be prepared to engage in IP learning and practice during their program’s graduate/PY phase?

Step 3: How do we evaluate progress and outcomes at each level and link those to learning experiences at the next level of practice?

From here, our development team also considered evaluating our outcomes beyond changing attitudes or positive reactions to the IPE undergraduate experiences using the Modified Kirkpatrick Framework (Hammick et al., 2007). Measuring core competencies of an undergraduate learner as a freshman (foundational Year 1), and then again as they matriculate to PY level learning would help determine progressions in the Interprofessional Learning Continuum during their undergraduate academic career. Core competency attainment data could inform educators at the graduate level of their students’ readiness to step into clinical

Table 1: Undergraduate IPE Curriculum Blueprint

Developmental Content of IPE and Applied Teamwork	
FRESHMAN	SENIOR
Outcome Assessment: ICCAS (Archibald et al., 2014)	Assignment 1: Observe and assess a current team in your internship, through the Jefferson Teamwork Observation Guide (Lyons et al., 2016).
Lecture 1: Define IPE terms, explanation and historical perspective of each aim in the Quadruple Aim (Rathert et al., 2018).	Virtual session 1: Discuss attributes of a team discussed in lectures and observed during the activity of assessing a team.
Lecture 2: Investigate leadership, personality assessments (True Colors Assessment), and inform on healthy resolutions of conflict (Cooper, 2009; Saltman et al., 2006).	Assignment 2: A case study of a patient/client who experienced health and wellness care as they traveled in and out of the medical system. Students assigned to take on the professional role currently observed in their internships. Placed in a situational team with their peers, the students would record a team meeting on the case.
Lecture 3: Discuss diversity, equity and inclusion, including watching a video on privilege, What is Privilege (BuzzFeedYellow, 2015), discuss cultural sensitivity scales (Intercultural Development Inventory) report on inequities in healthcare and identify the gender continuum leading to co-creating language to address injustices during future internships (Hammer & Bennett, 2012).	Virtual session 2: The case’s answer key was reviewed, answering questions about various health and wellness members’ level of education, scope of practice and potential challenges in representing the role.
Assignment 1: Interview a graduate student or professional in an area of health or wellness continuum, per student interest, engaging with the power of socialization (Khalili et al., 2013).	Formative Assessment: To assess student leadership, each member would self-assess their collaborative skills using the Self-assessed Collaboration Skills Instrument (Hinyard et al., 2019).
	Summative Assessment: ICCAS (Archibald et al., 2014).

training on teams with other professions. From this work, information could further refine Kirkpatrick’s classification of IP outcomes by pairing it with a suggested timeframe, as seen in Figure 1.

With more clarity on knowledge and skills appropriate for learner level, the strategy of delivery remained unclear. A growing body of evidence supported activity design to include aspects of group learning, reporting on the benefits of both team-based learning (TBL) and problem-based learning (PBL) (Burgess & McGregor, 2021; van Diggele et al., 2020). Attentive of our graduates’ future charge of effective teamwork skills, our design scaffolded acquisition of knowledge, skills and healthy affective behaviors in a variety of team interactions. Prioritizing teamwork required exchanging and condensing content for these valuable assignments to take place. Finally, application of teamwork skills became the focus of the

curriculum during senior intern sites in the community.

As a result of integrating all of these pieces of information, our *Undergraduate IPE Curriculum Blueprint* emerged as a mental model for the team to consider the integration and outcomes of our IPE initiatives. See Table 1.

To gauge the learning during the course of the IPE curriculum, the Interprofessional Collaborative Competencies Attainment Scale (ICCAS) became the summative assessment for the beginning of the freshman year and end of the senior year (Archibald et al., 2014). Open access to this tool can be [found here](#).

Our intended study design possessed a longitudinal approach measuring change of ICCAS scores from freshman to senior year, and therefore the final results are not complete. The analysis of this data together with focus groups of students experiencing

this curriculum from freshman to graduating senior, will help inform our development team of the effectiveness of this curricular change. While the sample size from the assessment of this curricular revision is small, we hope to share the longitudinal study results when our current freshmen graduate.

Our understanding of the undergraduate learner is slowly developing and the data toward measuring the change in knowledge, skills and behaviors needed for the foundational interprofessional education curriculum is maturing. This developmental schema is only one path that one undergraduate and one graduate educator created. Future studies should continue to assist in curricular standardization for incoming graduate/PY students as well as a development of a deeper awareness of various future healthcare and wellness career paths.

Graduate level programs have course requirements in the sciences; in recognition of the team-based work of health and wellness careers, should competency in areas of teamwork (Fitzpatrick's 1-2b levels) be required as well? Until there is more uniformity, other challenges will arise for undergraduate educators with students interested in a future in health and wellness. For undergraduate educators who teach in programs where the level of education for licensed healthcare practice is at the undergraduate level, like in nursing, how can this content be added to an already full curriculum? Without beginning to build teamwork skills in the foundational years, skills and behaviors needed for collaborative practice become "on the job" training. Healthcare educators are being called upon to standardize measures upstream to the various undergraduate degree programs toward this future work of a complex but collaborative practice.

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References

Aldriwesh, M. G., Alyousif, S. M., & Alharbi, N. S. (2022). Undergraduate-level teaching and learning

approaches for interprofessional education in the health professions: A systematic review. *BMC Medical Education*, 22(1), 1-14

Almås, S. H., & Barr, H. (2008). Common curricula in Norway: Differential implementation and differential outcomes in undergraduate health and social care education. *Journal of Interprofessional Care*, 22(6), 650-657.

Archibald, D., Trumppower, D., & MacDonald, C. J. (2014). Validation of the Interprofessional Collaborative Competency Attainment Survey (ICCAS). *Journal of Interprofessional Care*, 28(6), 553-558.

Areskog, N. H. (1994). Multiprofessional education at the undergraduate level—the Linköping model. *Journal of Interprofessional Care*, 8(3), 279-282.

Brashers, V., Erickson, J. M., Blackhall, L., Owen, J. A., Thomas, S. M., & Conaway, M. R. (2016). Measuring the impact of clinically relevant interprofessional education on undergraduate medical and nursing student competencies: A longitudinal mixed methods approach. *Journal of Interprofessional Care*, 30(4), 448-457.

Breitbach, A. P., Pole, D., Rauvola, R. S., Kettenbach, G., & Hinyard, L. (2020). Longitudinal Assessment of Students' Perceived Collaboration Skills at an Institution with a Structured Interprofessional Education Curriculum. *Journal of Allied Health*, 49(4), 235-248.

Burgess, A. W., & McGregor, D. M. (2021). Use of Established Guidelines When Reporting on Interprofessional Team-Based Learning in Health Professions Student Education: A Systematic Review. *Academic Medicine*, 97(1), 143-151.

BuzzFeedYellow. (2015, July 4). "What Is Privilege?" [YouTube]. Retrieved from <https://www.youtube.com/watch?v=hD5f8GuNuGQ>.

Cooper, W. (2009). *True Colors Personality Test*.

Covey, S. R. (1991). *The seven habits of highly effective people: Audio learning system application workbook*.

Cox, M. (2015). *Committee on Measuring the Impact of Interprofessional Education on Collaborative Practice and Patient Outcomes*. The National Academies Press.

Densen P. (2011). Challenges and opportunities facing medical education. *Transactions of the American Clinical and Climatological Association*, 122, 48-58.

Health Professions Accreditors Collaborative. (2019). *Guidance on Developing Quality Interprofessional Education for the Health Professions*. Retrieved June 1, 2022, from <https://healthprofessionsaccreditors.org/wp-content/uploads/2019/02/HPACGuidance02-01-19.pdf>.

Hammer, M. R., & Bennett, M. (2012). *The intercultural development inventory. Student*

learning abroad, 115-136.

Hammick, M., Freeth, D., Koppel, I., Reeves, S., & Barr, H. (2007). A best evidence systematic review of interprofessional education: BEME Guide no. 9. *Medical Teacher*, 29(8), 735-751.

Hernandez, L. M., Rosenstock, L., & Gebbie, K. (Eds.). (2003). *Who will keep the public healthy?: Educating public health professionals for the 21st century*. National Academies Press.

Hinyard, L., Toomey, E., Eliot, K., & Breitbach, A. (2019). Student perceptions of collaboration skills in an interprofessional context: Development and initial validation of the self-assessed collaboration skills instrument. *Evaluation & The Health Professions*, 42(4), 450-472.

Interprofessional Education Collaborative Expert Panel. (2011). *Core competencies for interprofessional collaborative practice: Report of an expert panel*. Washington, D.C.: Interprofessional Education Collaborative.

Khalili, H., Orchard, C., Laschinger, H. K. S., & Farah, R. (2013). An interprofessional socialization framework for developing an interprofessional identity among health professions students. *Journal of Interprofessional Care*, 27(6), 448-453.

Koulopoulos, T. (2020). *Reimagining Healthcare: How the Smartsourcing Revolution Will Drive the Future of Healthcare and Refocus it on what Matters Most, the Patient*. Post Hill Press.

Lyons, K. J., Giordano, C., Speakman, E., Smith, K., & Horowitz, J. A. (2016). Jefferson Teamwork Observation Guide (JTOG): An instrument to observe teamwork behaviors. *Journal of Allied Health*, 45(1), 49-53C.

O'Halloran, C., Hean, S., Humphris, D., & Macleod-Clark, J. (2006). Developing common learning: The new generation project undergraduate curriculum model. *Journal of Interprofessional Care*, 20(1), 12-28.

Rathert, C., Williams, E. S., & Linhart, H. (2018). Evidence for the quadruple aim. *Medical Care*, 56(12), 976-984.

Saltman, D. C., O'dea, N. A., & Kidd, M. R. (2006). Conflict management: A primer for doctors in training. *Postgraduate Medical Journal*, 82(963), 9-12.

Standards and Guidelines. CoAES. (2022) Retrieved June 1, 2022, from <https://www.caahep.org/Program-Directors/Standards.aspx>.

van Diggele, C., Roberts, C., Burgess, A., & Mellis, C. (2020). Interprofessional education: Tips for design and implementation. *BMC Medical Education*, 20(2), 1-6.

World Health Organization. (2010). *Framework for action on interprofessional education and collaborative practice* (No. WHO/HRH/HPN/10.3). World Health Organization.