

## POTENTIAL PATTERN

### ▲ **Building Interdisciplinary Teamwork Among Allied Health Students Through Live Clinical Case Simulations**

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Building interdisciplinary teamwork among allied health professionals involves more than coordinating services. Professionals also must integrate their various understandings of a patient's health and determine mutual health care goals while still working within limited resources.<sup>1</sup> When building genuine interdisciplinary teamwork, allied health professionals coordinate patient care through shared learning, interaction, and collaboration.<sup>2</sup> A limited, yet growing, body of research suggests that health care students educated in interdisciplinary teamwork may become more collaborative professionals in the workplace, which, in turn, may foster more productive and satisfied health care professionals.<sup>3-6</sup> Most important, researchers have identified lower mortality and morbidity rates, fewer hospitalizations, decreased costs and improved function by patients among significant health benefits of interdisciplinary teamwork, especially when it is applied to underserved and geriatric populations.<sup>7-12</sup> Such positive outcomes have prompted medical schools and accreditation boards of many allied health professions to add interdisciplinary education into their training requirements.<sup>13,14</sup>

Meeting these requirements have challenged universities, like our own at The University of South Dakota (USD), where there are multiple allied health programs and limited time, faculty, and financial resources to coordinate interdisciplinary education. The challenges have been magnified by insufficient research on the most effective methods to educate university students about interdisciplinary teamwork. This article presents the background, evolution, and key building blocks of one such method: A simulation-based workshop designed at USD over seven years to educate its allied health students *about* various health professions *through* shared learning, interaction, and collaboration. The workshop is now an annual event in which over 200 students and dozens of faculty from twelve allied health and medical programs at USD

participate in live clinical case simulations of elderly clients (played by faculty) interacting with interdisciplinary health care teams (composed of students).

### **Background in Interdisciplinary Education**

At the turn of this century, Lavin and colleagues from Saint Louis University conducted a meta-analysis of over 100 articles from the previous four decades dealing with interdisciplinary education.<sup>15</sup> The primary issues emphasized were professional identity in the 1960s, core competencies and content in the 1980s, and interdisciplinary education models in the 1990s. One question, nevertheless, continued to be asked throughout these years: How can educators best integrate interdisciplinary education of students throughout a university?<sup>15</sup>

Two groups of researchers addressed this question in studies of university students from the United Kingdom.<sup>2,15</sup> Cooper and colleagues surveyed undergraduate health care students about their education in interdisciplinary teamwork.<sup>2</sup> The dominant teaching methods were small groups, case studies, and experiential learning; however, traditional didactic teaching still represented over one-third of the interventions. Although knowledge of professional roles and interdisciplinary teamwork improved among students, the researchers concluded there was no clear impact on professional practices due to a lack of long-term evaluations. Pirrie and Wilson, likewise, conducted a two-year evaluation of interdisciplinary education among health care students, course organizers, and professionals from ten universities and four cooperating healthcare sites.<sup>16</sup> The authors concluded that interdisciplinary education contributed to professional development of health care students; however, it was most effective for graduate students due to their greater sense of professional identity and confidence in exchanging ideas.<sup>16</sup> Factors necessary for successful interdisciplinary education were convincing faculty and students of its importance and having educational leaders committed to working collaboratively. Factors

inhibiting interdisciplinary education were a need to maintain professional identity, excessive requirements of national boards, disparities in student numbers among health professions, a lack of suitable accommodations for teaching large numbers of students, and coordination across disciplines with different timetables.<sup>16</sup>

Similar barriers to building interdisciplinary teamwork have occurred in the United States as funding for demonstration projects grew and partnerships between communities and universities expanded.<sup>17</sup> When the PEW Charitable Trust funded interdisciplinary partnerships between the community institutions and universities, community partners complained universities operated in bureaucratic ways that hindered interdisciplinary cooperation; university departments were fragmented, compartmentalized, and political; and the burden of coordinating across health care disciplines too often fell on community partners rather than on university faculty who often were unaware of each other or unwilling to work together. The W.K. Kellogg foundation, likewise, supported five-year community partnerships involving interdisciplinary health care teams. Follow-up studies identified interdisciplinary components (e.g., maintaining professional identities, territorial boundaries, structural differences, high costs, and unclear goals) as posing the greatest challenges to sustaining these partnerships.<sup>17</sup>

Researchers at a few universities have stressed benefits of educating allied health and medical students about interdisciplinary teamwork using structured, problem-based learning. Among the more popular and promising methods have been teams of students from different disciplines working together on clinical case simulations using written scenarios,<sup>18</sup> real clients,<sup>3</sup> or a combination of both.<sup>4</sup> Based on educational models suggesting collaborative learning among adults is enhanced through hands-on realistic experiences,<sup>19,20</sup> Anderson<sup>21</sup> has encouraged early training of medical school students with real-life clinical scenarios and environments using

virtual or live substitutes for real patients. This training is followed by “facilitated debriefings” by faculty to evaluate students’ achievement of performance targets. This simulation-based learning may provide students opportunities to achieve clinical competencies in a safe environment that allows students to make mistakes without harming real patients.

A limited number of researchers have applied problem-based and simulation-based learning to interdisciplinary training of students serving geriatric clients, a population who often has multiple health problems requiring attention from professions in various fields.<sup>22</sup>

The Hartford Foundation, for example, supported a Geriatric Interdisciplinary Team Training program in which working healthcare professionals and college students convened periodically for interdisciplinary training using experiential exercises, training videos, and live clinical case simulations in which trained actors portrayed clinical manifestations of actual patients.<sup>23</sup>

Participants, nevertheless, identified barriers to employing these more innovative and realistic methods, such as scheduling conflicts, diverse skill levels, inadequate collaboration between college and work settings, insufficient faculty and field instructors, and differences in professional cultures.<sup>23</sup>

### **Evolution of Our Interdisciplinary Workshops**

Around the same time others were exploring the above interdisciplinary programs, partnerships, and methods, faculty from seven allied health disciplines at USD designed a full-day, interdisciplinary didactic-based workshop for their students in the fall of 1999. In the morning, faculty lectured about their respective health professions; how their respective professions contributed to health care of seniors; and their roles on interdisciplinary teams. In the afternoon, students were divided into interdisciplinary groups to develop and discuss health care plans for five clinical case studies of seniors written by faculty. On the post-workshop

questionnaires, students reported the workshop increased their knowledge of other health professions; but it was too long, the faculty lectures were too redundant, and the room was too noisy when groups discussed case studies. Student evaluations, disappointingly, were no better for our 2000 workshop in which we added a faculty demonstration of how a multidisciplinary team worked on a case.

This led to major changes in our 2001 workshop. First, we reduced its length to only a four-hour morning session by replacing faculty lectures with handouts describing each healthcare profession. Second, faculty rewrote two of the previous five clinical case studies into “scripts” and faculty acted out their parts as live clinical case simulations. Third, instead of students meeting in one large room, faculty divided the 100 students into twelve interdisciplinary teams that met in smaller conference rooms in the USD Student Center. Students greeted these changes so well that we just readjusted this simulation-based framework during future workshops. For the 2002 workshop, faculty designed medical charts with brief histories, diagnostic findings, and prescriptions from each discipline. Medical charts and scripts were enhanced even further in 2003, 2004 and 2005 when students from other allied health, medical and physician assistant programs students joined the workshop.

The workshop currently begins with students taking 15 minutes to find the room where their team was assigned and to introduce themselves and their discipline to other team members. Each member also fills out a pre-workshop questionnaire composed of four-level scales of how comfortable they are in the knowledge of each of the different disciplines represented at the workshop including the services provided, as well as a similar four-level scale of how comfortable they are in representing their own discipline. Faculty members then enter the room role-playing a senior and students are given 45 minutes for the interview. If students ask about

specific diagnostic tests or medications, the client either answers from the memorized script or gives the team slips of paper describing the results or prescriptions. The client then leaves the room and students are given 30 minutes to create a health care plan. Faculty return to the room for 15 minutes as the students offer recommendations. Faculty then step out of character for a 15-minute debriefing where they provide feedback and answer questions about the interview, the plan, and teamwork. After a short break, the student teams reconvene and repeat the same steps during a second, different, live clinical case simulation. The workshop concludes with students completing a post-workshop questionnaire with the same four-level scales they filled out earlier; as well as writing comments about the workshop and how it could be improved.

### **Key Building Blocks of Our Interdisciplinary Workshops**

Many of the challenges we faced during the seven-year evolution of our interdisciplinary workshops mirror challenges cited in previously mentioned reports on improving interdisciplinary education. Accordingly, we have described the key building blocks of our interdisciplinary workshops to address these challenges.

*Bureaucratic Fragmentation Between University Departments:* The PEW Commission<sup>17,24,25</sup> reported that university departments typically are not structured to enable interdisciplinary education and communication. As recommended by Silver and colleagues,<sup>26,27</sup> we have tried to overcome this bureaucratic fragmentation by maintaining a core faculty who attend a few strategic planning and debriefing meetings during the months before and after the workshop. This core faculty included at least one faculty member from each discipline who is committed to interdisciplinary education; but did not include some of the additional faculty members who play clients during the workshop. We usually scheduled these meetings over the lunch hour to accommodate tight teaching and supervision schedules.

*Compartmentalization and Politics Within University Departments:* We mainly encountered this challenge, also cited by the PEW Commission,<sup>17,24,25</sup> when we needed to draw faculty and students from a variety of academic departments within the College of Arts and Sciences, the School of Business, and the School of Medicine and Health Sciences. We quickly realized it was imperative that deans and department chairs recognized the importance of the workshops enough to allow their students and faculty time to prepare and attend them. Fortunately, this is no longer a major challenge as upgrades in accreditation requirements of nearly all academic disciplines call for more interdisciplinary training of their students.

*Maintaining Professional Identities and Territorial Boundaries:* We recognized this challenge, also identified in the Kellogg Foundation,<sup>17</sup> as an early potential barrier to our workshops. One tool we have used effectively to preserve professional identities was to have faculty develop a handout describing their own discipline using a rubric including title and professional education, primary services, and typical reimbursement and insurance coverage. The information from each discipline was then consolidated into a single handout. Professors have been encouraged to discuss this handout with their students prior to the workshop, noting where their own discipline overlaps and differs with services provided by other disciplines.

*Structural Differences, Workshop Scheduling and Costs:* One or more of these challenges have been cited in several reports on interdisciplinary education.<sup>17,22,26,27</sup> We have scheduled the workshop one year in advance to increase student and faculty attendance and to avoid leaving out interested disciplines. This early planning respects each discipline's scheduled events and guarantees sufficient conference rooms to accommodate the numerous teams. This advanced notice also has enabled the workshop to become a requirement for students in one course in each



discipline. At least one week before the workshop, faculty are e-mailed room assignments, the workshop agenda, and the disciplines handout to prepare the students for the actual workshop.

*Discipline Representation:* Ideally, each interdisciplinary team at our workshops would have included one student from each discipline. In reality, large disparities in the size of disciplines have made equal representation on teams a constant challenge. Table 1 shows how the number of students attending varied markedly among the disciplines. The most students attending were from medicine, whereas about one-tenth as many students attended from audiology. It is likely other universities will face these disparities and we have found some partial remedies. If a team lacked a student from one underrepresented discipline (e.g., a dietetic intern), we assured the team had a student from another underrepresented discipline (e.g., an occupational therapist). Likewise, faculty offered recommendations for missing disciplines during their debriefings with students after each of the two case simulations. Other options for this challenge have been to invite students in underrepresented disciplines from area colleges and invite undergraduate students in disciplines with fewer graduate students (e.g., seniors from communication disorders would join graduate students in audiology and speech-language pathology).

*Student Evaluation of Workshop Targets:* Anderson<sup>21</sup> encouraged early simulation-based training of health-care students in safe environments where they can make mistakes without harming real clients, followed by facilitated debriefing of students to evaluate achievement of performance targets. The major target of our interdisciplinary workshops was to educate students *about* various health professions *through* shared learning, interaction, and collaboration. Faculty first evaluated student achievement through a debriefing after the first live clinical case

simulation. In general, during the second simulation, students rectified many of the problems identified during the debriefing after the first simulation.

Analyses of our pre-workshop and post-workshop questionnaires were invaluable in providing quantitative and qualitative information on how well students achieved the workshop target as well as how we could improve future workshops. Markedly different findings were revealed on pre-workshop and post-workshop questionnaires when students rated how comfortable they were in their knowledge of other disciplines and the services they provide. Most students showed pre-workshop ratings at the lower two levels of comfort: “not real comfortable” or “somewhat comfortable.” Most of these same students, in contrast, showed post-workshop ratings at the higher two levels of comfort: “know discipline, still some discomfort” or “very comfortable.” Table 1 details the percentages of students’ comfort in knowing about each of the twelve different disciplines from before to after the workshop. Depending on the discipline, fewer than one-tenth of the students were less comfortable in their knowledge of each discipline from before to after the workshop, about one-third to one-half of the students were just as comfortable in their knowledge from before to after the workshop, and nearly one-third to two-thirds of the students were more comfortable in their knowledge from before to after the workshop. Multiple Sign Tests indicated a significant proportion of students improved their knowledge of each of the 12 professions from before to after the workshop ( $p < 0.0001$ ;  $p < 0.005$  experiment-wise error rate).

Among the 12 disciplines, the largest proportion of students improved in their knowledge of health administration from before to after the workshop, whereas the smallest proportion of students improved in their knowledge of nursing. A closer inspection of pre-workshop ratings suggested this was, at least in part, because students were less comfortable with their knowledge

of health administration than of nursing before the workshop started, so they presumably had more to learn about health administration than nursing. In other words, while the workshop helped most students learn more about all 12 disciplines, it was especially valuable when students were learning about professions with which they were least familiar.

Some of the most useful evaluation information has come from students' comments at the end of their post-workshop questionnaires. These comments have been increasingly positive since we switched the workshop from didactic-based teaching to simulation-based learning. Some students have written short compliments like "Nice job" or "Wouldn't miss this experience for the world." Other students have reported that the live case simulations made them feel tense because they were more realistic than they had expected. One student, for example, wrote, "The husband is the primary caregiver and was quite bad off; the team was not prepared for this." Moreover, two main themes (i.e., difficulty prioritizing recommendations and difficulty being heard) have consistently emerged on student questionnaires since we switched our workshops to live clinical case simulations. Interestingly, both themes illustrated for students real challenges that working professionals also face on interdisciplinary teams. The first theme of prioritizing ideas is shown with the following student comment, "The biggest challenge is recognizing the important issues, consensus, and listing them in order of importance." The second theme of being heard was exemplified by one student who was frustrated, "...trying to get my ideas across to other professions; some were stubborn and wouldn't listen to my ideas." Other students showed some insightful thinking by recognizing a tendency towards ethnocentricity with the following comments, "It's hard not to feel as though your discipline is most important" and "Some team members didn't listen to each others' questions, and they kept repeating the same questions to the frail client." The latter comment, moreover, addressed a persistent problem

during our workshops and on many professional interdisciplinary teams: A tendency for team members to focus on their individual discipline's diagnoses and recommendations while ignoring clients' opinions, values, and emotions.

*Carryover and Follow-up:* A final challenge cited by Cooper and her colleagues was to document carryover following interdisciplinary training activities.<sup>2</sup> As illustration, many of the students and faculty from our annual fall interdisciplinary workshops also participated in an annual spring interdisciplinary health fair at a large geriatric center. At the end of the spring 2006 health fair, we administered a questionnaire to 77 students from nine departments who had participated in the fall 2005 interdisciplinary workshop (i.e., a treatment group), as well as to 24 students from the same departments who had not participated in the workshop (i.e., a control group). The questionnaire included the same four-level scales administered during the workshop. Results indicated that the treatment group had significantly higher comfort ratings ( $p < 0.005$ ;  $p < 0.01$  experiment-wise error rate across both Rank-Sum Tests) than the control group in how comfortable they were with their knowledge of the other eight disciplines besides their own. This suggested that many students carried over knowledge of other disciplines learned during the fall workshop to the spring health fair.

We also have received encouraging comments about carryover from faculty and student alumni of our workshops. One former student, who is now a nurse, has written us, "I thought the interdisciplinary day gave us an opportunity to discover how other members within the health care field worked together. I was unaware of the resources we had available to us or what each area did, but was surprised at the options." Another former student, who is now a dental hygienist, has written us, "The geriatric interdisciplinary workshop has been useful in my career because it allows me to be a better educator with prevention of oral health issues that arise with

the geriatric population.” Consistent with Mid-Atlantic Allied Health Geriatric Education reports,<sup>26,27</sup> many of our faculty have reported that participating in the interdisciplinary workshops improved their awareness of and collegiality with faculty from other disciplines within the university. We welcome faculty and professionals from other institutions to contact us if they are interested in our training materials to build their own interdisciplinary workshops using live clinical case simulations.

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Table 1. 2005 Workshop Before-to-After Changes in Comfort Regarding Knowledge about Other Disciplines

Discipline (n)	Number of Student Responses from Other Disciplines n	Less Comfortable		As Comfortable		More Comfortable	
		n	%	n	%	n	%
Administration (27)	219	17	8%	73	33%	129	59%*
Alcohol & Drug Abuse Studies (16)	231	18	8%	97	42%	116	50%*
Audiology (4)**	232	12	5%	106	46%	114	49%*
Dental Hygiene(26)	218	11	5%	81	37%	126	58%*
Dietetics (6)	233	17	7%	113	48%	103	44%*
Medicine (42)**	201	9	4%	100	50%	92	46%*
Nursing (37)	206	17	8%	119	58%	70	34%*
Occupational Therapy (8)**	236	17	7%	110	47%	109	46%*
Physician Assistant (7)**	229	22	9%	95	41%	112	49%*
Physical Therapy (19)**	225	15	7%	101	45%	109	48%*
Social Work (18)	225	13	6%	85	38%	127	56%*
Speech-Language Pathology (10)**	229	16	7%	113	49%	100	44%*

\*Significant increase in comfort from before to after workshop at  $p < 0.001$  level for individual Sign Tests as well as at  $p < 0.005$  experiment-wise error rate across multiple Sign Tests.

\*\*Graduate Programs