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Innovation and Collaboration: Creating a Transdisciplinary Childhood Obesity Prevention Graduate Certificate Program

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Abstract

Preparing future professionals to work in transdisciplinary settings with a skill set to effectively foster collaborations and sustainable change requires a thoughtful and concerted interprofessional education approach. Through an inter-university partnership in 2010 with South Dakota State University (SDSU), Brookings, SD, and the University of Nebraska-Lincoln (UNL), Lincoln, NE, a group of faculty convened to propose the Transdisciplinary Obesity Prevention (TOP) graduate certificate program. With funding supported by a United States (US) Department of Agriculture (USDA) National Institute of Food and Agriculture grant in 2011, a team of faculty from SDSU and UNL representing various disciplines (exercise science, nutrition, dietetics, health promotion, public health, nursing, early childhood education, family and consumer sciences, biology, biostatistics, and counseling) began developing the TOP graduate certificate program which is currently in its 5th year. The primary goal of this report is to outline the overall framework and components of the TOP graduate certificate program, providing information, strategies, and considerations other institutions can apply in developing effective and sustainable transdisciplinary, interprofessional education to their existing graduate programs.

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Introduction

While obesity rates in United States (US) low-income preschoolers declined from 2008 to 2011, the rate in children and teens remains too high with 12% of preschoolers, nearly 18% of children aged 6-11, and 21% of adolescents aged 12-19 years qualifying as obese (Ogden, Carroll, Kit, & Flegal, 2014). Disparities in childhood obesity are prevalent in the US as well, with some population and ethnic groups experiencing a higher prevalence than others. Furthermore, low-socioeconomic status is associated with obesity among certain population groups (Wang, 2011). Obese children are more likely to be obese as adults and are at greater risk of chronic diseases such as cardiovascular disease, type 2 diabetes, stroke, certain types of cancer, and joint problems (CDC, 2015).

Efforts across the US to combat childhood obesity have resulted in a multitude of successful “what works” strategies. Many of these strategies employ state, community and school initiatives, and coalitions (National Center for Chronic Disease Prevention and Health Promotion, 2015). In the US Surgeon General’s Vision for a Healthy and Fit Nation, critical opportunities for interventions were identified in multiple settings: home, child care, school, work place, health care, and community. The Surgeon General also calls for a health care system that helps their staff advocate for community strategies that improve nutrition and physical activity resources for their patients (USDHHS, 2010).

Population-based interventions with multiple partners are needed to not only address the childhood obesity epidemic but also reduce disparities (USDHHS & OMH, 2011; Wang, 2011). One of the Healthy People 2020 goals is to create social and physical environments that promote good health for all. The Social Determinants of Health (SDOH) that have been organized into five key domains are: Economic Stability, Education, Health and Healthcare, Neighborhood and Built Environment, and Social and Community Context. Identifying and working collaboratively across all domains is key in addressing the SDOH and interventions that will positively impact populations (Office of Disease Prevention and Health Promotion, 2010). The Institute for Healthcare

Improvement (IHI) and the Triple AIM framework is developed to simultaneously pursue three dimensions: improving the patient experience of care, improving the health of populations, and reducing the per capita cost of health care (IHI). These multi-system approaches at the complex etiology and causal factors surrounding childhood obesity prevention require a highly collaborative and integrated approach to improve population health (IHI; Office of Disease Prevention and Health Promotion, 2010; WHO, 2012).

The highly collaborative and integrated approaches to combatting childhood obesity and improving population health require a future workforce of individuals prepared to tackle these issues. Multidisciplinary approaches typically involve individuals working separately in their own discipline specific field. Multidisciplinary teams may come together to address common problems while remaining anchored to their specific discipline’s concepts and methods. The interdisciplinary approach involves the integration of perspectives, concepts, theories, and methods from two or more disciplines or fields with team members working jointly to address a common problem. The transdisciplinary approach involves not only the collaboration of team members working jointly, but also the creation of fundamentally new approaches aimed at developing solutions to social problems (Stokols, Hall, Taylor, & Moser, 2008).

Preparing future professionals to work in transdisciplinary settings and be more responsive to actual population health needs requires a thoughtful and concerted interprofessional education approach to address the complex issues surrounding childhood obesity. “It is no longer enough for health workers to be professional. In the current global climate, health workers also need to be interprofessional” (WHO, 2010, p. 36). Interprofessional education as defined by the WHO: “When students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes” (WHO, 2010, p. 36).

Through an inter-university partnership in 2010 with South Dakota State University (SDSU), Brookings, SD, and the University of Nebraska-Lincoln (UNL), Lincoln, NE, a group of faculty convened to propose the Transdisciplinary Obesity Prevention (TOP)

graduate certificate program. The primary goal of developing an innovative, interprofessional education graduate certificate program was to prepare students to be actively engaged in working with diverse, transdisciplinary teams on childhood obesity prevention. With funding supported by a US Department of Agriculture (USDA) National Institute of Food and Agriculture grant in 2011, a team of faculty from SDSU and UNL representing various disciplines (exercise science, nutrition, dietetics, health promotion, public health, nursing, early childhood education, family and consumer sciences, biology, biostatistics, and counseling) began developing the TOP program.

The primary goal of this report is to outline the overall framework and components of the TOP graduate certificate program, providing information, strategies, and considerations other institutions can apply in developing effective and sustainable transdisciplinary, interprofessional education to their existing graduate programs.

Methods

TOP Certificate Creation

The TOP program is a graduate certificate program requiring 9 credits at SDSU and 14 credits at UNL per respective Board of Regents credit requirements for graduate certificate programs. The program was created as a certificate program rather than a degree program to allow the program to be feasible for a wider variety of students (including practice professionals, such as dietitians) to improve the likelihood of program sustainability after the initial grant funded period, to allow professionals to continue to advance in their fields of study through MS and PhD degrees, while simultaneously gaining experience working collaboratively with a multidisciplinary group of students to better understand and advance the field of childhood obesity prevention.

The TOP graduate certificate program has support at the department, college, and graduate school levels at each institution. Graduate school policies allowed credit sharing between degree programs and certificate programs, which allowed students to use the TOP core classes as elective credits for their respective graduate

degrees. Students are notified of the opportunity to earn a TOP certificate via University websites (SDSU TOP: <http://www.sdstate.edu/health-and-nutritional-sciences/transdisciplinary-childhood-obesity-prevention-top-graduate> and UNL TOP: http://www.unl.edu/gradstudies/prospective/programs/Cert_ChildhoodObesity), graduate school catalogs, hard copy brochures distributed at graduate school events, electronic brochures shared via social media (SDSU: <https://www.facebook.com/SDSUTOPs>), and word of mouth from faculty and students enrolled in the program. Most the faculty involved in the grant proposal that funded the development of the certificate program were housed within the Department of Health and Nutritional Sciences at SDSU and the Department of Nutrition and Health Sciences at UNL, thus most student participants were seeking degrees under these departments. Faculty and department heads across campus were notified of the opportunity and were asked to communicate with the students in their area of study. Development of a more formal structure and evaluation for recruitment is currently underway.

Students enroll to earn the certificate with the graduate school in a similar process to enrolling in their degree program of study. After an application for graduation has been submitted by the student, the graduate school will check to ensure the student has met all the certificate requirements. All students who meet the requirements will have the TOP certificate listed on their official academic transcript.

The TOP certificate requires seven “core” credits, which are courses that were newly created specifically for the TOP program. The remainder of the credits required for the certificate come from courses that existed prior to the development of the TOP certificate at each institution. The core credits include two three-credit courses (Transdisciplinary Obesity Prevention I & II) and a one-credit course (Practicum: Experiential Learning Experiences in Transdisciplinary Obesity Prevention). Student learning outcomes and detailed curricula were developed for each core class by the transdisciplinary, multi-state team of faculty and Extension personnel. They are updated and revised annually based on process evaluation of student learning and student satisfaction. The courses outside of the TOP core vary at each institution. UNL requires

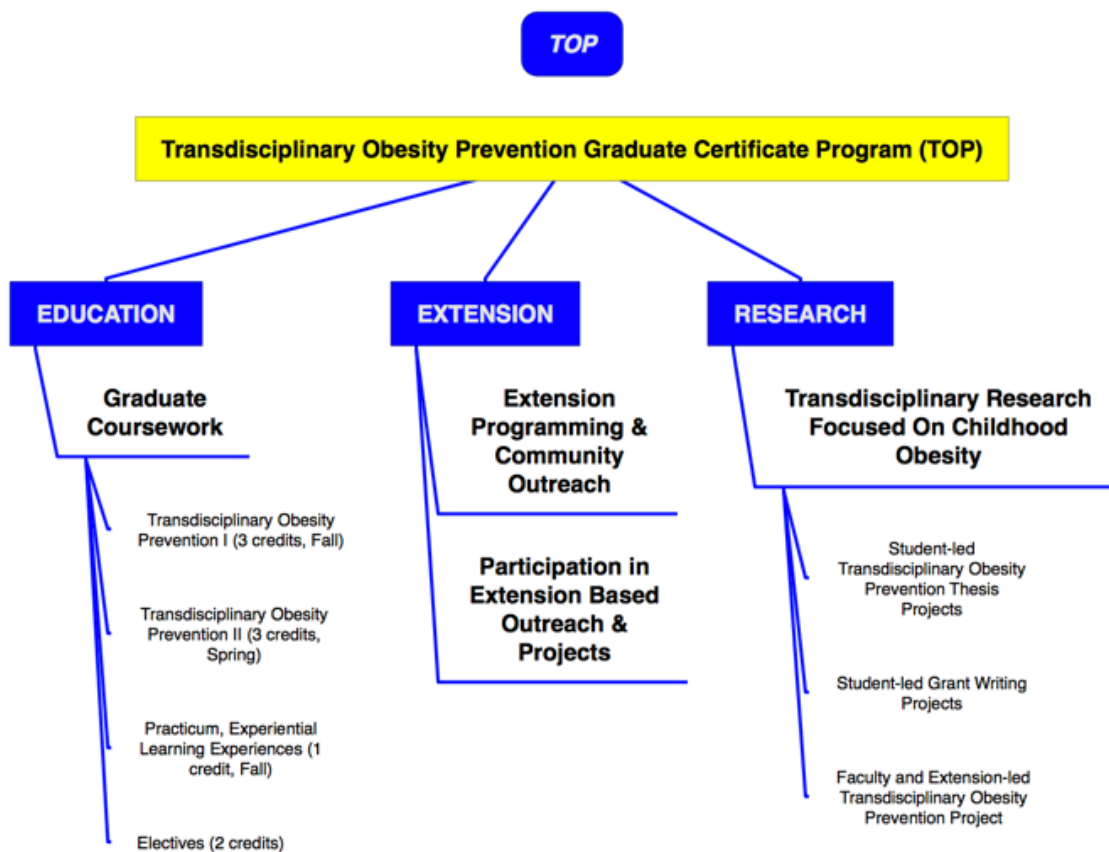
7 credits outside of the core. Of these three credits, each come from a research methods and a statistics course, and one credit is graduate seminar. SDSU elected to require 2 elective credits and provide students with a list of courses that were pre-approved as TOP certificate electives. In addition, SDSU agreed to potentially approve additional courses if a student felt a course that was not on the approved elective list, covered content related to the childhood obesity prevention field. This clause accounts for potential differences in the degree requirements of each student and allows the list of electives to continually grow and develop as additional disciplines become involved in the program.

The TOP graduate certificate has three required components: Education, Extension, and Research (figure 1). Each component of the program will be discussed in detail in the forthcoming sections. Together, these components provide students with the knowledge, skills, and abilities to work collaboratively with professionals of varied disciplines in the field of childhood obesity prevention.

Education

The core courses, TOP I (Fall) and TOP II (Spring), are delivered in a hybrid learning environment to allow for the convenience and scheduling an online environment provides while still bringing students face-to-face for relationship building and integral discussion and interaction. TOP students are also engaged in multiple team projects throughout the course of both semesters as well as their TOP Practicum experiences. The hybrid learning environment allows for greater time spent by students engaged in planning and implementing their “real world” experiences with the TOP Practicum course. The delivery method of the course is constructed around the Team Based Learning (TBL) approach. With this approach, individuals are required to spend time outside of class in self-study and then are assessed on the required readings and provided immediate feedback while in class. This type of process allows for a true application of the material versus just “lecturing” on information. By applying key concepts right away, receiving immediate

Figure 1. Key Components of the Graduate Certificate Program in Transdisciplinary Obesity Prevention.



feedback, and solving an activity or problem with a team, students are likely to get more out of the content and can apply concepts in the “real world.” This approach also facilitates students to individually prepare in advance so that they can effectively contribute and collaborate in the team setting (Michaelson, Knight & Fink, 2004).

The models utilized to form the core curricular components of the TOP courses are the Social Ecological Model (SEM) (IOM, 2012; Story, Kaphingst, Robinson-Brien, & Glan, 2008), Social Determinants of Health (SDOH) (CDC), and the Evidence Based Public Health (EBPH) model (Brownson, Fielding, & Maylahn, 2009). In addition, the core competencies identified by the Interprofessional Collaborative Practice (IPEC) group are integrated throughout each of the TOP courses as students engage in their didactic and experiential team projects (IPEC, 2011). Although the content extends beyond the individual level of the child, the application of the content provided in the TOP coursework is focused on childhood obesity prevention.

TOP I (3 credits) provided over the fall semester introduces students to transdisciplinary work, teamwork, SEM, SDOH, and the EBPH with an emphasis on understanding the multifaceted nature of childhood obesity prevalence and prevention. Students are formed into teams of 3-5 students from a mix of disciplines (i.e. nutrition, exercise science, counseling, nursing, etc.) These student teams remain as a team throughout the TOP I and II courses and the TOP Practicum experiential experiences. The primary project teams are tasked during TOP I to develop a concept paper on an area of childhood obesity prevention. This concept paper is extended into the TOP II course (3 credits) over the spring semester where students investigate funding sources for intervention and ultimately prepare a potential grant proposal. Tables 1-3 outline the course syllabus learning objectives and learning activities for the required TOP graduate courses (see pages 6-8).

Extension

Both SDSU and UNL are land-grant universities

with thriving Extension systems that have programs focused on community health throughout each state. Extension systems at land-grant universities link evidence-based research and instruction done at the university with local citizens in their state, providing them with solutions and opportunities to empower their lives. The TOP Practicum course, which is designed to provide students with “real world” experiential experiences, collaborates with Extension to provide students community engagement opportunities in obesity prevention. TOP Practicum students have been engaged in a variety of Extension projects and partnerships with health organizations and community wellness coalitions including: working with a community group on a Healthy Eating and Active Living Mapping Attributes Using Participatory Photographic Surveys (HEAL MAPPS) project, working with a local school district to improve the wellness status of employees in an effort to help them serve as positive role models for the students they teach, working with a health and physical education teacher to deliver a nutrition and physical education program called KidQuest. Other experiential learning experiences have included working with the Smarter Lunchroom Movement in elementary and middle school environments, implementing afterschool nutrition education programs with cooperative extension program, and a Building Healthy Families community-based program with the University of Nebraska-Kearney. Extension partnerships have been key to creating sustainable and transdisciplinary experiences for TOP students. The experiential opportunities through Extension also fostered collaborative research projects among faculty members and TOP students since the bulk of the practicum experiences were part of existing grant funded projects. All TOP students are required to participate in one experiential learning project through the TOP practicum. There is no set number of hours required, and hours were not tracked for the experiential learning. To gain the experience of investiture and leadership in a project, the students are tasked with seeing the project through to completion and are measured on outcome of the project rather than hours spent on the project.

Table 1. TOP I Course Objectives and Learning Activities**Objectives****Module One: Childhood Obesity**

- Define overweight and obesity and measurement parameters.
- Identify consequences and trends associated with childhood overweight and obesity.
- Describe trends and factors related to childhood obesity health disparities.
- Explain where childhood obesity data can be found to quantify childhood obesity related problem.
- Understand the multifaceted determinants of childhood obesity utilizing social ecological models.

Module Two: Transdisciplinary Approaches and Team Concepts (Haire-Joshu, D. & McBride, T.D., 2013; Interprofessional Collaborative Expert Panel, 2011)

- Explain why the complex, multifactorial nature of problems to public health and health disparities requires a transdisciplinary approach.
- Describe how social, behavioral, environmental, and biological conditions contribute to health outcomes, using theoretical approaches drawn from diverse disciplines.
- Distinguish the features of transdisciplinary collaboration.
- Develop and apply processes that integrate and promote transdisciplinary perspectives, contributions, and collaboration.
- Define problems in a transdisciplinary way, and develop shared conceptual frameworks from discipline-specific theories and models.
- Apply transdisciplinary solutions to public health problems using appropriate analytical tools drawn from public health or other disciplines.
- Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan and deliver population centered approaches that are safe, timely, efficient, effective, and equitable
- Evaluate evidence and application to a childhood obesity problem.
- Locate and utilize descriptive epidemiologic and surveillance data sources to quantify a childhood obesity problem.
- Develop a logic model for a specific childhood obesity problem.

Module Three: Social and Behavioral Sciences Research

- Identify why a community assessment is beneficial.
- Utilize evidence to understand etiology.
- Apply community assessment tools to a childhood obesity specific problem.
- Identify potential collaborators and partners at multiple levels in academic and non-academic arenas to address a specific childhood obesity problem.

Module Four: Social Ecological Model (Dietary Guidelines for Americans, 2010; Story, M., et al, 2008)

- Describe major determinants of childhood obesity at each level and how they interrelate with one another.
- Develop a social ecological model for a childhood obesity problem identifying individual, environmental, sectors of influence and social norms and values.
- Compose a concise statement of a childhood obesity problem/issue identifying condition or risk factor, scope of the problem, population affected, prevention opportunities and potential stakeholders.
- Develop a SWOT (Strengths, Weakness, Opportunities, Threats) analysis for a childhood obesity recommendation/intervention.
- Complete the Evidence Based Public Health (EBPH) framework for a specific childhood obesity problem.
- Identify non-traditional partners that would be a potential benefit when addressing a childhood obesity problem.

Learning Activities to Support Objectives

- Team Management Plan: Teams complete a team management plan outlining each member's role in the upcoming tasks, communication plans, team structure, etc.
- Video Reflections and Discussion:
- Students reflect on childhood obesity issues and are challenged to think critically about the social ecological model in relation to childhood obesity.
- Readiness Assessment Tests: The Readiness Assessment Tests (RAT's) are short quizzes designed to prepare students to go forward and apply concepts in a team environment.
- Team Worksheets: Throughout the course, teams of 3-5 individuals each work towards meeting a goal of developing an obesity prevention program/policy that could be reasonably replicated in a "real world" setting and/or utilized to further develop for a grant proposal. The Team worksheets integrate transdisciplinary concepts and the Social Ecological Model towards developing an obesity prevention program/policy utilizing the Evidence Based Public Health (EBPH) framework for construction.
- Team Final White Paper: Teams submit a written proposal of their obesity prevention intervention. The final report combines all the elements from the team worksheets.
- Oral Presentation: Teams present key components of their intervention.
- Peer Review: Each team member can assess the contribution of his or her other team members by completing a mid-point and final peer review assessment.

Table 2. *TOP II Course Objectives and Learning Activities***Objectives****Conducting Research in Community Settings** (Developing and sustaining CBPT Partnerships: A Skill-Building Curriculum)

- Understand the importance of traditional and nontraditional partnerships, i.e. planners, departments of transportation, and others.
- Explain the theoretical basis, definition, rationale and key principles of CBPR.
- Describe how CBPR differs from traditional research approaches.
- Identify ethical considerations for researchers and community partners.
- Describe effective strategies for identifying and selecting partners.
- Determine how to work with partners to set priorities.
- Describe effective strategies for creating “glue”: the substance of a partnership that promotes and sustains trust, communication, connectedness, and meaningful work efforts and products.
- Describe the rationale and effective strategies for establishing an organizational structure of board and staff for your partnership.
- Describe the rationale and effective strategies for establishing a mission statement, bylaws, principles and operating norms for your partnership.
- Consider examples of policies and procedures that can be applied to your partnership.
- Articulate the importance of trust in CBPR partnerships.
- Learn about processes for establishing and maintaining trust among partners.
- Identify processes for making decisions and communicating effectively.
- Understand how conflicts can arise and how to approach conflict resolution.
- Learn strategies for motivating, recognizing and celebrating partners.

Module 2: Grant Proposals

- Identify key components of a grant proposal and general federal, non-profit, and foundation type grant application concepts and guidelines.
- Develop a proposal idea and locate potential funding.
- Select a grant proposal, write a compelling problem statement, define clear goals and objectives, prepare an evaluation component, develop a program budget, and write a proposal summary.

Learning Activities to Support Objectives

Readiness Assessment Tests: The Readiness Assessment Tests (RAT’s) are short quizzes designed to prepare students independently to go forward and apply concepts in a team environment.

Team Worksheets: Throughout the course, the same student teams formed in TOP I work towards the goal of developing components for a grant proposal. Instructor feedback from the completed team worksheets facilitate modifications for consideration prior to developing the team’s final grant proposal.

Community Based Participatory Discussion (CBPR): Students are asked to participate in an online class discussion board addressing various concepts related to CBPR.

Writing for the Public: Each student is tasked with writing an article and creating an infographic geared towards the general public audience.

Team Final Grant Proposal: Teams submit a written grant proposal of their obesity prevention intervention. The final report will combine all the elements from the team worksheets.

Oral Presentation: Teams present an overview of their grant proposal during an oral presentation towards conclusion of the course.

Peer Review: Each team member can assess the contribution of his or her other team members by completing a mid-point and final peer review assessment.

Table 3. *TOP Practicum Course Objectives and Learning Activities***Objective:**

Gain an appreciation and understanding of transdisciplinary collaboration and intervention and engage others from multiple disciplines in identifying and proposing solutions concerning childhood obesity prevention.

Learning Activities

- **Practicum Proposal:** The initial practicum proposal is completed with input from the site preceptor/mentor. As a collaborative tool, the practicum proposal enhances alignment of student learning objectives with expectations of the site.
- **Mid-Point Synopsis:** Student teams have an opportunity to provide a 10 minute oral overview of their practicum experience to date and receive feedback from their fellow students and course instructor. It is recommended students utilize the following SHARP synopsis acronym to structure their oral review. S = Situation. (Provide a brief overview of the situation and setting.) H = How. (What action steps have been taken? Tools and resources used? Collaborators and partners?) A = “A ha.” (What have been some of your “A ha” moments? Successes, positives, surprises, lessons learned?) R = Roadblocks. (What are some of the challenges, opportunities for improvement or other considerations?) P = Plan. (What’s next? What are the next steps for the project or experience?)

Objective

Gain insight into the complex etiology of childhood obesity and apply concepts involved in developing, providing and/or evaluating childhood obesity prevention as it applies to their practicum experience.

Learning Activities

- Practicum Reflective Journal: Students utilize an electronic discussion board. The reflective journal is comprised of three main parts:
 1. *What?* Document what has been done relating to their practicum experience, the date and estimated hours accumulated. Included are brief descriptions of preparation activities or actual program implementation they have been involved in.
 2. *So What?* Complete when they have finished their experiential experiences and WHAT? reflection entries. SO WHAT? Question 1: List the learning objectives that were included in their final practicum proposal and evaluate their progress on meeting those objectives, including why they think some objectives weren’t met if that was the case. SO WHAT? Question 2: What are some of the pressing needs/issues related to childhood obesity prevention in the community where they did their experiential experience? SO WHAT? Question 3: How did the experience they were involved in meet some of the pressing needs addressed in question 2?
 3. *Now What?* Question 1: Did anything about their experience affect and/or change their previous notions about the type of work they were involved in for their practicum? NOW WHAT? Question 2: How can they apply what they have experienced and learned to address the issue of childhood obesity prevention in the future? Included in their answer how a transdisciplinary approach could be applied. NOW WHAT? Question 3: What do they think they would like to know more about, related to their experience and/or other issues they have identified in their reflections?

Research

The TOP program provides students with research experience in the field of childhood obesity prevention through the three primary mechanisms: 1) student-led obesity prevention thesis projects, 2) student-led obesity prevention grant writing projects, and 3) faculty/Extension-led obesity prevention research projects. Students are strongly encouraged to complete a thesis as part of their degree plan of study. However, some students from certain disciplines were less likely to pursue a thesis due to a variety of reasons such as: high number of required course credits and low number of electives required for their degree plan of study, history of students from that discipline not electing to do a thesis, or faculty advisors who served as practice professionals that were not tasked with research as a primary component to their workload. Thus, participants in the TOP certificate program are not required to complete a thesis as one of the

certificate requirements. Even so, students who do not complete a thesis have the opportunity to gain research experience through student-led obesity prevention grant writing and/or participation in faculty/Extension-led obesity prevention research projects facilitated by faculty and Extension personnel involved in the TOP program.

All TOP students go through a multi-semester process within TOP I and TOP II in which they build the skills required to write a grant focused on childhood obesity prevention and then work collaboratively in multi-disciplinary teams to prepare a grant. Furthermore, students are provided the opportunity to get involved in faculty/Extension-led research through graduate research assistantships, hourly paid research positions, or volunteer research positions. Through these mechanisms students gain knowledge, skills, and abilities in areas such as (but not limited to): finding funding opportunities, developing collaborative,

multidisciplinary teams, learning about the community of interest, conducting literature reviews, critically thinking about problems and developing innovative solutions, creating logic models, selecting assessment tools, evaluating data, creating budgets, and applying course concepts related to childhood obesity prevention efforts.

Results

As Table 4 illustrates, a total of 50 students graduated with a TOP certificate. In addition to these graduates, 19 students are expected to complete their certificates and graduate in 2017 (13 from SDSU and 6 from UNL). SDSU also trained 4 students who completed their certificates, but have not yet graduated.

Among TOP graduates, the majority graduated from the nutrition and exercise science disciplines. As Table 5 illustrates, SDSU graduates were primarily from the fields of nutrition (43%) and exercise science (43%), while UNL graduates were focused in the nutrition field (77%). Other disciplines represented were family and human sciences, counseling, nursing, and plant science/statistics.

Several presentations and publications were completed through TOP to disseminate the research produced through the program. Thirty-one oral presentations were given, including presentations at research centers, conferences, summits, and other settings. Thirty-five poster presentations were accepted and presented at various conferences and research fairs. Finally, 31 abstracts and 26 peer-reviewed publications were published, with several more in development. The publications and presentations involved faculty and TOP students and covered a range of topics crossing several disciplines. The majority were in nutrition and physical activity related journals and conferences, but also included journals and conferences in childhood obesity, experimental biology, family and consumer science, minority health disparities, broader health areas, and the field of evaluation.

The TOP courses were modified over the course of the grant period, both as a result of formative feedback and to best fit within the institutional structure of each university. Modifications included, but were not limited to, clarifying the syllabi, increasing instructor feedback, revising some course topics and speakers, and modifying the course structure. The change

Table 4. *Number of Students Completing TOP Certificate by Institution by Academic Year*

Academic Year	SDSU	UNL	TOTAL
2012	1	1	2
2013	7	6	13
2014	6	2	8
2015	9	5	14
2016	5	8	13
TOTAL	28	22	50

Table 5. *Number of Students Completing TOP Certificate by Institution by Discipline*

Discipline	SDSU	UNL	Total
Nutrition/Dietetics	12	17	29
Exercise Sciences	12	1	13
Family/Human Sciences	0	4	4
Counseling	2	0	2
Nursing	1	0	1
Plant Science/Statistics	1	0	1
Total	28	22	50

in course structure was especially significant as it evolved from a traditional in-person class structure to a hybrid structure, with some of the course content delivered online. Focus group results suggested that students were receptive to the hybrid model, but expressed concern with the concept of moving the course to be offered solely online. Students felt the transdisciplinary nature of the course benefits from in-person interactions; thus, the course was maintained utilizing the hybrid model. As one focus group participant expressed:

Yeah there are benefits to online courses for graduate studies, but I think the class is transdisciplinary obesity prevention, the idea is that we are working with grants... but the idea is that you are working with people from other fields and that is the point of the class, to do group work and getting to know those people and understanding how groups works, so I don't see the point if that is the point of the class to taking it online, because you are moving away from all the things we are learning about.

Course evaluations from the TOP courses suggest the program is increasing students' knowledge, abilities, and confidence in addressing childhood obesity prevention. Many program alumni are applying the experience through their employment, while others are incorporating their experiences into graduate school. Among the employed alumni, most describe that at least some of their current job responsibilities are related to childhood obesity prevention. Alumni survey data show that 93% feel that the TOP program prepared them somewhat or very well for their current positions. Moreover, most attribute the TOP program with preparing them for their job responsibilities and that they are using skills and knowledge learned from the program, specifically the transdisciplinary nature of the program, which involves working with people in a variety of disciplines. Half of alumni survey respondents (50%) reported that the program prepared them to work collaboratively with transdisciplinary teams in their current job. In addition to impacting their careers, alumni report personal impacts of the program, such as a desire to serve as role models and to eat better and exercise more.

Conclusion

The primary goal of developing this innovative, interprofessional graduate certificate program (TOP) was to prepare students to actively engage in working with diverse, transdisciplinary teams on childhood obesity prevention issues. Specific strengths emerged such as introducing students to "real world" obesity problems within coursework, while providing students with practicum experiences directed at to potentially prevent future health issues related to obesity. Research efforts and practicum experiences were flexible, dependent upon the students' professional goals and needs. Collaborative efforts were sought out on a variety of levels, including the usage of team work and research within coursework. Students from different professions studied and worked together to investigate and provide programing for real-life situations. Faculty from different disciplines collaborated to provide the interdisciplinary programing for the course.

Improvements in the course content and delivery occurred during the development and delivery of the certificate programing. As time progressed, faculty used course evaluations, as well as other formative feedback from present and past students to modify the course content, strategies, pedagogy, and delivery to best fit the identified needs in students' learning as well as surrounding communities. Past students also mentioned the program's content being used in their current job settings, a strength showcasing TOP's potential for future collaborations, research, and possible findings related to childhood obesity. In addition, being land-grant universities, the emphasis for this program was to extend not only to the teaching and research aspect, but to the Extension, or service, component as well, providing students with "real world" experiences related to childhood obesity.

Challenges with this program include growing new partnerships with other university graduate programs and departments, to which childhood obesity may be of interest. Some programs do not have many elective credits to which the TOP courses could be added, and other programs were not interested in offering certificates, nor were students interested in obtaining a certificate, with their graduate degree. There is room for conversation toward building these partnerships. However, this has led to unique

opportunities as well. TOP faculty have learned more about the various graduate programs offered on campus and the variability to which TOP could expand on these programs and students' learning. As the program matures, there may be opportunities to expand the course delivery method to be more inclusive of the non-traditional student.

The program evaluations demonstrate the positive impact that this certificate program plays in developing graduates from across disciplines to be effective collaborators in tackling obesity prevention measures in the community. This Transdisciplinary Obesity Prevention Certificate program serves as a premier example for development of transdisciplinary academic programs developed to help solve real-life problems.

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References

- Brownson, R., Fielding, J., & Maylahn, C. (2009). Evidence-based public health: A fundamental concept for public health practice. *Annual Review of Public Health, 30*, 175-201. <https://doi.org/10.1146/annurev.publhealth.031308.100134>
- Centers for Disease Control and Prevention. Social Determinants of Health. Retrieved from <http://www.cdc.gov/socialdeterminants/>
- CDC. (2015). Childhood obesity facts. Retrieved from <http://www.cdc.gov/healthyschools/obesity/facts.htm>
- Haire-Joshu, D., & McBride, T. D. (Eds.). (2013). *Transdisciplinary Public Health: Research, Education, and Practice*. San Francisco: Jossey-Bass.
- Institute for Healthcare Improvement. Triple Aim for populations. Retrieved from <http://www.ihl.org/Topics/TripleAim/Pages/default.aspx>
- Interprofessional Education Collaborative Expert Panel. (2011). Core competencies for interprofessional collaborative practice: Report of an expert panel. Washington, D.C.: Interprofessional Education Collaborative.
- Retrieved from <http://www.aacn.nche.edu/education-resources/ipcreport.pdf>
- Institute of Medicine. (2012). Accelerating progress in obesity prevention: Solving the weight of the nation. *National Academies Press*.
- Michaelson, L., Knight, A. B., & Fink, L. D. (2004). *Team-based learning – A transformative use of small groups in college teaching*. Sterling, VA: Stylus Publishing LLC.
- National Center for Chronic Disease Prevention and Health Promotion. (2015). Combatting childhood obesity. Retrieved from <http://www.cdc.gov/features/preventchildhoodobesity/>
- Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *Journal of the American Medical Association, 311*(8), 806-814. <https://doi.org/10.1001/jama.2014.732>
- Stokols, D., Hall, K. L., Taylor, B. K., & Moser, R. P. (2008). The science of team science: Overview of the field and introduction to the supplement. *American Journal Preventive Medicine, 35*(2 Suppl), S77-89. <https://doi.org/10.1016/j.amepre.2008.05.002>
- Story, M., Kaphingst, K. M., Robinson-Brien, R., & Glan, K. (2008). Creating healthy food and eating environments: Policy and environmental approaches. *Annual Review of Public Health, 29*, 253-272. <https://doi.org/10.1146/annurev.publhealth.29.020907.090926>
- 2010 Dietary Guidelines - health.gov. (2010). Retrieved April 28, 2017, from <https://health.gov/dietaryguidelines/2010/>
- United States Department of Health and Human Services. (2010). *The Surgeon General's vision for a healthy and fit nation*. Rockville, MD. Retrieved from <http://www.surgeongeneral.gov/priorities/healthy-fit-nation/obesityvision2010.pdf>.
- United States Department of Health, Office of Minority Health. (2011). *HHS action plan to reduce racial and ethnic health disparities*. Retrieved from <http://minorityhealth.hhs.gov/npa>.
- Wang, Y. (2011). Disparities in pediatric obesity in the United States. *Advances in Nutrition, 2*, 23-31. <https://doi.org/10.3945/an.110.000083>
- World Health Organization (WHO). (2010). *Framework for action on interprofessional education & collaborative practice*. Geneva: WHO Retrieved from http://whqlibdoc.who.int/hq/2010/WHO_HRH_HPN_10.3_eng.pdf.
- World Health Organization (WHO). (2012). *Population-based approaches to childhood obesity prevention*. Geneva, Switzerland: WHO Retrieved from http://www.who.int/dietphysicalactivity/childhood/WHO_new_childhoodobesity_PREVENTION_27nov_HR_PRINT_OK.pdf.

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