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Evaluation of I-TOPP examines outcomes of transdisciplinary doctoral training program

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Over the past 30 years, the prevalence of overweight and obesity has doubled in 2- to 5-year-olds and tripled in children aged 6 to 11 years. To address this public health concern, in 2011, the USDA funded the Illinois Transdisciplinary Obesity Prevention Program (I-TOPP), a joint doctoral/Masters of Public Health (MPH) degree program, at the University of Illinois with the goal of training future leaders to address the problem of childhood obesity.

Although transdisciplinary doctoral training programs in academic settings are relatively new, these types of research approaches are increasingly being used to address complex research areas, such as childhood obesity.

"We know the causes of childhood obesity are multifactorial, involving both genetic and environmental causes," says Sharon Donovan, professor in the Department of Food Science and Human Nutrition at U of I and director of I-TOPP. "Of the environmental factors, family routines, nutrition, food security, physical activity, sedentary behavior, and sleep are all important.

"To tackle such a multifaceted issue, many perspectives need to be brought to the table, necessitating a transdisciplinary approach," she adds.

Because Donovan and her fellow researchers were undertaking a new approach to doctoral training, they wanted to evaluate the education

process as well as the outcomes. To understand the barriers and benefits to transdisciplinary doctoral training—versus focusing on a single discipline—the researchers conducted focus groups with the faculty and students at the start of the program and after five years into the program.

A paper focusing on the perspectives of faculty and students in the program, published in Palgrave Communications, describes some of the perceived benefits and barriers to transdisciplinary education. Some of the benefits cited were greater collaboration and networking, more guidance and support from advisors, newly broadened ways of thinking, and expanded opportunities for learning and research.

Some of the barriers cited by students included time concerns; feeling like they had too much to do and not enough time to do it, as well as feeling like they were under greater pressure compared to their traditional counterparts. "While both the faculty and students acknowledged the benefits of I-TOPP, it is important to think about ways to lower the barriers to transdisciplinary training in order to be successful," Donovan adds.

Previous research has shown that the timing of publications from transdisciplinary research can be delayed due to the need for the team to come together and the nature of the complex questions the teams often undertake. Thus, the researchers were interested in determining if that was the case for I-TOPP.

A second paper, recently published in PloS One, shows that the program's success in training doctoral students has included higher-impact research publications by I-TOPP students, more collaborators (co-authors) on those papers, and more disciplines represented when compared to the publications of students in traditional doctoral programs. Publication impact indicators were significantly higher for I-TOPP students, including higher citations in Google Scholar and Scopus.

Publication productivity was somewhat, though not significantly, higher for I-TOPP students, as well.

The program's transdisciplinary approaches span beyond the expertise of instructors and researchers within academia and also involve community stakeholders. These approaches, which are often a component of team science, teach students to master and then integrate broad methods to find solutions to complex public health problems such as childhood obesity.

"Our students work with the community to find real-world solutions when it comes to research," explains Anna-Sigrid Keck, program coordinator and lead author on both papers. "It's really applied research that the students are working on during their doctoral training. Students in the I-TOPP program take the disciplinary foundation, and create new thinking and new hypotheses, and then merge them together. That takes more work but the publication impact is an indication that it might be worth the extra work effort."

The program has 11 doctoral students, who were enrolled in three cohorts in 2011, 2012, and 2013. Seven I-TOPP students have already begun or have accepted prestigious grant-funded post-doctoral positions. Another student recently accepted a faculty position at Boston College, the first faculty position for one of the program's graduates.

Keck says the intent is to continue following the careers of I-TOPP graduates over the next 10 years, continuing to compare them to traditional doctoral students. "Even now there are publication differences, but I think the real impact will be 5-10 years out," Keck says.

Donovan adds, "When we started I-TOPP in 2011, we proposed that the graduates of the program would be ideally positioned to undertake

complex public health problems, due to the combined PhD, MPH degree, and the transdisciplinary educational approach. Given the high-quality institutions where we have placed our graduates, including the Baylor College of Medicine, Boston College, Harvard, Northeastern University, Northwestern University, the University of Iowa, and the University of Minnesota, we are beginning to see that promise fulfilled."

More information: Anna-Sigrid Keck et al, Productivity, impact, and collaboration differences between transdisciplinary and traditionally trained doctoral students: A comparison of publication patterns, *PLOS ONE* (2017). DOI: 10.1371/journal.pone.0189391

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