“Synergistic Science”: A Theoretical Framework for Transdisciplinary Research Collaboration and Innovation

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Abstract

We developed a new theoretical framework, “Synergistic Science: A Theoretical Framework for Transdisciplinary Research Collaboration and Innovation” and tested it in a real-world setting for the development and implementation of a comprehensive Interactive Voice Response (IVR)-Supported Care Transition System. The transdisciplinary team of experts participating in the project included experts and professionals from academia, business, engineering, law, graphic design, database management, programming, interface architecture, medicine, nursing, marketing and analytic modeling. The use of a framework based on common principles and best practices fostered the rapid development using parallel strategies to guide the project from conceptualization through successful patenting and full implementation in a real-world setting within an 18-month time period.

Introduction

While the optimal process for development of meaningful solutions to healthcare challenges is grounded in rigorous research that provides evidence-based knowledge, it is well known that research is a time-intensive process and the diffusion of innovative solutions from bench to bedside can take up to ten years or longer. \cite{1-3} In addition, economic constraints have resulted in reductions in funds for grant support and greater numbers of applicants are competing for a shrinking pool of available resources. \cite{4-6} Of necessity, researchers may need to find alternative sources of funding to fill the gap in available monies from traditional grant mechanisms. Collaborations between healthcare researchers and business entities are on the rise, as evidenced by the growing formation of Innovation Centers and Collaborative Institutions designed to foster transdisciplinary project development and cooperative efforts \cite{7,8} However, the process of developing successful transdisciplinary teams of experts and working collaboratively can be daunting. There is a critical need for a common framework to guide the process, one that transcends the often fragmented perspectives entrenched within each discipline and guides the principles of collaboration by synergizing efforts so that the resulting whole is truly greater than the sum of the individual parts.

Description

We developed “Synergistic Science: A Theoretical Framework for Transdisciplinary Research Collaboration and Innovation” The model is a synergy of the best components of the scientific research model, the engineering process, the business development model and project management principles.

Results

We tested the theoretical model in a real world setting from idea conceptualization through implementation of a comprehensive interactive voice response (IVR)-supported care transition system. By working in parallel with a large number of transdisciplinary experts using this common framework, we were able to bring the project from conceptualization, development, testing, refinement and patenting to full commercialization within 18 months.

Theoretical Discussion

The value added to individual and group participation by using a framework that capitalizes on common principles cannot be overstated. Clinicians, researchers, data programmers, interface architects, business leaders, attorneys, graphic designers and engineers are not trained in the same philosophies of science or work. They come to the table with very diverse perspectives and expertise, often with goals and language specific to the tradition of each discipline. The use of a common theoretical framework provides alignment of goals and strategies while recognizing the value of transdisciplinary expertise so that collaboration and engagement are fostered throughout the
The Synergistic Science model is a circular, iterative framework that includes planned ongoing evaluation and refinement processes, thus promoting optimal outcomes and maximizing efficiency.

**Implications for the Interdisciplinary Community**

Use of a common theoretical framework to guide transdisciplinary collaboration reveals great promise in overcoming barriers based on discipline-specific perspectives. Knowledge gained from this process can be used to strengthen collaboration and innovation in developing real-world solutions to today’s healthcare challenges and foster the development of HIT tools that effectively include all the stakeholders.

**Recommendations for further investigation**

Further testing and applications of the Synergistic Science model in conducting transdisciplinary research that encompasses a variety of additional disciplines such as medical sociology, psychology, anthropology, and comparative effectiveness and translational research are appropriate next steps.

**Conclusion**

The use of the Synergistic Science Theoretical Framework for Transdisciplinary Research Collaboration and Innovation was highly effective in guiding a successful project from conceptualization through implementation and demonstrates tremendous potential for reducing costs associated with time and scope while building value and effective project outcomes in a real world healthcare setting.

**References**

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