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Research Article

University Education in a Time of Perpetually Wicked Problems

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Abstract

Wicked problems differ from tame ones in important ways that define significant challenges in resolving them. Among these differences are their lack of a prescriptive definition, their absence of a clear stopping rule, their emphasis on better or worse outcomes rather than right or wrong solutions, their uniqueness, and their demand that resolutions not make the problem worse. University graduates will take on central roles and leadership responsibilities for addressing the world's wicked problems such as those identified as the United Nations Sustainable Development Goals. Those roles and responsibilities require advanced critical, systems, design, and ethical thinking skills and not just the disciplinary tactics and tame problem-solving abilities that largely comprise a university educational experience. This paper challenges the ways in which universities fail to equip their graduates with sufficient understanding of wicked problems and the approaches that offer the best chance to address them. The increasingly-granular structure of the academic year, the curricular emphasis on disciplinary rather than inter- or multi-disciplinary learning experiences, the lack of collaborative opportunities with those of other theoretical and practical perspectives, and the lack of intentional learning for critical, design, systems, and ethical thinking are discussed.

Keywords

Wicked Problems, University, Pedagogy, Curriculum

1. Introduction

For those of a certain age, the cartoon characters of Fred Flintstone and George Jetson are familiar. The former lived in the animated Stone Age, the latter in the animated Space Age. Yet, they both faced exactly the same kinds of challenges. Going to work and earning a living. Making a marriage work and raising a family. Being a friend. Getting around. Having fun. Their solutions were different: Fred's feet powered his personal transportation while George traveled by flying car. However, the juxtaposition of these cartoon series that aired on television during the 1960s, one imagining a prehistoric retrospective based on modern life and the other imagining a futuristic extension of modern life suggested that we always face the same basic problems and our time period and its technologies provide era-relevant solutions. Author Willa Cather [2] writing in the early 20th century about life on the American Plains, captured this idea when she wrote, "There are only two or three human stories and they go on keep repeating themselves as fiercely as if they had never happened before".

It is true that the exigencies of daily life for humans on Planet Earth, at the most basic level of our hierarchy of needs [7] are the same as they always have been. We need food to eat,

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we need water to drink, we need air to breathe, we need protection from our environmental conditions, and, because most of us do not live solitary lives, we need mutually beneficial relationships with others. That not everyone has those basic needs met in a world of abundance – some athletes and entertainers are paid enough money to have personal economies the size of small island nations and tech billionaires fund their own personal space programs – is less about inadequate resources and more about distributing what we have. That highlights a fundamental challenge for university education: it is a wicked problem.

Universities are good at connecting the traditional problems on which students' academic disciplines focus with the fundamental knowledge, techniques, strategies and skills they develop in their programs of study. Agriculture students learn how to help the land yield better harvests. Engineering students learn how to build better transportation systems and power grids. Environmental science students learn how to reduce air and water pollution. Political science students learn how our governments (are supposed to) work to build an ever-better common good. Most of how students in disciplinary areas learn focuses on problems that, even if they are neither simple nor easy to solve, are what can be termed "tame problems". These are problems that Lauzon described as relatively stable ones on which there is agreement on the nature of the problem itself and the kind of solution it requires [6]. In the world into which university students graduate, the tame problems, as Cather wrote, are pretty much the same as they have always been and solutions are not difficult to imagine even if they are not straightforward to implement. However, the more pressing, even existential, problems we face now are not tame but are what have been called wicked problems and we are not very good at explaining to students what it takes to resolve those or giving them the skills they need to imagine addressing them.

Think of trying to solve a Rubik's Cube. (We will come back to this example of a tame problem throughout this paper.) As much as the Rubik's Cube can be genuinely difficult to solve, it is really just a tame problem. The actions we can take to solve it are well-defined by rules even if those actions can be almost infinite in the number of possibilities. The end result is clearly recognizable – we know when we are done and when we are not. None of the steps we can take are affected by whether the Rubik's Cube is hot or cold, having a good or a bad day, is tired, or whether it has been used so often that its colours are worn and faded. What, then, makes a wicked problem different from a tame problem like solving a Rubik's Cube? More importantly, how do we educate students to address wicked problems and not just tame problems? More than a half century ago in a journal called Policy Sciences a paper by Rittel and Webber entitled (frankly not in the most thrilling way) "Dilemmas in general theory in planning" introduced the concept of the wicked problem [9]. That concept has more relevance now than ever before to university education and is the basis for the discussion in this paper.

2. Real World Problems

Consider the significant real-world health problem of Type 2 diabetes in children. There has been a large increase in the number of children, not adults but children, who are contracting what had typically been a condition that did not appear until much later in life [10]. Based on data from 2002-2027, we see a trend to increasing prevalence in an increasingly-large population which, taken together, will further exacerbate this already-existing health challenge among young people. (This challenge is not racially uniform and that represents an additional social issue.) What makes diabetes in childhood a particularly wicked problem and not a tame problem like the Rubik's Cube? After all, could we not argue that if the problem is not having enough of the hormone insulin to regulate glucose metabolism and the solution is to provide it via, say, injection, then is the problem not just tame, simple, and solved? No. The trend to greater incidence of childhood diabetes is a time bomb for global public health systems who will have to provide more and more insulin via our already-stretched health care systems and budgets. Those same public health systems will also have to address the collateral problems that come with diabetes such as nerve damage, vision problems, and vascular problems that can be pronounced among young diabetics. The real problem we face is not the tame problem that can be addressed by the simple proximate solution – if someone has no insulin then give it to them – but the more complex problem of why so many more people are developing an as-yet incurable disease earlier in life than ever before and how to reverse the trend.

Diabetes cast in that light is not just an individual biomedical or physiological condition: it is a large-scale, social, public health problem. It is related to the individuals' lives, it is true. However, it is also related to family life and to the parents of the children who contract diabetes early in life. It pertains to the education system. It is directly relevant to the biomedical community such as nurses and doctors and social workers who work with young diabetics and their families. It has a research component: there are many scientists who are working to try to find a cure, whether it be genetic or pharmacological, that would allow us not just to treat the symptoms but to eradicate the disease. It has a public policy aspect: how do we address issues of children's health and how do we pay for our health care system when it has more and more competing demands? All in all, there are many different kinds of people who have a particular point of view on what makes the problem of children becoming diabetic early in life what it is and how we should go about resolving it. We would not even really know how to measure what would be an acceptable rate of diabetes in childhood if there is such a thing as an acceptable rate of diabetes in the population. When would we think we had solved the problem?

We have many such significant wicked problems that involve broad and deep social, cultural, health, political, and economic influences. Poverty. Homelessness. Political po-

larization. Mental health and addiction and opioid deaths. Child mortality. School bullying. Gender violence. Climate change. Artificial intelligence. These are but a few of the problems in the world into which university graduates will enter and ultimately they will be expected to lead us to solutions. If only solving these problems were as simple as solving a Rubik's Cube. How will they approach them? Are they prepared for a world in which wicked problems and not tame ones will be their life's work? This is where the ideas of Rittel and Webber help us.

3. Wicked Problems

First, they realized that wicked problems are hard to define in a prescriptive way as tame problems are. Imagine that Rubik's Cube again. Its so-called "solution space" is finite and relatively simple, comprised of all the possible ways in which a Rubik's Cube can be solved. There are very specific things we can do and many things we cannot. We know that we can twist it in three different dimensions but we know that we cannot change the colours on particular squares. All those rules or physical constraints are the way in which the problem is defined. The problem is to fill the gap between the state existing when the colours are all jumbled up on different sides and the state in which we want the cube to exist when every side has only one colour on it. In order to convert the cube from the jumbled form to the one-colour-per-side form, we know when we begin what we are allowed to do.

In contrast, wicked problems do not have a set of well-defined permissible operations that we are allowed to perform when approaching the problem as in the case of the Rubik's Cube. In the realm of wicked problems, there is no book of everything that can be tried: there is not even a record of everything that has already been tried. The means by which we might resolve a wicked problem often require considerable thought about what a permissible operation could and should be. That is because wicked problems are always deeply social problems. They involve complex individual, family, social, cultural, educational, and political interactions and it is not clear when we attempt to resolve them what we can do and what we cannot do in the same way that, no matter what, a certain number of maneuvers will lead all the colours to line up on a Rubik's Cube.

We do sometimes decide to take public policy steps to protect ourselves from ourselves. We have seat belt laws that require us to wear seatbelts when in a vehicle; we have laws that tell us that we must wear a helmet when on a motorcycle or scooter or bicycle; we have safety standards in our workplaces that tell us what actions are allowed and what are not; and, we have security screening at all of our airports to protect us from people bringing weapons onto planes. When and how do we make those decisions about what is an appropriate way to approach a wicked problem and when do we decide that we really do not have the ability or the right to step in to intervene? These are the kind of questions that do not arise when solving tame problems. When the problems themselves are not necessarily well-defined in a formulaic way and when the solution space is equally ill-defined, the set of realistic plans to attack the problem require human judgment and the capacity to work together and make sense or make nonsense of possible ideas, even the most radical or, on the surface at least, stupid ones. That is not at all how we would approach solving a Rubik's Cube where everybody goes in knowing what is permissible and possible or probable and what is not.

A second difference between a wicked problem and a tame problem is that wicked problems do not have a stopping rule. The Rubik's Cube has a simple rule that tells you from the very start how to know when the problem is solved. Such stopping rules, depending on the kind of tame problem, might be structured as time limits, as in one hour to complete a classroom test. Alternatively, there might be a measurement limit, for example when a student has to complete a fixed number of tasks during an assessment. There might even be a performance limit like having to achieve a certain grade on an assignment independent of how much time or how many attempts are required.

The stopping rule of a tame problem always tell us when the condition we were experiencing has turned into the condition we want it to be as defined by the stopping rule. It is not that achieving those things was necessarily easy: it is just that they were not wicked problems because they all had clear paths to knowing when we were going to be done solving them. Wicked problems do not usually end because of some predefined ways of knowing when we are finished that are built into the definition of the problem itself. Instead, the people solving them typically stop for reasons that are not about the problem itself. They run out of time. They run out of money. They run out of patience. They run out of political will. They run up against a technological wall beyond which what is needed has not been invented yet. They run out of ideas when up against seemingly intractable obstacles. They decide that they have done the best they could do under the circumstances for now. Wicked problems are never really solved upon arrival in a utopian state: they just become re-solved on an ongoing basis in different circumstances at different times. That might sound depressing, especially if one is a problem solver by nature, but wicked problems simply do not have that perfect end point at which to aim that tells us we are indisputably done.

A third way that wicked problems are differentiated from tame problems is that wicked problems do not have definitively right or wrong solutions. Most of us have been educated to solve tame problems with agreed-upon right answers. There has typically been one right answer to those problems. In some cases, there might even be two or three possible right answers to a particular tame problem and in some cases there are grey-area answers in our experience, especially in areas of study that are less precise than ones with a numerical solution. Still, even when there is more flexibility with regard to right and wrong answers, the questions on a typical educational

assessment have answers that are judged as being right or wrong by somebody who is grading the work and assigning a mark for it.

That mark, say, 20 out of 20 as compared with a mark of 0 out of 20, is based on an evaluation scheme of some kind – often a very a granular rubric – that is used in order to assign a particular level of merit to the answer. This granularity means there is relatively little subjectivity with respect to whether a student has demonstrated knowledge as required, hence, right and wrong, pass or fail. This is how most of a student's university education is framed: a mark for this, a half a mark for that.

Wicked problems do not lend themselves in the same way to solutions that are right or wrong. There are so many different perspectives on the problem – social, cultural, economic, political, theoretical, and practical – that we would have an impossible time even agreeing who will decide what is right and what is wrong when we are thinking about the problem. Who is going to define the standard by which we judge the best choice for eliminating poverty or homelessness or crime in the streets or racial discrimination? We cannot think of wicked problems as having singularly right solutions in the same way that we can when we are addressing a tame or a benign problem.

A fourth difference that Rittel and Webber identified is that wicked problems are unique problems, even when they appear to have similarities to other problems. Tame problems tend to be at least like some other tame problems. That is what Lauzon identified when he wrote of tame problems being "stable" [6]. We can usually put a tame problem into a category with others of the same basic kind and if we stretch our minds far enough we can almost always find some similarity between a current problem and one that has come before. The principles by which we solve them are the same. There are identifiable features in tame problems that allow us to say it is this kind of problem or it is that kind of problem and having done that we can use our experience with previous examples of this kind of problem or that kind of problem to solve the one that is in front of us at the moment. There are all kinds of different Rubik' s cubes: there is a traditional 3 by 3 by 3 one that most people know but there are 4 by 4 by 4 by 4 versions and triangular versions and so on. Still, no matter what version confronts us, we can use the same approach to solving any kind of Rubik's Cube. The permissible operations and the stopping rule are the same and the fundamental strategies from one type of cube translate well into any other kind of cube.

In contrast, wicked problems tend to be one of a kind even when appearing to be similar to previous experience and, therefore, copycat solutions cannot be assumed to work in the same way as they did when used before in different circumstances. Templates-off-the-shelf kinds of solutions based on the assumption that there is a one-size-fits-all way of approaching wicked problems is a path not to solving a wicked problem but often to creating worse problems than previously existed. Wicked problems are almost always unique in important ways and we have to approach them with an open mind and understand that our previous experience is at best only a guide about where we might start to imagine a strategy and is perhaps even a very unreliable guide to what is going to work as a way of approaching this particular wicked problem.

Fifth, and finally for purposes in this discussion, on our list of differentiating features from tame problems is that wicked problems do not give us the luxury of being wrong in the same way that tame problems do. Our usual way of expanding our knowledge depends a lot on people being wrong about what they thought was originally true. Scientists advance all kinds of hypotheses and design experiments to test those hypotheses and many times the results of those experiments do not support the hypothesis that everyone assumed was correct. After years of finding white swan after white swan, one black swan turns up in an observation in a faraway place and the hypothesis that all swans are white that everyone held all that time turns out to have been wrong. That massive change in thinking about swans is not thought by other swan scientists to be a major failing on the part of the scientist who found the black swan. The scientist is not blamed for overturning what we thought was right but is, in fact, congratulated for following up on a legend of a black swan in a far-away place and making a discovery that defied expectations and changed our understanding of swans.

With wicked problems, though, we are not just trying to decide what is true or expand our knowledge. We are trying to make the world a better place in which people can live. We are trying to improve life on earth. It is a serious calling and in doing so we are working with open systems that are filled with uncertainty and ambiguity and we are working in a social environment where human viewpoints of all kinds embed themselves in the definition of the problem. When we approach a wicked problem, getting things wrong when resolving it has a direct effect on people's lives. The stakes are high: addressing wicked problems is not a game where if we lose we can hit reset and play again tomorrow. That is why it is so important to recognize that wicked problems do not give us the luxury of being wrong about the resolutions we bring to them.

4. Educational Implications of the Differences Between Tame and Wicked Problems

What do these differences between tame problems and wicked problems mean for those providing and those receiving a university education? What are the fundamental issues pertaining to university education and its relevance to being able to address wicked problems rather than tame ones? The broad nature of influences on the structure of a wicked problem and its possible resolution demands certain skills that transcend individual disciplinary learning. These include

critical thinking, systems thinking, design thinking, and ethics. The resolution of a wicked problems necessitates: (1) the critical thinking ability to put together a well-structured argument that is fallacy-free and devoid of clearly problematic premises; (2) imaginative design thinking skill to work collaboratively with others who have different perspectives and see the resolution through the eyes of end users; (3) expansive systems thinking capacity to nurture collaboration and find new and complex links among the many nodes in the problem's structure; and, (4), a self-aware ethical foundation that guides an understanding of what is appropriate and what is not in possible strategies. Does the curriculum and pedagogy of a modern university degree program intentionally and coherently provide those educational opportunities for students to graduate and take a meaningful place in a world filled with wicked problems?

In reality, it is possible to graduate from university never having had a purposive and defined experience in any of these areas.

5. Curriculum Misaligned with the Demands of Wicked Problems

First, there is a case to be made for an undergraduate degree having a curriculum and pedagogy aligned with the concept of mastery learning, the idea that to become proficient at a high level at anything, the oft-quoted 10,000 hours of time on task – or at least some degree of long-term commitment – is required [5]. This is no doubt particularly pertinent to specialized baccalaureate programs leading directly to a professional accreditation such as Nursing, Engineering, Accounting, and in their own ways, Performing Arts. That said, and with no disrespect intended to those teaching and learning in these areas, the typical outcomes of such programs are based on students solving structured, tame problems semester by semester and, after several years of doing so, having a well-honed tool kit, their "bricks in the wall", they have mastered that allows them to solve the "real world" versions of those same practice problems upon graduation. Most such programs provide for a certain amount of experiential learning along the way to a degree to jump start awareness of real world challenges and for most students, the secret to academic success as they learn is encapsulated in the clichéd advice offered to the tourist on the New York street who asks, "How do I get to Carnegie Hall?" and receives the answer, "Practice, practice, practice".

In less professionally-directed programs in the traditional arts and sciences, there is less need to conform to a specific disciplinary content set. Still, in subjects like Biology, Chemistry, History, or Psychology, for example, there are always core elements that are deemed as foundational. Biology graduates who do not understand evolution, Chemistry graduates who do not understand atomic theory, History graduates who have no knowledge of ancient Greece or Rome, or Psychology graduates who have never thought about human consciousness cannot properly lay claim to being educated in their disciplines. While there is more scope in such programs to escape the tyranny of the tame problem as the basis for understanding, most of the learning experience is based on showing that one can navigate a series of tame problems within the discipline to their solutions. This can be true even in interdisciplinary and multidisciplinary programs combining disciplines such as in Environmental Studies or Kinesiology. The very nature of disciplinary academic programs of study, even in combination, whatever they might say about their intended learning outcomes, mitigates against the kind of skill development that wicked problems demand.

6. Summative Rather Than Formative Assessment of Learning

Second, the way in which student learning is assessed is often much more a reflection of the need for organizational efficiency, public accountability, and faculty time preservation for research and collegial governance demands than for evaluating how students might be building their capacity to resolve wicked problems. University education has expanded in its reach to vast numbers of students who might, in previous eras, not have had the opportunity for postsecondary study (e.g., Trow in the American context, Vanderkamp in the Canadian context, and Murthi & Bassett in a broader global context highlighting the immense growth in university enrolment in developing countries [8, 11, 12]). This surely is a public good with respect to both professional development and personal citizenship. The consequence of this expansion, though, is that universities have had to find ways to assess academic success for many more students than faculty complements can manage easily.

This has resulted in evaluation strategies that can be either easily graded (e.g., short answer questions such as defining a term or differentiating between two concepts) or machine graded (e.g., the ubiquitous multiple-choice test). This has been exacerbated recently by the availability of large language frameworks that extend the power of the online search in ways that now make it difficult to determine the authorship of submissions of forms of assessments like essays, position papers, case studies, lab reports, and even the content of oral presentations. Whatever the relative merits of testing techniques that provide opportunities for large numbers of students to become university graduates, many achieve their goal with little or no experience putting together a comprehensive line of thought about a difficult and complex problem and being assessed for their ability to approach a wicked problem rather than just a series of tame ones. If only resolving the issue of opioid addiction or counseling someone with such an addiction could be approached with a multiple-choice algorithm.

7. Inadequate Collaborative Multidisciplinary Learning

Third, students do have occasional opportunities to work with others in the courses they take to fulfill the requirements for their degrees. Business programs engage their students in case studies and pitch competitions. Programs in health professions such as Nursing organize their students into small teams to develop practical skills in clinical settings. Performing arts programs such as theatre and music provide ensemble performance opportunities. In the sciences, students often have a lab partner with whom they work in a situation of shared responsibility and accountability. And, in any course in any discipline, it is possible for professors to require a group project. These experiences take a small step in the direction of education for wicked problem resolution but only a small one.

They typically do not bring together students from different disciplines and different ways of thinking about problems to collaborate from diverse perspectives. Also, they most often require students to work on solving problems with clear stopping rules and a well-defined solution space. Much of this is a by-product of how universities recruit, enrol, and guide students into and through their programs. They are admitted on the basis of particular scholastic experiences from secondary education, taken into a cohort of like-minded students with whom they spend most of their time over several years, and tasked to complete a course of study whose requirements are structured in distinctly lock-step ways requiring much of the program to be taken from within the discipline itself. With that as a foundational starting point, there is little scope to experience the diverse perspectives and collaborative opportunities that are consistent with the demands of resolving wicked problems.

8. Fragmented Academic Year Structure

Fourth, the structure of an academic year is not ideal for the development of the perspective that wicked problems demand of those trying to resolve them. There has been a shift away from university courses flowing through an entire academic year to an almost-universal semester or quarter system. A useful history and summary of this is provided by Bostwick, Fischer, and Lang [1]. Bundles of content are taken usually for ten to twelve weeks at a time and the entirety of the learning experience, including assessment, is isolated in that brief period. Students study between two and six such content packages at a time although it is not always the case that any linkages among the different packages are made expressly obvious or even could be. (There are even more modular approaches in some universities in which a single area of content is studied on its own intensely to the exclusion of all else for perhaps three or four weeks.) What was originally conceived as an integrated, four-year learning experience has, over time, morphed into a series of shorter-term, isolated, rushed periods of content-focused performance measurement. This might serve the purpose of emphasizing the idea of time on task and mastering individual and specific skills in solving tame problems but it provides little opportunity for integration, consolidation, reflection, and deep learning (a term that has now been entirely co-opted to describe what machines do rather than humans).

9. Poorly Integrated Academic Program Structure

Fifth, with respect to academic programs themselves, it is not that universities do not spend immense time and invest copious resources in curriculum development, monitoring, and approval. Whether this yields a valuable return on investment with respect to student learning is debatable: I say that as someone who was a university Dean or Provost for 20+ years (and no doubt part of the problem sometimes rather than the solution). Despite the commitment to offering curricula that are current and relevant, innovation is constrained by heavy emphasis policies, procedures, and regulation intended to facilitate the achievement of an institution's administrative goals for fiduciary accountability. This is not, in its primary purpose, focused on supporting the kind of learning that students need to resolve wicked problems. Reading any university policy collection with an eye to finding where that kind of learning is embedded is likely to be a disappointing endeavour.

In the curricular development process, universities often prescribe learning experiences as desirable for all students whatever their major and minor areas of academic specialization. Some require a first-language course as part of the degree, most insist on some degree of breadth (for example, at least one course from the Humanities, one from the Social Sciences, and one from the Natural or Physical Sciences), and some in the Canadian context, at least, now require students to take a course that examines Indigenous issues in some way. These kinds of courses – electives as they are usually designated – are typically not taught or learned in with any particular purpose beyond the course itself and there is only a vague sense that they are somehow good for students from outside the discipline in some general way though how they might connect with greater intentionality to a non-major student's program is not usually clear. In contrast, the basic tenets of critical, design, systems, and ethical thinking are not typically given formal space at all in the curriculum and are, instead, assumed to have been provided and assimilated into a student's knowledge and skill through the disciplinary study itself. This is at best a dubious assumption, particularly given the aforementioned emphasis on short-term performance in courses that might or might not be integrated with each other in any coherent way. Connecting the dots, so to speak, does not happen by chance but by intention and yet it is to chance that this kind of learning is left.

10. Re-envisioning University Education for a World of Wicked Problems

The original formulation of the idea of wicked problems has endured and strengthened over more than five decades. It has become an idea in multiple disciplines not easily ignored by those working in fields of endeavour in which a relatively linear application of the standard scientific method does not easily, if at all, lead us to resolutions of significant problems in those areas. This includes Education itself as both a community of practice and an area of scholarly investigation. As Crowley and Head noted in their retrospective on the original paper by Rittel and Webber, there remain significant implications of the idea of wicked problems as we continue to come to grips with the "fundamental engagement with rationalism, closed and open systems, politics in society, pluralism and challenges to the efficacy of professional expertise" that animated the original paper. [3]

There are universities that have woven into their "DNA" the educational experiences needed to address wicked problems. This is not always expressed as being overtly about wicked problems but the critical, design, systems, and ethical thinking components are all there. The AshokaU concept, for example, originating within the not-for-profit community of global social entrepreneurs, Ashoka, is one that has brought together universities from around the world into a university sub-species whose common link is the idea of changemaking. (The full details of this network can be found at AshokaU.org.) Fundamental to the changemaker philosophy of these institutions is to provide their students with "purpose, agency, and skills to innovate for a better world, regardless of their discipline, role, or sector". To accomplish this, universities embracing the changemaker philosophy focus on curriculum, co-curriculum, and multidisciplinary pedagogy that emphasizes among other learning outcomes: empathy, inclusivity, ethics, multiple approaches for social change, building relationships of trust, systems thinking, and creative problem solving.

Such institutions are examples of how universities can re-organize themselves to provide education that is attuned to the reality of wicked problems. However, the process and resources needed to meet the requirements of a "changemaker university" as established by AshokaU as the initiators of the designation illuminate just how difficult such a re-alignment is [4]. Nevertheless, relatively simple changes to an academic program to ensure that the idea of wicked problems and an overview of the critical, ethical, design, and systems thinking could be the basis, even if just in a single required course, that would allow every university graduate to understand that the problems they will face after graduation are seldom tame and seldom solvable using the solution strategies for tame problems.

Wicked problems await our university graduates. They deserve to have the skills needed to resolve them.

Conflicts of Interest

The author declares no conflicts of interest.

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