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Rational and Challenges of Competency-Based Education and Training: The "Wickedness" of the Problem.

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Abstract
Our students will continue to be confronted with many environment and sustainability issues during their lifetimes because they are unpredictable, serious and complex by nature. These issues challenge not just our technologies but our universities and educational institutions, values and way of living and interaction. Competency-based education and green skills for work and life in post-2015 Africa will involve dealing with very complex problems. These problems go beyond the capacity of any one organization to understand and respond to, and there is often disagreement about the causes of the problems and the best way to tackle them. These problems are called 'wicked' problems. These wicked problems quite often have become policy issues. There are numerous examples of wicked policy issues such as climate change, environment degradation, and sustainable development. Usually, part of the solution to wicked problems involve changing the behaviour of groups of citizens or all citizens. Other key ingredients in solving or at least managing complex problems include successfully working across both internal and external organizational boundaries and engaging citizens and stakeholders in policy making and implementation. Wicked problem require innovative, comprehensive solutions that can be modified in the light of experience and on-the-ground feedback. All the above can pose challenges to competency-based education approaches and their implementation. This discussion paper explores the characteristics of wicked problems and challenges they pose for competency-based education approaches. Although developing effective ways to tackle wicked problems is an evolving art, this paper contributes by identifying some of the rationale that seem to be required. The first part of this paper introduces the concepts of competency-based education and the wicked problems. The second part of the paper discusses the characteristics/ challenges of wicked problems in the context of competency-based education. The third part suggests possible strategies/ rationale for taming wicked problems. The last part draws conclusions and finally proposes the way forward.
Keywords: Competency, Education, Wicked problems, policy, Environment, Social welfare, Strategies, Sustainable development

1. Introduction

In today's complex environment, organizations often find themselves facing confounding problems. These issues are not just tough or persistent; they are "wicked"—a label used by urban planners for problems that cannot be definitively resolved. Poverty and terrorism are classic examples. A wicked problem has innumerable causes, and has no correct answer. It can be tamed, however, with the right approach (Camillus, 2008). A wicked problem is a form of social or cultural problem that is difficult to solve because of incomplete, contradictory, and changing environments. These problems are typically offloaded to policy makers, or are written off as being too cumbersome to bother with. Yet these are the problems that plague our world and our societies – environmental degradation, poverty, sustainability, equality and health and wellness are issues that touch each and every one of us.

These issues challenge not just our technologies but our universities and educational institutions, values and way of living and interaction. Today our higher education system is facing a crisis regarding its perceived quality. The public is putting pressure on institutions to show the value of their degrees. Not only do employers complain about university graduates who lack skills, but students also question the meaning and value of a university education, no doubt because of its high cost and its potential for resulting in significant personal debt. One model for improving quality is competency-based education, in which an educational institution clearly defines the specific competencies expected of its graduates. A competency framework sends a message to those outside the institution about what a university degree-holder should know and be able to do. When the institution also assesses for those competencies, the message is one of transparent rather than abstract expectations.

However, our students will continue to be confronted with many environment and sustainability issues during their lifetimes because these issues are unpredictable, serious and complex by nature. These problems go beyond the capacity of any one organization to understand and respond to, and there is often disagreement about the causes of the problems and the best way to tackle them. Because of their nature, these problems are called 'wicked' problems. These wicked problems quite often have become policy issues. There are some examples of wicked policy issues such as climate change, environmental protection, and sustainable development. Environmental, social and economic dimensions of development constitute "wicked problems" that add to the challenges of competency-based education and green skills for work and life in Post-2015 Africa.

2. Competency-based education

Competency-based education has become a hot topic in higher education circles around the world including Uganda. In Uganda it is becoming increasingly popular as the country searches for ways to improve university affordability and more accurately measure student learning. There are almost as many institutions claiming to have competency-based education as there are definitions, so it seems worthwhile to define what competency-based education is and how it can benefit higher

education (Mendenhell, 2012). What is competency-based education and what makes it different? The most important characteristic of competency-based education is that it measures learning rather than time. Students progress by demonstrating their competence, which means they prove that they have mastered the knowledge and skills (called competencies) required for a particular course, regardless of how long it takes. While more traditional models can and often do measure competency, they are time-based -- courses last about four months, and students may advance only after they have put in the required time. This is true even if they could have completed the coursework and passed the final exam in half the time. So, while most educational institutions and universities hold time requirements constant and let learning vary, competency-based learning allows us to hold learning constant and let time vary ((Mendenhell, 2012 and Weinert, 2001).
According to (Mendenhell, 2012), competency-based education can improve quality and consistency, reduce costs, shorten the time required to graduate, and provide true measures of student learning if implemented effectively. Mendenhell (2012) emphasizes that effective competency-based education must:

2.1 *Measure student learning rather than time*. Students progress by demonstrating their competence, which means they prove that they have mastered the knowledge and skills rather than completing series of courses per given time.

2.2 *Harness the power of technology for teaching and learning.* Computer-mediated instruction gives us the ability to individualize learning for each student. Because each student learns at a different pace and comes to college knowing different things, this is a fundamental requirement of competency-based education.

2.3 *Fundamentally change the faculty role*. When faculty serve as lecturers, holding scheduled classes for a prescribed number of weeks, the instruction takes place at the lecturers' pace. For most students, this will be the wrong pace. Some will need to go more slowly; others will be able to move much faster. Competency-based learning shifts the role of the faculty from that of "a learned on the stage" to a "sage on the side." Faculty members work with students, guiding learning, answering questions, leading discussions, and helping students synthesize and apply knowledge.

2.4 *Define competencies and develop valid, reliable assessments*. The fundamental premise of competency-based education is that we define what students should know and be able to do, and they graduate when they have demonstrated their competency. This means that we have to define the competencies very clearly.

The benefits of this competency-based approach have been recognized by policy makers and influencers in higher education. While policy makers are praising competency-based education, there are challenges that constitute the focus of this paper.

3. Challenges of Competency-based education and training

This section discusses the challenges of competency based education and training from three perspectives: measuring competencies, question of suitable criteria and the “wicked problem”.

3.1 Measuring competencies acquired in higher education

Measuring competencies acquired in higher education has to be regarded as a challenge. The progress made in empirical research on the school system since the 1990s – for example, through large-scale assessments such as the Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA) and through a massive expansion of instructional research (Blömeke, Suhl, Kaiser, and Döhrmann, 2012 and 2011) in general, has revealed that nothing comparable exists at the higher education level. This deficit can be traced back to the complexity of higher education and academic competencies. Not only is there a variety of institutions, programs, occupational fields and work place requirements, but also the outcome is hard to define and even harder to measure. Thus, the problem is caused in part by the complexity that characterizes the academic competencies of undergraduate, graduate and doctoral students owing to the inter and intra-national diversity of study models, education structures, teaching performances, etc. In the context of a differentiated tertiary education system, assessing the development of competencies among students presents a methodological challenge. From this perspective, modelling and measuring academic competencies as well as their preconditions and effects is complex.

3.2 What criteria is suitable?

Another challenge is the question of a suitable criterion (for example, future work place requirements) that will help to evaluate the acquisition of competence (Hartig, Klieme, and Leutner, 2008; Kuhn, and Zlatkin, 2011).. The requirements of workplace and of academics change constantly and any one criterion at any one time may not be suitable.

Measuring competencies acquired in higher education and what criteria is suitable for evaluation are direct challenges of competency-based education. The other challenges of competency-based education arise from environmental, social and economic dimensions which are even more complex. These challenges are complex and therefore described in this article as “wicked” problem.

3.3 The “wicked” problem

There are several ways to define a wicked problem, but according to Rittel and Webber (1973), it has some or all of 10 characteristics. Caveat: The criteria are not a set of tests that mechanically determine wickedness; rather, they provide insights that help one judge whether a problem is wicked. Later, Conklin (2005) generalized the concept of wicked problems to areas other than planning. Here are some important characteristics of these problems:

3.3.1 Wicked problems are difficult to clearly define. The nature and extent of the problem depends on who has been asked, that is, different stakeholders have different versions of what the problem is. Often, each version of the policy problem has

an element of truth – no one version is complete or verifiable right or wrong. It is not possible to write a well-defined statement of the problem, as can be done with an ordinary problem. The debate concerning the causes, the extent and solutions to environmental and unemployment are good examples. In this context, the issue of competency is difficult to define and measure.

3.3.2 Wicked problems usually have no clear solution. Since there is no clear definition of wicked problem, there is often no definite solution to the problems. Solutions to wicked problems are not verifiably right or wrong but rather better or worse or good enough. Wicked problems are assumed to be solved when deadlines are met, or as dictated by other resource constraints rather than when the 'correct' solution is identified. In some cases, such as the challenge of environmental degradation, the problem may never be completely solved. To pursue approaches based on 'solving' the problem may cause policy makers to act on unnecessary and unsafe assumptions and create unrealistic expectations.

3.3.3 Wicked problems are socially complex. Social complexity outweighs the technical complexities of the wicked problems. This is because solutions to wicked problems usually involve coordinated action by range of stakeholders, universities, schools, including government agencies, NGOs, private businesses and individuals.

3.3.4 Wicked problems is not the sole responsibility of any one organization. Even if competency-based education can be a way of achieving green skills for work and life, it is clear that it involves many organizations beyond the universities and other educational institutions. It is clear, for example, that environmental and socio-economic issues cannot be dealt with at any one level of government. They require action at every level – from the international to the local – as well as action by the private and community sectors and individuals.

3.3.5 Some wicked problems are characterized by chronic policy failure. Some longstanding wicked problems seem intractable, environment degradation is a clear example.

3.3.6 Wicked problems involve behaviourial change – the solutions to many wicked problems involve changing the behaviour and/ or gaining the commitment of individual citizens. The range of traditional levers used to influence citizen behaviour – legislation, fines, taxes, other sanctions – is often part of the solutions but these may not be sufficient. More innovative, personalised approaches are likely to be necessary to motivate individuals to actively cooperate in achieving sustained behaviourial change.

4. Rationale and strategies for tackling wicked problems/ over- coming the challenges

There is no quick way of tackling wicked problems. Most of the literature advocate a collaborative approach to wicked problems, but some research acknowledges that other approaches are possible. Roberts (2000) identified three possible strategies:

4.1 Collaborative strategies – the most effective in dealing with wicked problems that have many stakeholders amongst whom power is dispersed. At the core of collaboration is a win-win view of problem-solving, partnerships, joint ventures, whole of government, international agencies and information campaigns to influence lifestyle choices are all variations on this strategy.

4.2 Authoritative strategies – These give the problem to some group or an individual who take on the problem-solving process while others agree to abide by its decisions.

4.3 Competitive strategies – this strategies aim at search for power, influence and market share – stakeholders following this strategy generally assume a win-lose outcome. key advantage include creation of new ideas and innovation and the provision of choice.

4.4 Avoiding a narrow approach – wicked problems are difficult to tackle using the techniques traditionally used by the public sector. traditional policy thinking suggests that the best way to work through a policy problem is to follow an orderly and linear and linear process, working from problem to solution. The solution would start by understanding and defining the problem. This involves research and consulting with stakeholders. it is often thought that the more complex the problem is, the more important it is to follow this orderly flow.

Such a linear, traditional approach to policy formulation is an inadequate way to work with wicked policy problems. this is because part of the wickedness of an issue lies in the interactions between causal factors, conflicting policy objectives and disagreement over the appropriate solution. linear thinking is inadequate to encompass such interactivity . the handling of wicked problems requires holistic rather than linear thinking. This is thinking capable of grasping the big picture, including the interrelationships between the full range of causal factors and policy objectives. by their nature the wicked problems are imperfectly understood, and so initial planning boundaries that are drawn too narrowly may lead to a neglect of what is important in handling the wicked issues. It is in this unforeseen interconnections that policy problems grow and policy failures arise.

4.5 Innovative approaches – a traditional bureaucracy, divided into vertical silos, in which most of the authority for resolving problems rests at the top of the organization, is not well-adapted to support the kinds of process necessary for addressing the complexity and ambiguity of wicked problems. bureaucracies tend to be risk averse, and are intolerant of messy processes. They excel at managing

issues with clear boundaries rather than ambiguous, complex issues that may require experimental and innovative approaches.

Public universities and other educational institutions need to adopt more systematic approaches to social innovation as opposed to the current ad hoc approach. How many universities or educational institutions have a committee responsible for innovation? How many have significant budgets for innovation? While the primary responsibility universities and educational institutions is to deliver an excellent service and achieve continuous improvement, a secondary responsibility is

to ensure that part of the university is focused on the models and services of the future, cultivating the innovators both inside and outside and helping them to evolve their ideas. The bottom line is that universities need to become more adaptive and flexible in dealing with wicked problems.

4.6 Working across organizational boundaries

As mentioned earlier, one of the challenges is social complexity that is often hardiest part of tackling wicked problems and that overwhelms most current problem-solving and project management techniques. It is the need to work across universities and educational institutions, the need to work with other jurisdictions and organizations, and the need to engage with many dispersed stakeholders that makes tackling wicked problems such as socially complex exercise. Shergold (2004) observed the challenges posed by the social complexity of wicked problems in the following words:

Reviewing the "in terrain which is politically contested, in which the resources to address difficult human issues are necessarily finite, there are rarely clear questions, let alone easy answers. progress is nearly always marked by consultation, discussion, negotiation and iteration."

4.7 Effectively engaging citizens and stakeholders – a key conclusion of much of the literature about wicked problems is that effectively engaging the full range of stakeholders in the search for solutions is crucial. Engagement is most important when the active participation and cooperation of citizens is required as part of the solution. Effective collaboration is in creating shared understanding about the problem, and shred commitment to the possible solutions. Shared understanding does not mean necessarily agreeing on the problem….shared understanding means that the stakeholders understand each other's positions well enough to have intelligent dialogue about the different interpretations of the problem, and to exercise collective intelligence about how to solve it. Because of social complexity, solving a wicked problem is fundamentally a social process. The question is how to achieve this shared understanding. A starting point is stakeholder and citizen engagement. The Organization for Economic Co-operation and Development, OECD (2001) identified three levels of government-citizen relations in this context.

4.7.1 Information - government disseminates information or policy making or programme design. information flows from the government to citizens in a one-way relationship.

4.7.2 Consultation – government asks for and receives feedback from citizens on policy-making and programme design. In order to receive feedback, govt defines whose views are sought and on what issues based on prior information.

4.7.3 Active participation or citizen engagement – occurs where citizens actively engage in policy and decision-making processes. Citizens may propose policy options and engage in debate on the relative merits of various options, although the final responsibility for policy formulation and regulation rests with the government.

4.8 Achieving sustained behaviourial change – successful addressing of most wicked problems requires achieving sustained changes in behaviour. This is because it is clear that govt cannot simply deliver key policy outcomes to a disengaged and passive public. In the areas of welfare, employment, education and environment it is clear that achieving significant progress requires the active involvement and cooperation of citizens. Universities may have more impact on key policy outcomes by using their limited resources to engage, involve and change the behaviour of users and other parties, than by concentrating on traditional policy tools and service delivery.

5. Conclusion

Today our higher education system is facing a crisis regarding its perceived quality. The public is putting pressure on institutions to show the value of their degrees. Not only do employers complain about university graduates who lack skills, but students also question the meaning and value of a university education, no doubt because of its high cost and its potential for resulting in significant personal debt. One model for improving quality is competency-based education, in which an educational institution clearly defines the specific competencies expected of its graduates. But this is not being realized because of challenges.

Many of the most pressing challenges for competency-based education involve tackling wicked problems. Wicked problems are characterized by social complexity – they cross the boundaries of universities and other educational institutions. Stakeholders often disagree about the exact nature and causes of the problems, and also disagree about the best way to tackle them. A key part of the solution to many wicked problems involves achieving sustained behaviourial change. It has become increasingly clear that a disengaged and passive public can be a key barrier, and is a factor in the policy failures around some of Africa's longstanding problems. In the areas of employment, education and environment, significant progress requires the active involvement and cooperation of citizens. tackling wicked problems is an evolving art which seems to at least require: holistic, not partial or linear thinking; innovative and flexible approaches; the ability to work across university and other educational institution's boundaries; increasingly understanding and stimulating a debate on the application of the accountability framework; effectively engaging stakeholders and citizens in understanding the problem and in identifying possible solutions and a better understanding of behaviourail change by policy makers.

6. Way forward

Some practical ways in which universities and other educational institutions can assist their students more effectively tackle wicked problems are at two levels:

6.1 At government level – continue with the current structure and activities aimed at improving whole of govt working, working across the organizational boundaries and engaging with citizens and stakeholders. Incorporate training and case studies on tackling wicked problems into Africa Public service Commission's programmes that focus on skills needed to deal

with social complexity, in order to achieve high levels of systems thinking and a basic understanding of behaviourial change. Increase the understanding of and stimulating debate about options available under the government accountability framework for universities to tackle wicked problems and whether there are any barriers that need to be addressed.

6.2 At university level – focus on obtaining competencies necessary to tackle wicked problems, including by recruitment, contracted labour, outsourcing particular analysis, formal learning programmes and encouraging people to undertake a relevant range of work designed to including by recruitment, contracted labour, outsourcing particular analysis, formal learning programmes and encouraging people to undertake a relevant range of work designed to broaden their experience. Encourage a new style of managing for learning organizations - a style that encourages initiative but recognizes the need for learning. It is characterized by willingness to think and work in new and innovative ways and requires flexible and creative thinking. Continue to work on fostering a culture that encourages collaboration and engagement, including developing a shared understanding of contentious issues among relevant stakeholders and organizations.

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