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Towards an Understanding of the Implementation & Adoption of Massive Online Open Courses (MOOCs) in a Developing Economy Context

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ABSTRACT

This research is a preliminary study that interrogates key stakeholders' values in the delivery of massive online open courses (MOOCs). MOOCs have received increased attention and prominence particularly within the last couple of years since well-known US universities have been promoting their implementation as a desirable strategy. Its implementation touts multiple benefits, such as wider student reach, flexibility in learning modes, and improved class administration, benefits which are seen on a larger scale when compared to traditional online learning environments. Formal academic studies examining key issues, success factors and, stakeholders' values are limited with little attention to developing regional perspectives. This study exploits this opportunity by utilising the principles of Value Focused Thinking (VFT) methodology, developed by Keeney (1999) to elicit core values and objectives from administrators, management, lecturers, students and other stakeholders in optimising the success of MOOCs. VFT is known to enhance decision making through targeted non-traditional techniques to determine the means and end objectives in any decision context. This approach provides significant opportunities for policy makers, education executives and other stakeholders in better understanding what can drive the success of these MOOCs, thereby enhancing investment and management decisions surrounding their adoption. The study is currently situated in a developing country context yet offers insights to all regions.

Keywords: MOOCs, Massive online open courses, Online learning, Value Focused Thinking (VFT), Caribbean

INTRODUCTION

The ubiquitous nature of Information & Communication Technologies (ICT) has provided important strategic opportunities in education via online learning methods. The opportunities and advantages have now extended to the most recent development of Massive Online Open Courses (MOOCs). Online learning has gained popularity because of its promise to deliver anytime any place access to content and instruction (US Department of Education, 2010). There is a growing uptake in the adoption of online learning in many developing countries such as those in the

Caribbean, particularly at the tertiary level. There is general agreement that students in online learning environments perform better compared to more traditional delivery methodologies (US Department of Education, 2010). The online learning environment provides learners with a wider variety of resources so that they build on their strengths, allows for a more cost efficient delivery of content and allows instructors to handle a large cohort than would be possible using a face to face modality (US Department of Education, 2010). The notion that learning a complex body of knowledge works best in a *community of learners* where students, teachers, and other interested participants share norms that value learning and high standards (Bransford et al, 2004) is a common conjecture for those advocating online learning. Similarly another conjecture is that asynchronous discourse is inherently self-reflective and therefore more conducive to deep learning than is synchronous discourse (US Department of Education, 2010).

An analysis of the current discourse on MOOCs revealed that the discussions are primarily in the non-academic domain. On closer inspection, there is a paucity of academic literature that examines the implementation and adoption of MOOCs and the implications to key stakeholders such as educators, administrators and students. There have been even fewer studies on the implications for the adoption of MOOCs in developing countries from the perspective of key stakeholders involved in the delivery of tertiary education. The current state of academic studies provides a timely opportunity to gain an understanding of the opportunities, rationale, associated risks and constraints, in implementing and adopting MOOCs. With the massive investment in capital and other resources required, it is necessary to critically examine the attributes that can foster sustainable success of MOOCs.

The purpose of this study is to examine the strategic implications of the widespread implementation and adoption of MOOCs in tertiary institutions through the application of the Value Focused Thinking (VFT) approach. This initial study is conducted at one of the top universities in the Caribbean, however it is expected that the study and its results will have implications for other regions and contexts. The VFT approach is used because it is designed to bring to the attention of decision-makers the pertinent, key activities necessary to solve a decision problem (Keeney, 1999). In this research context, we are attempting to identify the key objectives needed to enhance the successful implementation and adoption of MOOCs. This research approach is motivated by the benefits of the VFT technique as an alternative approach to traditional thinking, useful for identifying key alternatives and values, and providing a "value centric" approach to enhancing the decision-making process (Keeney, 1999).

The study provides an excellent opportunity to identify key events, considerations necessary to promote sustainability of investments in MOOCs. Deeper insights into the perspective of educators, administrators and students regarding the adoption and implementation of MOOCs is important as it will provide an answer to the question as to whether their adoption are consistent with the objectives that educators and administrators have for the delivery of education or whether a collective response to the phenomenon might be best given a finding of a common view among fellow faculty. The study would also provide faculty with a means of gauging how their own perspective matches up to the collective so as to determine whether a change in their approach might enhance their quest to provide better outcomes for their students and understanding how they can learn from contemporary views about best practices in this space. Given the potential for MOOCs addressing real problems of education delivery in developing economies (MIT Technology Review, 2013), the research will provide policymakers and

administrators with improved understanding into the attitudes of educators towards adoption of MOOCs and an appreciation as to whether entrenched views could support or hinder educational institutions taking advantage of what is on offer.

REVIEW OF LITERATURE

E-Learning and MOOCs

E-learning systems are rapidly becoming an integral part of the teaching and learning process in many schools (Pituch & Lee, 2006). According to McEwen (1997), online instruction can potentially enhance learning compared to what can be accomplished using a classroom only approach. Additionally, online education can result in cost reduction and improvements in efficiency through a standardized way to deliver content (McDonald, 1999-2000). MOOCs claim to offer to a large global audience the benefits of online learning (MIT Technology Review, 2013a) on a massive scale (Koller, 2012). The extent to which stakeholders sees the adoption of this new technology as living up the promise of improvements in the delivery of knowledge by among other things facilitating the employment of modern delivery techniques has not been extensively explored.

In contrast to traditional delivery methods, on-line learning promises to enhance the adoption of a wide variety of approaches. Bransford, et al., (2004) explained how the use of technology creates learning environments that are learner, knowledge, assessment and community centred; capabilities consistent with the effective exploitation of a wide range of pedagogical approaches. For example, constructive theories (Anderson & Dron, 2011) have in recent time gained currency. Here the emphasis in on a learner centric approach where students are actively involved in their learning. Knowledge is created and constructed by the user - learning takes place by allowing the learner to discover things for himself and to determine the pace of his learning. The theory is that learners learn best when they are forced to discover things for themselves. The instructor's role is that of a facilitator rather than someone who simply imparts knowledge.

MOOCs add two twists to the e-learning paradigm. *Massive* indicating huge number of students enrolled over a wide geographic area. *Open* indicating that the material is freely available. Two prominent institutions offering Massive Online Open Courses (MOOCs) seek to apply the experience with online learning to suggest that their courses provide the promise of student centred learning to a global audience and thus address challenges such as the limited access to quality tertiary level education and the high the cost for delivering education that restricts access to a large segment of the population in developing countries (Koller, 2012; MIT Technology Review, 2013). However, due to such factors as language differences, access to technology, computer literacy and cultural sensitivities, it is not clear that the adoption of MOOCs will result in favourable outcomes for developing countries (Liyanagunawardena & Williams, 2013). Bates (2012) makes a similar argument about technology access in a direct response to Koller's submission

In the USA where MOOCs have gained some popularity, educators and administrators have had differing views of their efficacy and desirability (Seaman, Lederman, & Jaschik, 2012). Many issues have arisen as a result including the perceived threat to traditional forms of lesson delivery, livelihood of educators and faculty (MIT Technology Review, 2013b), the most

appropriate or effective operational strategy or business model (Daniel, 2012; Inside Higher Ed., June 2013), scalability, impact on quality assurance, and drop-out rates (Daniel, 2012).

In contrast to the optimistic picture painted by proponents of MOOC, there have been concerns about their adoption:

- The extent to which current implementations embodies new learning paradigm. In his criticism of current MOOCs offerings by leading providers, Bates (2012) points to the use of outdated pedagogical approaches: courses with a mix of short video lectures, quizzes and projects reflects the more traditional behavioural and cognitive approaches.
- Quality Assurance and completion rates. (Daniels, 2012) points to the implication of about the lack of quality assurance provisions and the low completion rates for MOOCs courses. Quality auditors and assessors are keen to ensure that value is realised from the investment of public funds and the protection of students from poor practices (Daniels, 2012)
- Threats to Professors' Intellectual Property. Cary Nelson, a former president of the American Association of University Professors, argued at the group's annual conference that MOOC was a threat to faculty members' copyrights and academic freedom because of issues surrounding ownership of the material developed for these courses (The Chronicle of Higher Education, 2013).

Technology Adoption

MOOCs are considered innovation in the education delivery space. It is therefore useful to consider models of technology adoption in order to evaluate how stakeholders values might provide insights into their willingness and readiness to embrace the innovation of MOOCs. Two significant families of thought on technology adoption are technology adoption model (TAM) first proposed by Davis (1989), figure 1, and diffusion of innovation model (DOI), (Rogers 1983; 1995).

TAM is strongly influenced by the theory of reasoned action (TRA), which according to Ajzen and Fishbein (1980) explains why a user accepts or rejects information technology. In the TAM, user acceptance of technology as measured by use of the technology looked at in two dimensions. Firstly, the extent to which persons believe technology will help them perform their job better termed *perceived usefulness* and secondly whether performance benefits of usage are outweighed by the effort to use the application termed *perceived ease of use* (Davis, 1989). Venkatesh and Davis (2000) extended TAM by considering additional variables. Significant for this study were their concept of *voluntariness* as a moderating variable, defined as "the extent to which potential adopters perceive the adoption decision to be non-mandatory". Additionally, they pointed to *image* as "the degree to which use of an innovation is perceived to enhance one's . . . status in one's social system" (Moore and Benbasat, 1991). Also mentioned is the concept of *subjective norm*, defined as a "person's perception that most people who are important to him think he should or should not perform the behavior in question".

A study among pre-service teachers confirmed the validity of the TAM in an educational setting (Teo, Lee & Chai, 2007). It found that the subjective norm mentioned in the extended TAM was a significant determinant of pre-service computer attitudes. Specifically they found that subjective norm had a significant effect on pre-service teachers' attitudes towards computer use

in a mandatory setting, but it had no effect in a voluntary setting. In a study involving a sample of 628 university students in Korea, Park (2009) showed TAM to be a good theoretical tool to understand users' acceptance of e-learning.

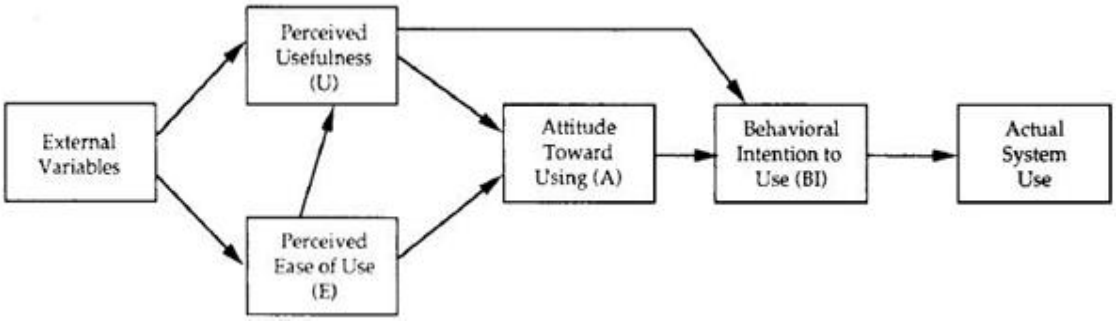

Figure 1: Original TAM (Davis, et al., 1989)

The DOI theory suggests that members in a social system will vary in how early they adopt a new innovation (Rogers, 1983; 1995). Rogers (1995) reasoned that innovation consists of four stages: invention, diffusion (or communication) through the social system, time and consequences. The information flows through social networks. The nature of the networks and the roles opinion leaders play in them determine the likelihood that the innovation will be adopted. Five adopter categories are: innovators, early adopters, early majority, late majority, and laggards, figure 2. Rogers (1983; 1995) further contended that there are several intrinsic characteristics of innovations that influence an individual's decision to adopt or reject an innovation:

- Relative advantage or the degree to which the innovation is perceived as being better than earlier ones. In our case the traditional modes of education delivery.
- Compatibility or the degree to which an innovation such as MOOCs is perceived as being consistent with the existing values and past experiences of potential adopters.
- Complexity or the degree to which an innovation as perceived as being difficult to use.
- Observability or the degree to which the results of an innovation are observable by others.
- Trialability or the degree to which an innovation may be experimented with before adoption.

In the education space domain, the findings of a study of teacher adoption of web technology in a secondary college in Sydney, Australia show that DOI theory was successful in predicting the future Web use by teachers for purposes of teaching preparation and teaching delivery and so should be considered by school administrators seeking to increase the rate of adoption of e-Learning within their organisation (Jebeile & Reeve, 2003).

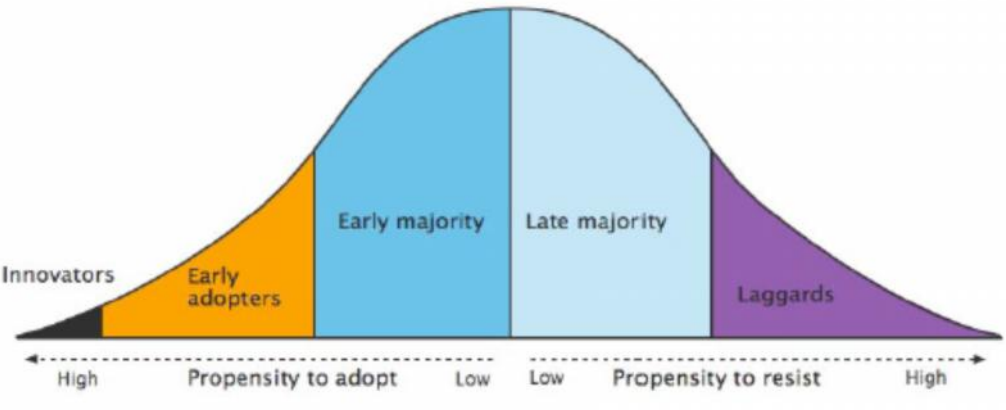

Figure 2: Diffusion of Innovation (Robinson, 2009)

RESEARCH METHODOLOGY

The study adopts the VFT approach to gain insights into the important values of diverse stakeholders regarding the delivery of MOOCs. The use of interviews is used to support the data collection from the diverse stakeholders. The VFT approach (Keeney, 1994) speaks to the importance that stakeholders' values play in determining the decisions they make. The VFT approach provides a systematic way to identify objectives based on stakeholders' values and a way to organize these objectives. A distillation of values that educators, administrators and other key stakeholders hold facilitates the opportunity to gain interesting insight into how their disparate thinking collectively inform an understanding of the implication for the implementation and adoption of MOOCs. The VFT approach is particularly apt in this context as it imposes no limit on identifying 'what we care about' and the values elicited also inform the relative desirability of consequences (Kenny, 1994). The approach is well positioned for this study since it has been successfully applied in multiplicity of contexts, including information systems domains, for example: to identify values of mobile technology-based education (Sheng, Siau & Nah, 2007); to gain insights into the values of internet commerce to customers to facilitate design (Keeney, 2007); to better understand the strategic implications of mobile technology (Sheng, Nah, Siau, 2005); to examine information system security in organisations (Dhillon, Torkzadeh, 2006); and to determine project success criteria for multiple project contexts (Barclay & Osei-Bryson, 2008; 2009).

The steps taken in the application of the methodology and VFT (Figure 3) include the following stages:

1. Identify the Education/MOOCs Stakeholders. Gathering insights from the persons or groups that have a vested interest in the implementation and adoption of MOOCs is important to help assure quality in the values and objectives elicited. The individuals or groups that will have a vested interest in this include a cross-section of instructors, students, administrators, online learning specialists, and education executives to name a few. This research focused on one university based in the Caribbean in this preliminary study. Six (6) persons were

interviewed that included students, online learning specialist and instructors. Additional stakeholders will be interviewed at a later stage.

2. Elicit values from the stakeholders. Values are those principles that one strives to, and define the entire considerations one can care about in a specific situation (Keeney, 1994; 1999). Therefore this study through the use of questions, sought to ascertain the principles that the stakeholders strive to attain or care about in the context of the successful implementation and adoption of MOOCs.
3. Convert values to objectives. Upon gaining insights into the stakeholders' values, these identified values are converted into objectives. An objective is characterized by three features, namely a decision context, an object and a direction of preference (Keeney, 1999). Multiple objectives can be derived from the value statement.
4. Determine means and fundamental objectives. The relationship between the objectives is determined by the process of distinguishing between means and fundamental objectives. The means objectives are regarded as those whose attainment will help achieve the fundamental objectives while the fundamental objectives refer to the objectives underlying the essential reasons for the problem under consideration, (Keeney, 1999). To perform this step the ''*why is this important*'' procedure is performed. Therefore, each objective is weighed against this question and if an objective is found to be important because it helps achieve another objective, it is categorized as a means objective; otherwise it is a fundamental objective.
5. Construct means-end objective network. A means-ends objective network is constructed to show the relationships among the means and fundamental objectives. From this graphical depiction of objectives and relationships between them, decision-makers can better appreciate the diverse actions that ought to be taken into consideration for the successful implementation and adoption of MOOCs.
6. Discuss results. The means-end objective network and findings from the study are elucidated.

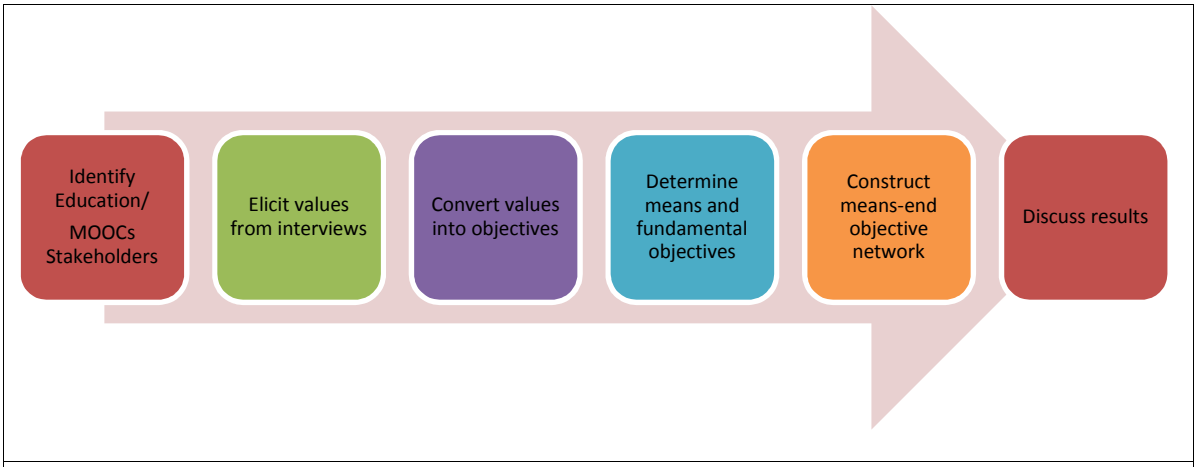

Figure 3: Steps in conducting research

APPLICATION OF VFT

Identify Stakeholders

The stakeholders included a representative sample of the key categories of stakeholders in the online learning and MOOCs domain. Centered on a top university in the Caribbean, six

stakeholders were interviewed which showed representation from the key stakeholder groups, table 1. The university has a student population of over 12,000 and offers both undergraduate and graduate courses. It has been offering online courses since 2006, and while it is currently not engaged in MOOCs, the experience from its online delivery will be instructive to this study. Further, the stakeholders have varied type of interactions with MOOCs including from a student/customer perspective.

Table 1: Stakeholder Demographics

Stakeholder Group	# of Persons
Students	2
Instructors	2
Academic Management	1
Online-learning specialist	1

The main questions asked during the interviews included:

1. *What do you consider desirable outcomes with respect to your delivery of online learning?*

   The objective here is to identify goals that respondents might have in the delivery of the product. Typical answers might be satisfying varied learning needs or maintaining student interest.

2. *What initiatives would you like to undertake to improve delivery of online learning in this university?*

   It is expected that the responses from stakeholders (typically in the form of a wish list or alternatives) will provide clues to their values with respect to how online learning should be delivered. Additional follow-up questions to elicit circumstances where there are no limitations or constraints are also discussed to depict the best set of conditions necessary to achieve the decision context, which is in this case is to maximise or optimise the successful implementation and adoption of MOOCs.

3. *What are your concerns with respect to the widespread adoption of MOOCs?*

   Stakeholders may have different types of concerns about MOOCs; strategies to address these concerns may form objectives and alternatives

4. *What are key features or characteristics MOOCs must have in order for their successful adoption in this university*

   While similar to question 3 above, here the focus is environmental rather than issues relating to more personal concerns.

5. *What can be done to improve education delivery outcomes at this University?*

   The question seeks to identify the immediate concrete steps that can be taken to improve education delivery.

6. *What are limitations that exit with respect to the implementation of more effective educational delivery methods such as MOOCs?*

   Understanding the limitations or constraints to success can help determine necessary constituents of successful operations of MOOCs. These objectives can provide the opportunity for due consideration to how limitations may be addressed or overcome.

7. *If you given the task of evaluating new education delivery methods, how would you go about doing it?*

   This question will help us to quantify objectives by providing insights as to the stakeholders; ideas of appropriate metrics for delivery methods and especially online methods including MOOCs.

8. *How would you judge the success of a MOOC at this university and in general?*

   This question seeks to gauge how the different stakeholders measure success which will help to identify the specific set of criteria important to them.

Values Elicitation & Objectives Identification

Using the VFT approach, six stakeholders were interviewed regarding their values with respect to the implementation of MOOCs. The stakeholders were taken from the student body, lecturers, online learning specialists, and administrators. All had exposure to on-line learning in different capacities. The interviews were conducted face-to-face with each participant and lasted between forty-five (45) minutes to one (1) hour. The interviews were recorded using a recording device with the interviewer making notes as a supplement. In some cases the interviewees were provided the questions beforehand so that they had a chance to prepare his responses. Clarification was sought by the interviewer both to the answers provided in the interview and the prepared answers.

The means end objectives were derived from the values elucidated by the interviewees. Upon obtaining the set of values, these values were first converted to a common form - a decision context, an object and a direction of preference. Fundamental objectives were then derived from these end means objectives using the "Why is it important test". For example, in response to the question "What is important to you with respect to how learning is delivered", the subject responded with "Delivery that is problem-based, authentic and appealing to different learning styles ". The researcher followed up with "Why is it important that the delivery be problem based"? The participant then responded that "so that the student can deal with challenges". When further probed, the participant responded "So they are equipped for the work world”. From this,

the following means-end objectives were discerned: Maximise use of problem based delivery → Appropriate attitude to challenges → Maximise Preparedness for the working world. A similar approach was taken for values relating to "authentic" and "different learning styles".

Fundamental & Means Objectives

The following represents the network diagram showing the relationship between the means objectives and fundamental objectives (Figure 4). The network was constructed based on the identification of means and fundamental objectives of the stakeholders along with the relationships among these mean and fundamental objectives. In short, it represents graphically the results of the previous steps.

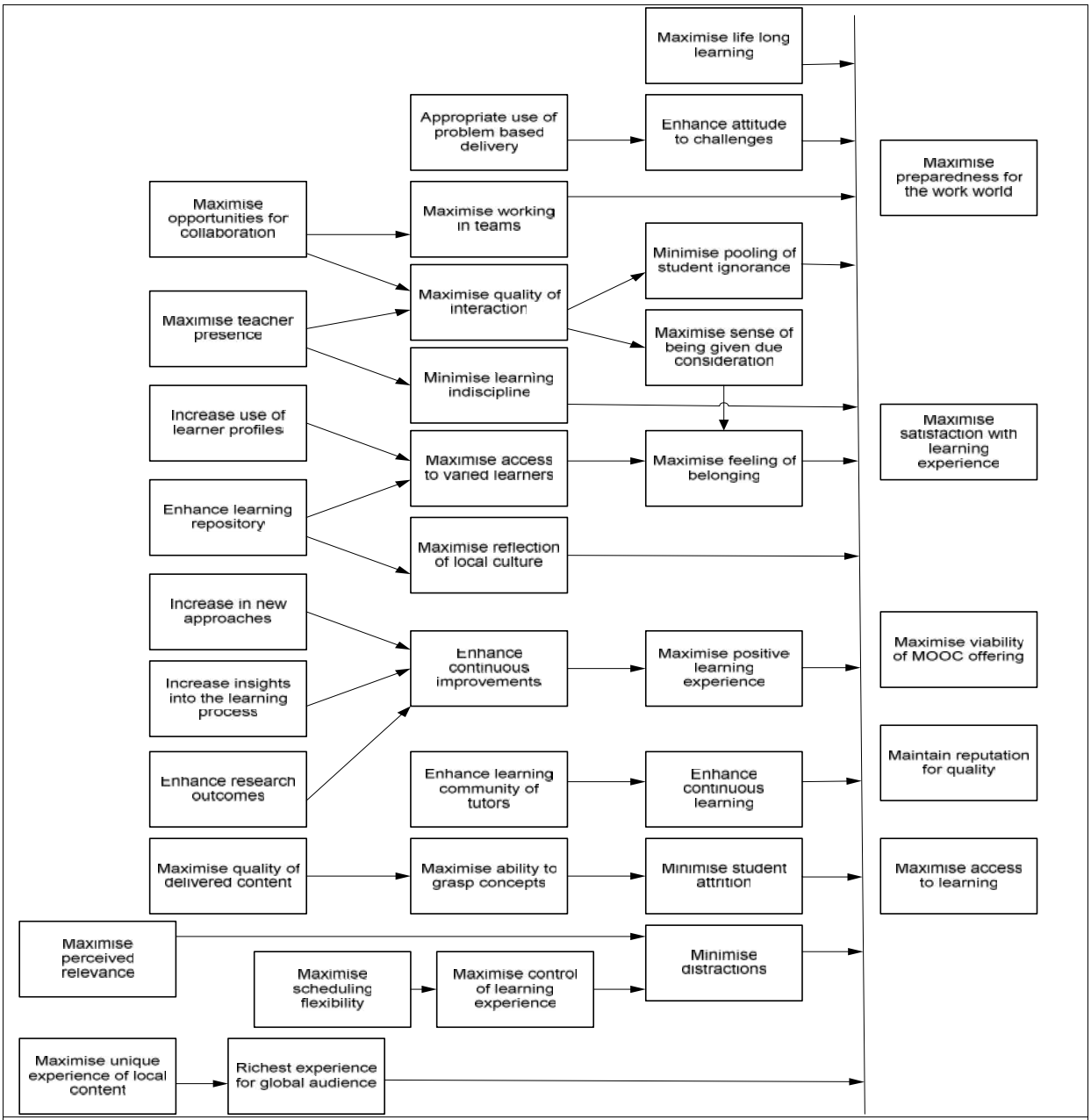

Figure 4: Preliminary Means-end Objective Network

Five fundamental objectives and thirty one end-means objectives were identified. The fundamental objectives included: maximise preparedness for the work world; maximise satisfaction with the learning experience; maximise viability of MOOC offering, maximise access to learning; and maintain reputation for quality.

Although the results presented here are preliminary, it is clear that some of the objectives derived from the study subjects are consistent with what was gleaned from the study of relevant literature. Objectives of maximising access to learning, ensuring that the reputation of the institution is maintained by offering quality products and the importance of having interactions between stakeholders are relevant examples. One interesting observation is the sense among stakeholders about the importance of being given due consideration, about maximising their feeling of belonging. This needs to be further explored.

The investment in MOOCs is a complex process with varied set of values and objectives from the key stakeholders. Understanding the propensity to implement and adopt is a critical consideration to help to better predict the behaviour of stakeholders. This will likely be related to the level of perceived usefulness, usability or value of the stakeholders. For example, decision makers in university settings of developing countries must understand the interests of not only their client-based but their lecturers and administrators in adopting different learning platforms including MOOCs. From the preliminary examination, dimensions of the quality of learning, profitability or viability of the investments, accessibility and the potential impact on the workforce were fundamental concerns. Decision-makers must therefore critically assess the strengths, opportunities and threats with the global competitive landscape to aid in the determination of an investment in MOOCs.

CONCLUDING REMARKS

The study sought to identify key objectives and conditions necessary in the successful implementation and adoption of MOOCs which resonates with developing and more developed economies. The research and findings have significant implications for their administration and management particularly as they continue to grow in prominence worldwide. This research in progress offers contribution to research and practice. It sets the stage for studies in MOOCs and the factors that may be necessary for sustainable success, while extending the discourse in online learning. The preliminary fundamental objectives such as maximising learning experience and reputation for quality highlights important considerations for decision-makers to resolve as they seek to implement and adopt MOOCs and other types of online learning approaches.

This study provides an opportunity to critically examine MOOCs. The study is currently focused on multiple stakeholders from a single university. The next phase of this study will involve inclusion of additional stakeholders, the refinement of the fundamental and means objectives, and resulting means-end objective network. The end means objectives and fundamental objectives that have been identified thus far in consistent with the experience gleaned from countries where MOOC are well established. Completion of the study will realise the objective of further clarifying the role that MOOCs can play in the effective delivery of learning from a developing country perspective. Future research directions include inclusion of additional universities, and the exploration of MOOCs development, issues challenges and diverse contexts,

success factors and criteria for sustainable operations in developing, emerging and more developed economies.

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