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## Modeling Course Design and Delivery Processes: A Case Study in an Egyptian Higher Education Institution

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### Abstract

In a competitive environment where academic institutions are under pressure to develop employable graduates, the quality of education has become a crucial differentiator. Hence, a major pragmatic motivation for this article was to be able to improve the quality of education: in particular, to improve the course design and delivery processes of one of the postgraduate programs within an Egyptian higher education institution. This improvement was achieved using process modeling approaches; a mixture of hard and soft modeling techniques were applied, and a case study approach was used to analyze findings both with respect to the utility of tools and the process improvement itself. Lessons learned led to suggestions for the best ways of combining approaches which included a 'novel' hybrid RAD-SSM model being suggested. This combined approach promises to be useful for analyzing different processes and identifying possible areas for improving educational processes.

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### 1. Introduction

Although Egypt has one of the oldest and largest educational systems in the Arab region, the main challenge facing the country's educational system is quality (Holmes, 2008); who stated that higher education (HE) in Egypt is experiencing "an overall lack of quality". The recent Organization for Economic Co-operation and Development (OECD) and The World Bank report (OECD and TheWorldBank, 2010) on HE in Egypt revealed that it is based on a narrow, inflexible, and outdated curriculum, and argued that it is essential to introduce broader and innovative approaches to curriculum design, which can help graduates to become more successful in their careers.

In addition, the Egyptian revolution embarked in January 2011 has triggered a wave of social demands related to higher wages, pensions, improved education and employment opportunities (Dabrowski, 2011). Accordingly, Kandeel (2011) stated that "proper education is absolutely critical to Egypt's future" (p.45). Therefore, these

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challenges have placed higher education institutions (HEIs) in Egypt under pressure to improve the quality of their educational processes and products.

This paper investigates the use of business process modeling (BPM) and its application to the course design and delivery processes of one of the postgraduate programs within an Egyptian HEI. The rest of the sections are as follows: the following section reviews the use of BPM techniques in HE; section 3 presents a description of the case study followed by different process models developed in section 4. Finally, section 5 presents the conclusions drawn from this work.

## **2. Business process modeling**

Recently there has been an increased interest in methodologies, techniques and tools to facilitate a common understanding and analysis of business processes (BPs). Aldin and Cesare (2009) stated that BPM is useful in facilitating human understanding and communication. BPM can provide a comprehensive understanding of a process by showing its activities structure, their logical order, and their interdependence (Aburub, 2010). However, Cull and Eldabi (2010) state that it is necessary to determine the purpose of a model in order to be able to choose the suitable modeling technique(s).

Given the challenges of HEIs in Egypt, the selected BPM techniques should be able to reveal the problems regarding the quality of inputs, processes, and outputs of the course design and delivery processes, thus being able to show needed improvements. HEIs core business processes are essentially educational services that depend on individuals in providing their services; where, individuals (lecturers, heads of departments, deans, support staff) are fundamental to the improvement and delivery of courses (Garrison & Kanuka, 2004).

Role Activity Diagrams (RADs) and Soft System Methodology (SSM) will be used in this work for the graphical representation of the course design and delivery processes. RADs can illustrate humanistic processes and can represent business models in more simplistic means (Arguilar-Savén & Sara, 2004; Yousef et al., 2009); on the other hand, SSM can be used for investigating complex human activity systems' problems (Checkland, 1993).

Although there is no evidence in literature about applying RADs to curriculum design and delivery processes; RADs have been used to model processes within HEI libraries and the approach is proven to be able to model these processes with sufficient detail to enable improvement of such processes (Cordes, 2008; Tbaishat, 2010).

The literature also shows that SSM was successfully implemented in various educational settings, such as the analysis of the teaching and learning processes in higher education (Nandish, 1995), designing courses (Tajino et al., 2005), and even review of taught courses and its development (Warwick, 2008).

## **3. Course design and delivery case study**

This case study will focus on investigating the course design and delivery processes of a postgraduate program leading to a master's degree. The program is offered by an HEI in Egypt and requires a minimum of two years to complete. This program has been selected as it requires students to successfully complete 12 courses during four semesters and to submit a thesis. Thus, it presents a good case for analysis of the different processes involved in delivering these courses.

The case study was conducted based on evidence gathered mainly from three sources: interviews, observations, and documentation. Based on the preliminary data collected and its analysis, impressions and anecdotal evidence is that the curriculum of the master program is narrow and rigid as it relies mainly on the teaching assistants' perspective. In addition, the assessment is based on content-recall rather than developing critical reasoning and analytical skills, which hinders the graduates to broaden their perspectives and gain skills to adapt to future change.

As a consequence, various areas offer opportunities for improvements, amongst which is the course material. Even though there is no feedback from students and teaching staff on how well the educational process is performing; there are several oral complaints from both lecturers and students concerning the quality of taught courses.

As mentioned earlier, the BPM techniques that are used here are the RADs and SSM, due to the nature of the course design and delivery processes being mainly service processes. The next section shows how these techniques are used to gather several perspectives about these processes.

#### 4. Course design and delivery process models

The RADs model was initially applied to give a holistic picture of the course design and delivery processes in terms of who does what and how, allowing a full understanding of the process, which facilitated determination of the pitfalls easily. For example, RADs (in Figure 1) shows that teaching assistants have to prepare course material with no support at all. It also illustrates that lecturers have to deliver ready-made courses. However, RADs failed to show respondents' perspective. Therefore, there has been a need to apply SSM in order to demonstrate various perspectives. The rich picture demonstrates the perspectives of lecturers, students, and teaching assistants, thus compensating for the limitations of RADs. For example the rich picture showed teaching assistants and lecturers' opinion. It showed that teaching assistants are overloaded and lack the background for preparing the courses. Also, lecturers have difficulties in delivering ready-made courses.

Accordingly, it is suggested that combining RADs and SSM would be useful to illustrate course design and delivery processes, since each role identified in RADs can be linked to the actors in SSM. For example, in Figure 2, the lecturer's role on RADs shows what activities are carried out and the interrelations with other roles, while the rich picture illustrates how the lecturers think about what they are doing. Consequently, it has been easy to identify who does what, how, in which order, and what problems are encountered.

In terms of future modeling, methods the researchers found that, whilst not mutually exclusive, both RADs and SSM bring different modeling strengths and different insights respectively. Hence, one might initially consider that a subsequent method should include both techniques. However, by far the bulk of the issues found were discovered using RADs, with the SSM predominantly revealing (as one might expect), softer issues typically around perspectives or motivations. In addition, the RADs provide a clear model for illustrating and discussing improvements and, when used with the system role approach (Phalp et al., 2010), will enable alignment of processes with supporting IT systems. Therefore we have considered whether a hybrid approach might be possible, bringing some of the benefits of SSM (particularly the rich picture) to the RADs.

While the suggestions are not definitive (and further modeling studies will be used as a trial), Figure 3 provides an example of a possible hybrid model of RADs and SSM which combines RADs with the perspectives gained from SSM rich pictures (the aspect of SSM which proved to bring the most additional benefit within our study).

It is expected that the proposed hybrid approach of both techniques would be useful for modeling other processes of educational settings. Furthermore, it can be applied to any process modeling, analysis, improvement and change initiatives.

#### 5. Conclusions and further work

The main purpose of this work is to ensure that process modeling and the resulting process models have distinctive benefits in facilitating explicit analysis of educational business processes. Having decided on the suitable modeling techniques, the proposed modeling approaches combining RADs and SSM provides a mechanism for improving educational processes. The proposed hybrid RADs-SSM model is a one way of providing a guide to educational institution in order to realize their deficient areas and to undertake appropriate improvement reforms.

Further work is needed for validating how the use of RADs and SSM in conjunction can provide a methodology for modeling that could be used for illustrating business processes. Therefore, the suggested hybrid model needs to be validated in order to provide a mechanism for course design and delivery process as well educational processes.

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