Application of Saudi's National qualifying Framework in System Analysis & Design Course

Dr. Riyaz Sheikh Abdullah

Associate Professor, College of Business Administration, Jazan University, Jazan(KSA)

dr.riyazsheikh@gmail.com

Abstract- *In higher education, research on quality assurance is one of the prominent fields at present. The National Qualifications Framework (NQF) is an important element in accreditation and quality assurance system in the Kingdom of Saudi Arabia. It is designed by National Commission for Academic Accreditation and Assessment (NCAAA) to ensure that the quality of higher education is equivalent to high international standards. In Saudi Arabia, quality assurance is still a relatively new concept and the Saudi universities seem not to effectively implement it because of certain obstacles. Curriculum development using NQF is one of the core and challenging contexts in quality assurance. This paper presents an application of Qualification Framework in curriculum development for system analysis and design course at Jazan University in Saudi Arabia. The objective of the research shall be to present a model course after applying NQF standards. The research shall begin with identification of the problems, finding out the reasons and to present a model curriculum. The research shall include a literature review. The method of research shall be descriptive, empirical and qualitative approach. Document analysis – mainly NCAAA guides and brainstorming interactions with the educators shall be used as a research instrument. The paper is expected to help educators in better planning of their course learning outcomes and most importantly helps in mapping the assessment methods and questions. This will also help to assess and ensure that the graduates' knowledge level and skills acquired are as defined in the learning outcomes in the curriculum. The educators can use this paper as a model to apply NQF for the curriculum development of other courses at higher education level.*

General Terms- *Management Education; Higher Education; Learning Outcomes et. al.*

Keywords- *Higher Education; Curriculum Development; Learning Outcomes; Mapping et.al.*

1. BACKGROUND OF THE STUDY

1.1 Quality Assurance in Higher Education

According to the American Society for Quality (2011)[4], quality assurance is "the planned and systematic activities implemented in a quality system so that quality requirements for a product or service will be fulfilled". Basically, quality assurance is the collection of activities that an organization performs to make sure that their outputs pass existing standards held by their customers or other important regulating and accrediting institutions.

In the United States, the first accrediting institution was established in the 1960's, and was an organization that consisted of different, well-respected, post-secondary institutions that developed a process of peer evaluation (NAPCIS, 2012)[7]. In the United Kingdom, the quality movement began in 1992, when Higher Education Quality Councils were established for England, Scotland, and Wales which were given the responsibility to assure quality of higher education institutions within their areas of responsibility (Brennan et al., 1998). These councils were abolished in 1997 and replaced with the Quality Assurance Agency for Higher Education, a non-governmental organization that followed a model of peer-evaluation. (University of Aberdeen, 2012)[13]

According to Shah et al. (2010) the quality assurance is most often initiated from top to bottom, but the success of such activities are mainly dependent on how well the top is able to influence the bottom. That is, it is important for higher education administrators to convince stakeholders of lower involvement in quality assurance of the importance of the process in their own perspectives, and motivate them to participate extensively in quality assurance activities.

Saudi Arabia is working towards greater economic expansion and sustainable growth. Under Vision 2030 - a strategic plan intended to transform the Saudi economy – the Kingdom aims to create an economic structure, which provides opportunities for all. It has also put a great deal of importance on education to prepare its future generations for an environment where excellence is curiosity-driven and goal-oriented. A rich, diverse and robust educational system will play a significant role toward successful execution of Vision 2030. (Business Wire, 2017)[5]

Higher education in Saudi Arabia has spread in the past ten years. There are 24 public universities and 27 private universities in Saudi Arabia, currently. All the 24 private universities and 16 of the 27 public universities were established in the last decade. In the fiscal year 2016 education is allocated the second biggest share, which is

23 percent of total spending of the whole country. The actual expenditure on education was expected to be SAR 205 billion in 2016 and is projected to be SAR 207 billion for the fiscal year 2017 (Ministry of Finance, Saudi Arabia, 2017)[6].

According to Albaqami (2015)[1], the commitment/support of leadership and management plays a crucial role in implementing quality assurance at Prince Sultan University (PSU). Awareness and orientation of employees/faculty was also found as important factors to support motivation and quality organizational culture. In addition, the findings also report that/faculty resistance and infrastructure limitations focused on financial and human capital constraints were perceived as inhibitive factors to QA. This has been brought to the fore by the finding of this research which reveals that the background and the qualification of staff is planning crucial role in implementing quality assurance.

According to Alharbi(2016)[2], The major challenges facing Saudi Universities are research productivity, accreditation and improving quality. The higher education in Saudi Arabia needs to adopt a benchmark strategy for resolving the challenges in order to meet the growing demand of the economy and fulfill the vision of the kingdom. Leaders in the universities must face these challenges with vigor to improve the universities performance, reputation, and quality outcomes in the coming five years.

According to Almusallam(2013)[3], the development of commitment to a wider range of learning outcomes and skills in new teaching strategy is one of the important challenge. The need to change from what has been a traditional emphasis on rote learning and shifting to creative thinking and problem solving, and the development of personal attributes of personal and group responsibility, leadership, is recognized. It is necessary to not only meet existing standards of learning in other countries but to continue to improve to keep pace with what is occurring elsewhere.

Reviewing the literature, it was found that in different countries all over the world, studies are being conducted to determine the extent of implementation of quality assurance activities in higher education institutions. The literature also addresses the challenges that the implementation of such activities face in the given contexts. In Saudi Arabia, higher education institutions are growing rapidly and the need for quality assurance is also generating, prompting the development of the National Commission for Academic Accreditation and Assessment. However, very few researches have been done to assess quality assurance practices in higher education in the Kingdom of Saudi Arabia.

2 NATIONAL QUALIFICATION FRAMEWORK (NQF) IN SAUDI ARABIA

Quality assurance in higher education is a relatively new concept in Saudi Arabia. According to the National Commission for Academic Accreditation & Assessment (NCAAA, 2015)[10], the mission of the organization is "to encourage, support and evaluate the quality of post-secondary institutions and the programs they offer". Specifically, this means that the commission is involved in the fulfillment of three major objectives, which are ensuring the quality of students' learning outcomes, monitoring the efficiency of management and support services provided by higher education institutions, and evaluating the quality and impact of research and community development contributions made by higher education institutions.

The National Qualifications Framework (NQF) is an important element in the quality assurance system (NCAAA-NQF, 2015). The NCAAA has developed a set of 11 standards and 33 key performance indicators (NCAAA-KPIs, 2015) for quality assurance and accreditation. The institutions should complete not less than 22 and program not less than 17 of these KPIs to get the accreditation. It is observed that more than 7 KPIs are related with learning outcomes which is based on the application of NQF. However, there is too few literature available showing the application of NQF in higher education.

This research will first study the basics of qualification framework. System analysis and design will be taken as a model course for the application of NQF. The research will demonstrate a complete plan for planning, implementing and assessing the course as per the guidelines provided by NQF.

The principal elements in the framework are:

Levels: Levels numbered are linked to qualification titles to describe the increasing intellectual demand and complexity of learning expected as students' progress to higher academic awards.

- **Credits:** Points allocated to describe the amount of work or volume of learning expected for an academic award or units or other components of a program.
- **Domains of Learning:** The broad categories of types of learning outcomes that a program is intended to develop.

2.1 Domains of Learning Outcomes

The framework groups the kinds of learning expected of students into four domains and describes learning outcomes at each level in each of these groupings. This is shown in figure 1 below:

Figure 1: NQF Learning Domains

The learning domains are:

1. ***Knowledge***, the ability to recall, understand, and present information, including:
   - knowledge of specific facts,
   - knowledge of concepts, principles and theories, and
   - Knowledge of procedures.
2. ***Cognitive skills***, the ability to:
   - apply conceptual understanding of concepts, principles, theories and
   - apply procedures involved in critical thinking and creative problem solving, both, when asked to do so and when faced with unanticipated new situations.
3. ***Interpersonal skills and responsibility,*** including the ability to:
   - take responsibility for their own learning and continuing personal and professional development,
   - work effectively in groups and exercise leadership when appropriate,
   - act responsibly in personal and professional relationships,
   - act ethically and consistently with high moral standards in personal and public forums.
4. ***Communication, information technology and numerical skills***, including the ability to:
   - communicate effectively in oral and written form,
   - use information and communications technology, and
   - use basic mathematical and statistical techniques.
5. ***Psychomotor skills*** involving manual dexterity are the fifth domain that applies only in some programs. They are extremely important in some fields of study; for example, very high levels of psychomotor skills are required for a surgeon, an artist, or a musician.

3. APPLYING NQF in SYSTEM ANALYSIS & DESIGN (SAD) COURSE

The learning outcomes, learning objectives and the assessment depend at what level they are being framed. In this research, the course system analysis and design is selected for the application of NQF. It is a 3 credit compulsory course taught at undergraduate (bachelor) level.

A bachelor degree program is designed to develop a comprehensive understanding of a broad field of study, with some studies taken to considerable depth and involving critical analysis of the latest developments and research. Students should be aware of relevant knowledge and theory in other related fields of learning. A bachelor degree is the basic qualification for entry to a number of highly skilled professional fields and programs in these fields should develop both the knowledge and skill to practice in those professions, and the background in practical and theoretical knowledge and research to proceed to further study (NCAAA-NQF, 2015).

The *learning outcomes* for the course system analysis and design at bachelor level are proposed below.

After the completion of this course, student must be able to:

- List the role of a system analyst in SDLC
- Apply SDLC as a framework for systems development and business modeling
- Conduct preliminary analysis for new system development
- Apply different techniques for information gathering and information representation
- Analyze new or existing system's operational feasibility, technical feasibility, and economic feasibility
- Conduct cost benefit analysis for new software development
- Design input and output forms for new software
- Apply the concepts of normalization in database design
- Decide the selection criteria for hardware and software
- Understand and list the meaning, types and method of software testing
- List the methods of system conversion and changeover
- Analyze the reason for information systems projects and the factors that affect such projects
- Apply and Evaluate the concept of good form/website design
- List the security issues in new software development

Learning outcomes of system analysis and design course require assessors to deliver questions with different cognitive levels. This is to ensure students who take SAD course are assessed effectively and are imparted with the right level of knowledge and skill-sets. Assessment questions are either formative or summative in nature. These can be in the form of assignments, quizzes or formal examination. In this section we look at each level of the Qualification Framework, learning outcomes and assessment method for system analysis & design course with suitable examples.

3.1 Knowledge Level

The students should possess a comprehensive, coherent and systematic body of knowledge in a field and that of the underlying principles and theories associated with it. They should be aware of related knowledge and theory in other disciplines and in the case of professional programs they should be aware of other professional fields. In programs preparing students for professional practice, graduates are aware of relevant conventions, regulations, and technical requirements and of how these may be modified over time in response to changing circumstances. Knowledge level questions include the keywords define, list, arrange, order, and state. Use of multiple choice questions, True/False, fill in the blanks, match the following and short answer questions are suitable to assess students at this level. Below are some sample questions that fall under this level:

- List the primary roles of system analyst.
- Draw the cycle of software development.
- What tools are used for information gathering at the time of system analysis?
- List the tools used for information representation in system analysis.
- What is normalization/de-normalization in database design?
- Write the security issues in new software development.

3.2 Cognitive Skills Level

The graduates should be able to undertake investigations, comprehend and evaluate new information, concepts and evidence from a range of sources, and apply conclusions to a wide range of issues and problems with limited guidance. They should be able to investigate relatively complex problems and recommend creative and innovative solutions taking account of relevant theoretical knowledge and practical experience and the consequences of decisions made. The assessment can be done using keywords like estimate, compare, analyze, plan, design, etc. Use of multiple choice questions and essay type questions are suitable to assess students at this level. Mock interviews can also be used as a powerful tool for direct one-to-one assessment. The frequency of this assessment shall be continuous and adequate weightage shall be given in the final grades. Following are some of the samples questions that can be framed for assessment:

- Describe a situation in which an analyst would choose to use object-oriented systems analysis and design rather than the systems development life cycle.
- Design an E-R diagram depicting the relationship between a person and a tee-shirt. This description should show the following relationship: Each person can have many tee-shirts, but each shirt can only be owned by a single person.
- Compose an open-ended question for Dr. XYZ, a university professor, who is eligible for retirement in three weeks.

- When should an interviewer compose a written interview report and why?
- Give two examples of primary keys that can be used to identify a person or thing.
- List the four objectives that a systems analyst can use to support accurate data entry.

3.3 Interpersonal Skills and Responsibility Level

The graduate should contributes to and facilitates constructive resolution of issues in group or team situations, whether in a leadership role or as a member of a group. They can exercise group leadership in undefined situations calling for innovative responses. They must show initiative in identifying issues requiring attention and in addressing them appropriately on an individual or team basis. They should take responsibility for own learning and is able to identify and use means of finding new information or techniques of analysis needed for completion of tasks. At this level, the graduates must be able to deal with ethical and professional issues involving values and moral judgments in ways that are sensitive to others and consistent with underlying basic values and relevant professional codes of practice. This can be effectively carried out by some assignments or small group/individual projects as illustrated below. The frequency of this assessment shall be continuous and adequate weightage shall be given in the final grades.

- Prepare a feasibility report for new software development for Company XYZ.
- Normalize the given database in a group setting and present it.
- Create an E-R diagram for your college Library management system.
- Design output screens for new website development project for your college.
- Compare the output designs created by Team A and Team B for new website project.
- Prepare a strategy for security and backup issues for new website development project.

3.4 Communication, Information Technology and Numerical Skills Level

This level ensures that the students must effectively use basic information and computer technology and numerical skills in tackling and resolving problems in educational settings and in everyday life. They should be able to communicates effectively, both verbally and in writing and through use of information technology. The graduates must be able to routinely use the most appropriate information and communications technology in gathering, interpreting and communicating information and ideas. The use of business cases and small projects in group followed by presentation can be adopted as a method of assessment. The frequency of this assessment shall be twice a semester and adequate weightage shall be given in the final grades.

- Conduct a research to find out the problems faced by the students while using college website and suggest 5 recommendations for improvement.

- Use questionnaire technique as a tool for information gathering to identify the benefits and problems associated with the use of Internet in studies.
- Prepare a project management plan for upgrading your college Library Management System.
- Design the output and input screens for College online examination system.

3.5 Psychomotor Skills Level

Psychomotor skills are developed through practice. Feedback on quality of performance is required, which may be partly through the student's own observations and partly by an instructor. Skills are progressively refined and become more advanced over time. Basic skills gradually become automated so the learner can focus attention on finer and more advanced application of skills relevant in differing circumstances. However this level of skill is mostly expected from clinical and engineering graduates. For management graduates following type of questions can be assigned at group level. The frequency of this assessment shall be once a semester and adequate weightage shall be given in the final grades.

- Design input and output forms for new software
- Design a website for ecommerce and corporate uses

For system analysis & design course at bachelor level the focus is more on first four levels of skills. The assessment method must be in line with the learning outcomes.

4 CONCLUSION

We have presented the application of Qualification Framework in system analysis and design course at higher education in Saudi Arabia. This paper will help the educators in better planning their course learning outcomes and most importantly will help in mapping the assessment method and questions. This will help to assess and ensure that the graduate's knowledge level and skills acquired are as stated in the learning outcomes in the curriculum. The educators can use this paper as model to apply NQF for other courses at higher education level. This model will help the institutions in better planning and self review processes for quality accreditation. However, curriculum development is an ongoing process; the lessons learnt here will be used as an input for the next cycle.

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Author's Biography

Dr. Riyaz Sheikh Abdullah is a professional, teacher and researcher working in the field of MIS and Management and has been actively involved in research and teaching activities for last 13 years. He has done PhD in MIS and has published his research findings in several forums of international repute. His experience in the field of training and research has afforded him the opportunity to become familiar with the latest trends in MIS and management. In his college as an Associate Professor and Department Coordinator for MIS, he is the chairman of Curriculum Development Committee which deals with curriculum

planning, design and implementation. Dr. Riyaz is also working as an Executive Member in a committee formed for conducting feasibility study for starting new post graduate management programs in Jazan University. He was associated as a Co-Editor of National Journal "Apotheosis-Tirpude's National Journal for Business Research" for the year 2011 and 2012.

Dr. Riyaz has published more than 13 research papers in international journals of high repute. He has 9 books to his credit published by renowned publication houses in India. His research area includes Education Technology, Genetic Algorithm, DSS, cloud computing and optimization. His goal in teaching is to empower students to become leaders within their chosen field. To that end, he is emphasizing on critical thinking, creativity, collaboration and communication skills in addition to the problem-solving skills that will make them experts in a subject.