Employability Model for Higher Education Institutes to Generate Work-Ready ICT Graduates in Sri Lanka

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Abstract: According to the survey conducted by National IT-BPM Workforce in 2019, it was found that there is a gap between demand and supply of ICT graduates in Sri Lanka. Furthermore, there is a gap between the demand and supply of skills due to the fact that top skills demanded by employers and top skills offered by training organizations are not aligned at present. Primary data for the study were collected from the sample through expert interviews and questionnaires. The sample (N=400) consists of employers, academics, and alumni. Secondary data were collected from the curriculum of ICT programmes, Subject Benchmark Statement (SBS) on IT, Sri Lanka Qualifications Framework (SLQF) and ACM guidelines for Bachelor's degrees in IT. The main objective of the study is to develop an employability model to generate work-ready ICT graduates in Sri Lanka while reducing the skill mismatch. According to the proposed employability model, components of the curriculum must align with the student-centred teaching and learning methods, programme learning outcomes and SLQF learning outcomes to develop graduate attributes which will be useful to generate work-ready graduates irrespective of the discipline. Most importantly, the Internal Quality Assurance Unit (IQAU) of the HEIs and Management of the HEIs have a great responsibility towards implementing the above-proposed model to generate work-ready ICT graduates in Sri Lanka. As a result, the gap between demand for and supply of ICT graduates and the skill mismatch can be reduced.

Keywords: Employability, Higher education, ICT graduates

Introduction

Demand and Supply gap of ICT graduates of Sri Lanka in 2019 is shown in figure 1 (NATIONAL IT - BPM WORKFORCE SURVEY, 2019). It shows that the demand exceeds the supply in a significant margin of 12,140. However, high demand for ICT workforce can be considered as a healthy sign of growth in the industry and should be welcome even though the supply is low. The main concern of the industry is not the numbers of supply alone but in terms of the quality of supply.
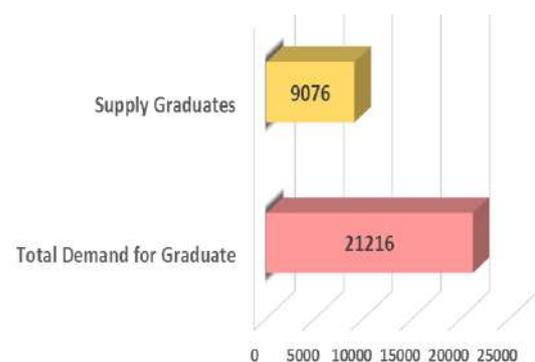

Figure 1. Demand and Supply Gap of ICT Graduates
Source: NATIONAL IT - BPM WORKFORCE SURVEY 2019

Furthermore, there is a gap between demand and supply of skills. Table 1 shows that top skills demanded and top skills offered are not aligned in a consistent order of priority. Hence, the main objective of the study is to develop an employability model to generate work-ready ICT graduates in

Sri Lanka while reducing the skill mismatch.

Table 1. Gaps in demand for and supply of skills

Types of skill	Skills in demand	Skills in demand	Mismatch of Skills	
			Less supplied skills in demand	Less-demanded skills in supply
Core Skills	Business analysis & process Engineering	Systems Design	• Business analysis & process engineering	• Network Design
	Database design & administration	Programming	• Customer service	• Internet & Systems Security
	Hardware engineering & maintenance	Systems Analysis	• Systems / Application support	
	Customer service	Network design	• System application testing	
	System analysis	Database design and admin		
	Programming	Network implementation		
	Systems/Application support	Internet and		
	Project management	Hardware engineering and maintenance		
	Network implementation	Systems Design		
	System design	Programming		
	System application testing	Project Management		
Soft Skills	Communication Skills	Communication Skills		
	Team work	Team working		
	Interpersonal Skills	Creative thinking Skills		
	Creative thinking skills	Interpersonal Skills		
	Professional ethics	professional ethics		
	Proficiency in English language	Proficiency in English language		
Technical Skills	SQL Server	Java	MS Windows	
	MS Windows	C++	My SQL	
	MySQL	Linux	Oracle	
	Oracle	Visual Basic	.NET	
	NET	NT		
	PHP	C#		
	Linux	SQL Server		
	C#	PHP		
	C++			
	Java			

Source: NATIONAL IT - BPM WORKFORCE SURVEY 2019

Research Methods

To identification of the tools are the most important factor in developing an employability model for Higher Education Institutes to generate work-ready graduates. Primary data collected from expert interviews and questionnaires from the sample. The sample (N=400) consists of employers, academics and alumni. Secondary data collected from, curriculum of ICT programs, subject benchmark statement on IT, Sri Lanka Qualifications and the Association for Computing Machinery (ACM) and the IEEE Computer Society (IEEE-CS) guidelines for Bachelor's degrees in IT.

The curriculum is an academic content and sequence of courses of the total learning experience of the student. A curriculum signifies a continuous evolution of the respective study programs. According to Ralph Tyler (2004), there are four (4) fundamental questions that were considered to develop a curriculum. The following table indicates the fundamental questions and answers for those questions (Arroyo & García Garduño, 2004).

Table 2. Fundamental questions and answers for those questions of the Ralph Tyler (1990).

QUESTIONS		ANSWERS
What kind of individual/employee do we need?	What educational purpose shall the curriculum serve?	What kind of individual/employee do we need? Can do by Selection of program aims (based on graduate profile/Program outcomes) • Graduate Profile • Curriculum determinants • Benchmarks • Stakeholders feedback
What do they learn?	What experiences should the institution and its faculty provide to meet these expressed purposes?	What do they learn? • Selection of learning experience and content driven by learning outcomes (Course Outcomes) • Course outcomes are determined to achieve program outcomes
How do they learn?	How can this experience be organized most effectively?	Organization of the experience with determined objectives • Learning Outcomes (LOs) based on levels should be cumulative: experiences should build on earlier ones Course workload • Credits – the agreed-upon value used to measure a student workload in terms of learning time required to complete course units, resulting in learning outcome's (UNESCO, 2004)
How do we assess the learning outcomes?	How can one best determine the outcomes of learning–the purposes and attainment of the curriculum?	Evaluation is the last step of the curriculum model. A comprehensive evaluation can be done using a variety of evaluation techniques. Through the evaluation process it can be decide whether or not the goals of the curriculum and objectives of instruction have been met.

Subject Benchmark Statement (SBS) in IT of the University Grants Commission (UGC) clearly indicated that the IT graduate should try to develop generic skills as well as subject-specific skills (Subject Benchmark Statement, 2010).

The Sri Lanka Qualification Framework (SLQF) is a globally standardized structure for all of Sri Lanka's offered higher education qualifications (Sri Lanka Qualification Framework , 2016). The SLQF refers to all public as well as private higher education institutions (HEIs), which provide post-secondary education. It helps to understand qualifications and assess a qualification's relative worth. This encourages learners to make educated decisions about the skills they want to obtain. The SLQF comprises twelve (12) levels, and comprehensively describes the descriptors of each of these levels. Since the amount of learning is included in the SLQF, there is also the number of credits that the students can earn for each certification.

Results and Discussion

Based on the analyzed primary data indicated that graduates must acquire meaningful work knowledge, demonstrated good working skills with the right attitudes at the workplace. Nevertheless, there were still areas for continual improvement to ensure graduates were well-prepared for practicum, further soft skill development and to improve the quality of their project and minor modifications to be done for the existing curriculum to match with the current market demand.

SLQF level descriptors describe the nature of the study and the academic standards expected of graduates in respect of particular qualifications (Sri Lanka Qualification Framework , 2016). They provide a picture of what graduates might reasonably be expected to know, do, and understand at the end of their program of study.

SBS is used as reference points in the design, delivery, and review of academic programs. They provide general guidance for articulating the learning outcomes associated with the program but are not intended to represent a national curriculum in a subject or to prescribe set approaches to teaching, learning, or assessment. Instead, they allow for flexibility and innovation in program design within a framework agreed by the subject community.

The K-SAM model is considered an integrated model. Thus, each learning outcome identified under the attributes of a particular level may not be confined to a single domain within the K-SAM model. For example, communication skills (i.e. a learning outcome) are not considered only as a skill (i.e. a single domain of the K-SAM model). The SLQF recognizes a given learning outcome as a blend of more than one domain (in most cases all the domains) in the K-SAM model.

Table 6. KSAM Model

Knowledge	What the qualification holders know?
Skills	What the qualification holders can do?
Attitudes, Values, Professionalism and Vision for life	How the qualification holders think and behave?
Mind-set and Paradigm	How the qualification holders perceive the world?

Source: SLQF Booklet

For each qualification, the generic outcomes and attributes signify the expected capabilities from qualification holders defined in terms of the four main domains of learning: knowledge, skills, attitudes, and mindset characterized as the 'K-SAM model'. This is exactly expected by the employer from the fresh graduates.

The curriculum of the degree program plays a vital role in employability. Contents, Teaching/Learning Methods, and Assessment Methods are the main components of the curriculum in any discipline. According to the SBS in IT, Information Technology is an integrative discipline. It combines together the IT knowledge areas of databases, human-computer interaction, networking, programming, and web systems. Concrete backgrounds in each of these areas enable graduates to solve all types of computing and informational problems, regardless of their origin.

There are twelve (12) learning outcomes defined in the SLQF as being of national significance have been adapted to fit each level of qualification as level descriptors. Categorizing the learning results according to the key components of K-SAM. Any of the widely used student-centered teaching and learning approaches recommended for the learning outcomes. The learner is expected to meet or demonstrate that certain learning outcomes have been achieved. Therefore, the assessment of the outcomes of learning by effective and appropriate assessment methods is essential in the process of the qualification framework.

A core consists of all essential areas that must be included in any IT undergraduate degree program that can be identified (Curriculum Guidelines for Undergraduate Degree Programmes in IT, 2017). Core areas in a degree program are IT fundamentals, Programming fundamentals, Computer fundamentals, Operating systems, IT systems, Web systems, Networking, Databases, Human-computer interaction, Professional communication, Information assurance & security, and Professional ethics. In addition to the above key areas, a successful IT graduate needs many skills in Mathematics, Scientific Method, and Familiarity with Application Domains and Communication Skills areas as well. Other than knowledge areas there must be projects including teamwork, professional communications (reports and presentations), design, implementation, and testing.

According to the proposed employability model, components of the curriculum must align with the student-centred teaching and learning methods, program learning outcomes, SLQF learning outcomes to develop graduate attributes which will be useful to generate work-ready graduates irrespective of the discipline
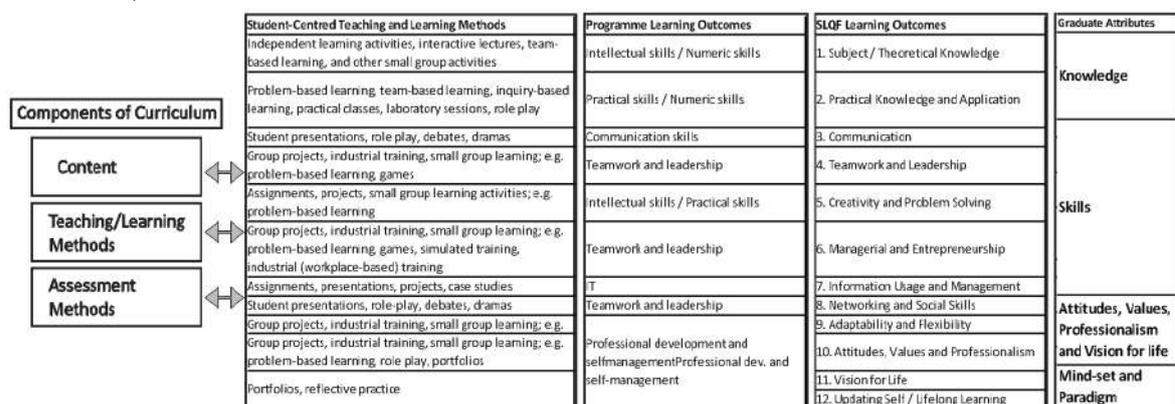

Figure 2. Proposed Employability Model
Source: Author Constructed

Conclusions

According to Yorke & Knight (2006), employability is a set of skills, understanding, and personal attributes that make graduates more likely to gain employment, and be successful in their chosen occupations, which benefits themselves, the workforce, and the economy (Dean & Mansour, 2016).

Hence, it is a fact that the content of the degree program must follow the core areas defined in the ACM guidelines. In addition, teaching/learning methods, and assessment methods must comply with the mentioned student-centered methods. Furthermore, each and every course outcomes map with the program learning outcomes and twelve (12) SLQF learning outcomes. Finally, those twelve (12) outcomes map with the graduate attributes which were considered as the employability indicators (KSAM Model). Additionally, the program outcomes consist of key skills: intellectual skills, practical skills, numeric skills, IT skills, communication skills, teamwork, and interpersonal skills and professional development & self-management skills.

Furthermore, the HEIs must consider the component of the curriculum and skills related to the ICT, when the proposed employability model will be used to generate work-ready ICT graduates

Most importantly, the Internal Quality Assurance Unit (IQAU) of the HEIs and Administrative Staff of the HEIs have a great responsibility towards implementing the above-proposed model to generate work-ready ICT graduates in Sri Lanka. As a result, can reduce the gap between demand for and supply of ICT graduates and skill mismatch.

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