NEED FOR CURRICULUM REFORMS IN TECHNICAL EDUCATION TO ACHIEVE OUTCOME BASED EDUCATION

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Abstract
The technical education plays crucial role in the development of any country. Changes in the curriculum do support fundamental economic and social transformation in the society. In the recent years, the educational institutions, particularly, the technical institutions have mushroomed in our country. But the quality of education offered by these institutions is questionable one. There are thousands of graduates coming out every year from the institutions in our country. But only very few of them are able to get better employability. This shows that they are not having the skills as required by the employers especially industries. Even though several accreditation agencies are giving accreditation globally, there is a huge gap exists between academia and industry. Autonomy in academia will help the institutions to develop the curriculum at par with industry's expectation. In this article, we analyze the factors influencing the achievement of OBE in the technical education system of our country.
Keywords:- Outcome Based Education, Accreditation, Curriculum

Introduction

We live in a rapidly changing world driven by technology and economy, necessitating the production of qualified and well-prepared professionals. Employers are demanding that university graduates not only have the knowledge, but the appropriate skills to be effective and

productive in the workplace. In order to adapt to these challenges, universities worldwide is thinking about how to redesign their academic models. A knowledgeable and skilled workforce is seen as the most important human capital required for the development of a country. Both vocational education and skill development are known to increase productivity of individuals, profitability of employers and national growth. Vocational education aims to develop skilled manpower through diversified courses to meet the requirement primarily the unorganized sector and to inculcate self employment skills in children through a large number of diversified vocational courses. Given that only 7 to 10 per cent of the population is engaged in the formal sector of economy, development of vocational education will provide skilled labour force in the informal sector which would further enhance the productivity. Several committees also emphasize the need to improve access and participation to vocational education and recommend the flexibility of vocational education within the main-stream education system.

The Indian higher education system is facing an unprecedented transformation in the coming decade. This transformation is being driven by economic and demographic change: by 2020, India will be the world's third largest economy, with a correspondingly rapid growth in the size of its middle classes. Currently, over 50% of India's population is under 25 years old; by 2020 India will outpace China as the country with the largest tertiary-age population. Despite significant progress over the last ten years, Indian higher education is faced with four broad challenges:

• **The supply-demand gap:** India has a low rate of enrolment in higher education, at only 18%, compared with 26% in China and 36% in Brazil. There is enormous unmet demand for higher education. By 2020, the Indian government aims to achieve 30% gross enrolment, which will mean providing 40 million university places, an increase of 14 million in six years.

• **The low quality of teaching and learning:** The system is beset by issues of quality in many of its institutions: a chronic shortage of faculty, poor quality teaching, outdated and rigid curricula and pedagogy, lack of accountability and quality assurance and separation of research and teaching.

• **Constraints on research capacity and innovation:** With a very low level of PhD enrolment, India does not have enough high quality researchers; there are few opportunities for interdisciplinary and multidisciplinary working, lack of early stage research experience; a weak ecosystem for innovation, and low levels of industry engagement.

• **Uneven growth and access to opportunity:** Socially, India remains highly divided; access to higher education is uneven, with multidimensional inequalities in enrolment

across population groups and geographies.

The three central pillars of the government's plans for education reflect these realities: expansion, equity and excellence. Over the next five years, every aspect of higher education is being reorganized and remodeled: funding, leadership and management, quality assurance, accountability, relationships with industry, international collaboration and the way teaching and research are conducted. Emphasis will be placed on strengthening existing institutions. In arguably the biggest reform in the governance and funding of state universities, an ambitious program is underway to devolve authority and budgets for higher education from the federal government to the state governments. The private sector, which currently accounts for 59% of all tertiary enrolments, continues to grow rapidly, providing most of the professional courses, particularly engineering and management. Many more providers are waiting for legislation which would allow them to enter the market. The private sector is expected to play a significant role in the future expansion of higher education in India.

In India, the general education and vocational education have been operating as two different verticals with very little interaction between the two. This had lead to hesitation in students opting vocational courses as there is a general apprehension that one cannot pursue higher degrees or qualification. The vocationalisation of secondary education scheme was revised in 2014 to address the issue of weak synergy with industry in planning and execution, lack of vertical and horizontal mobility, redundant courses and curricula as well as paucity of trained vocational educational teachers. The National Skills Qualification Framework NSQF) has been notified in Dec 2013, to provide and overall framework to set up vocational education programme. There is a greater emphasis on integrating skills in education and a renewed focus on vocational education in secondary education. It also demands of a revamp of our education system to make skill development an integral part of the curriculum at all stages. Quality of teachers has been a major cause of worry in the country and one of the basic pre-requisites to improve quality. Competence of teachers and their motivation is crucial for improving the quality. Several initiatives are being taken for addressing teacher shortages, shortages of secondary school teachers in mathematics, science and languages, improving the quality of pre-service teachers and in-service teachers professional development, enhancing the status of teaching as a profession, improving teachers' motivation and their accountability for ensuring learning outcomes, and improving the quality of teacher education institutions and also teacher educators. In this paper, a new Academic Program Model (APM) is designed to continuously improve the curriculum and provide students with the knowledge and skills to succeed in a rapidly changing world, which is an Outcome - Based learning approach. The life-long learning

outcomes, being the kernel of the courses, provide focus to the curriculum in the APM. Furthermore, all courses are designed to clearly show the experiences that students draw upon achieving a Learning Outcome.

Higher Educational institutions in India : A Brief Overview

A brief overview of the Indian higher education system provides an essential backdrop for the following research findings and comments:

There are three main types of tertiary institution in India: 1) universities and university-level institutions, 2) colleges and 3) diploma-awarding institutions. These are categorized by funding source: central government, state government and private.

If there is one overall structure which defines Indian higher education, it is the affiliated college system. The vast bulk of students study at public and private colleges which are affiliated to state universities. These colleges do not have their own degree awarding powers; they deliver the courses, curricula and examinations specified and regulated by their parent state university. The affiliated college sector is huge, enrolling over 90% of undergraduates, 70% of postgraduates and 17% of doctoral students. Some universities have as many as 1000 colleges affiliated to them. There are considerable challenges in regulation and quality control; and while there are notable exceptions, many are perceived to be sub-standard. Last year, accreditation through the National Assessment and Accreditation Council and the National Board of Accreditation for all universities and colleges were made mandatory. A huge exercise is underway to accredit the two-thirds of universities and four-fifths of colleges that do not have accredited status.

State universities, therefore, through their activities, form by far the greatest element of higher education in India. They are run and funded through their respective state governments. There is wide variation in the amount of funding they receive, but in general, they have been critically underfunded over the last 20 years. State universities depend on affiliation fees paid by the colleges for their survival. These fees, supplemented by state government funding, are generally used to pay salaries and little else; most have poor infrastructure and conduct little research, although pockets of excellence exist. Many state universities spend much of their time administering the exams and admissions to their affiliated colleges. Places at state universities are highly sought after by students. Most, but not all, state governments have legislation in place to grant university status to private colleges, providing them with their own degree-awarding

powers and much more autonomy. This is the fastest area of growth in new universities. There are currently 100 such private universities in India (16% of degree-awarding institutions). The central government also has the means to grant university status to private institutions, under the 'deemed university' category. There are currently 129 deemed universities (20% of degree-awarding institutions). It is unclear whether or not this central role will continue, given the plans to devolve more decision-making to the states.

The low quality of teaching and learning: Arguably, the greatest challenge facing higher education in India is the chronic shortage of faculty. Various reports estimate that 30-40% of faculty positions are unfilled. Most of the faculty members have had no training in teaching. Other issues in teaching and learning which compound the problems include:

• Outdated, rigid curricula and the absence of employer engagement in course content and skills development. Very few opportunities for interdisciplinary learning.

• Pedagogies and assessment are focused on input and rote learning; students have little opportunity to develop a wider range of transversal skills, including critical thinking, analytical reasoning, problem-solving and collaborative working.

• High student: teacher ratio, due to the lack of teaching staff and pressure to enroll more students.

• Separation of research and teaching; lack of early stage research experience.

• An ineffective quality assurance system and a complete lack of accountability by institutions to the state and central government, students and other stakeholders.

This has resulted in graduates with low employability, a common feature of higher education across south Asia32, and an insufficient basis for movement to higher levels of study and research. These problems are endemic across higher education institutions in India, including many of the 'top tier' institutions, but particularly so in affiliated colleges and state universities.

The supply-demand gap: Despite an average growth rate of over 7% in the last decade, India's GER in higher education is very low. By some estimates, even if India succeeds in its target of 30% GER by 2020, 100 million qualified students will still not have places at university33. India needs to drastically increase the number of places at universities and enrolment through distance learning programmes. Over the last decade, the diversity of courses

offered by universities and colleges has narrowed, resulting in saturated markets for engineers, technology graduates and MBAs.

Outcome based education: Outcome based education is a method of teaching that focuses on what students can actually do after they are taught. All curriculum and teaching decisions are made based on how best to facilitate the desired outcome. This leads to a planning process that is different from the traditional educational planning. The desired outcome is first identified and the curriculum is created to support the intended outcome (Fitzpatrick, 1995; Furman, 1994).

There is no single authoritative model for Outcome Based Education (OBE). Frameworks for OBE share an emphasis on systems level change, observable, measurable outcomes, and the belief that given time all students can learn. The shift toward OBE is a result of educational institutions worries about the current education system (Glatthorn, 1993; Guskey, 1994). There is a belief in the academic world that the classic "input" educational system cannot adequately prepare students for life and work in the twenty first century. Consequently, educators and policy makers are attempting to modify the way to measure the effectiveness of education. There is a need to shift from the emphasis on traditional inputs, such as course credits earned and hours spent in class to outcomes (Greater Expectation, 2002).

Learning outcomes are to be clear, observable demonstrations of student learning that occur after a significant set of learning experiences. They are not values, attitudes, feelings, beliefs, activities, assignments, goals, or grades, as many people tend to believe. Typically, these demonstrations, or performances, reflect three things: (1) what the student knows; (2) what the student can actually do with what he/she knows; and (3) the student's confidence and motivation in demonstrating what he/she knows (Guskey,1994; Kirk, & Welborn, 1992; McNeir, 1993). Proponents of OBE agree that even though there are many ways to arrive at the same results, what is important is that students achieve the defined outcomes. Opponents worry about why and how outcomes are selected and how students and schools are held accountable for achieving these outcomes. Both sides raise critical points on the structure and direction of the education system and the primary role of education in the community. There is some fear by educators that OBE takes away the freedom that teachers have in decision making pertaining to course content, course delivery and assessment. The fear of losing control of their courses has created a phobia of OBE (Schwarz & Cavener, 1994; Spady & Marshall, 1994).

Proposed Academic Program Model

In this paper, a new Academic Program Model ATAPM (Advanced Technology Academic Program Model) is designed to continuously improve the curriculum and provide students with the knowledge and skills to succeed in a rapidly changing world, which is an Outcome Based learning approach. The life-long learning outcomes, being the kernel of the courses, provide focus to the curriculum in the APM. Furthermore, all courses are designed to clearly show the experiences that students draw upon achieving a Learning Outcome. The ATAPM learning outcome model is a unique educational framework that draws on resources from the learning communities within and outside the institution. Furthermore, the learning communities are actively involved in shaping the model to make sure it addresses the needs of the country. It is designed to serve as the underlying structure that guides faculty and students in the development of AT programs. The learning outcomes, the learning communities, the e-portfolio, and the wired and laptop based campus form the infrastructure that supports the ATAPM as shown in figure 1.

The ATAPM model includes learning outcomes at all stages in the student's academic life. The curriculum at ATAPM involves three main programs:

- Readiness program
- General education
- Degree majors, programs

The readiness program is a prerequisite for students to be admitted to general education. Students must satisfy competency in English, basic mathematics and information technology. Students spend two years in the general education program and the last two years in a major of their choice. All students are assigned a seminar advisor upon joining the university. After entering their majors, students are assigned a major advisor. Students, with the assistance of their advisors, develop an individual learning plan. Learning outcomes in the major colleges emphasize planning, decision-making, and application skills, and students are assessed for their ability to demonstrate applied synthesis and integration of knowledge and skills. The ATAPM is framed by three sets of learning outcomes, as shown in figure 2.

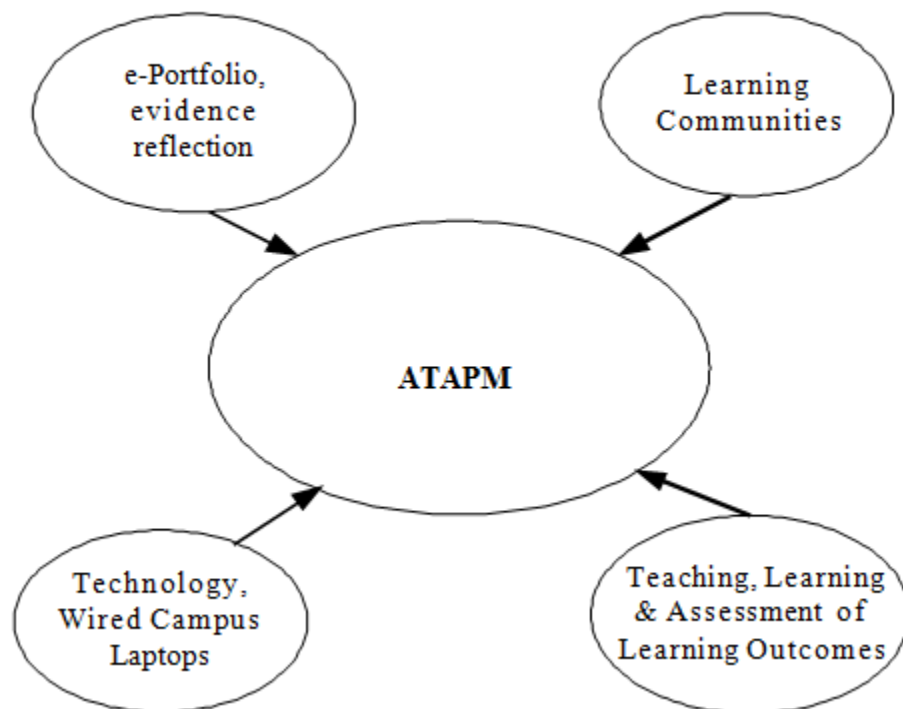The General Education Learning Outcomes (GELO)

The Major Learning Outcomes (MALO)

The AT Learning Outcomes (ATLO)

The GELOs and MALOs are course embedded, and the ATLOs are a set of higher intellectual outcomes, which can be achieved at different levels of the students' learning

experiences.

(Figure 1) Components of the ATAPM

The GELOs are designed to help students develop an understanding and the ability to apply the theoretical structures and methodologies of the academic disciplines. There are five GELOs: Creative Expression, Culture and Society, Humanities, Language and Communication and Science, Mathematics and Technology. The GELO knowledge domains are defined as follows:

Creative Expression: Graduates will make artistic form and observe, analyze and reflect on the many dimensions of human experience.

Culture and Society: Graduates will examine and discuss cultural and social issues from multiple perspectives; explore the relationships between different cultures on issues such as economics, politics, psychology, social history, sociology, and technology; identify cultural

values and assumptions in different communities; investigate the development of their own cultural values; and appreciate the impact of human society on nature.

Humanities: Graduates will develop an understanding of the history and culture of human experience, enrich the mind and contribute to the development of a more humane world.

Language and Communication: Graduates will communicate effectively in English and Arabic. They will read and listen to comprehend a wide range of written and spoken information, and write and speak effectively in a variety of contexts using diverse media.

Science, Mathematics and Technology: Graduates will use the tools and methodologies of science, mathematics, and technology and their interaction to solve problems and ex- plain the world in a wide environmental, cultural, social and economic context.

The GELOs specify what students should be able to achieve by studying the subjects in a specific knowledge domain. For example studying in Science, Mathematics, and Technology domain should enable the student to comprehend and apply the scientific method as a tool for thinking and seeking knowledge.

The MALOs are designed to help students develop academic and professional competencies necessary to function effectively and independently as a scholar and practitioner in a selected field. MALOs are developed in their respective colleges. The College of Information Systems (CIS), for example, has established five MALOs that complement the learning outcomes of the AT Academic program model. These MALOs form the basis for analysis and assessment that play an essential role in the continuous process of improvement. The MALOs for the College of Information Systems are:
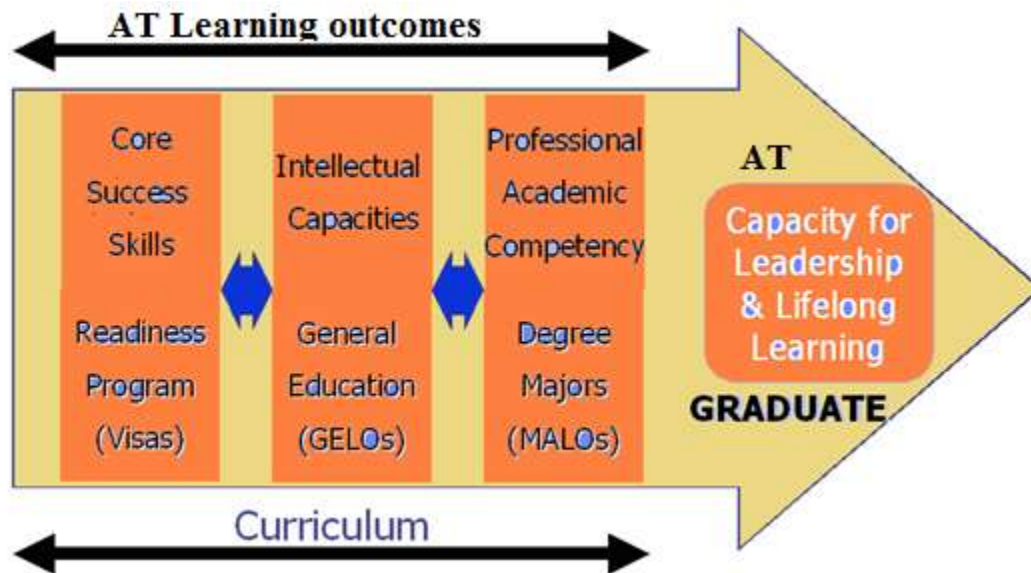
(Figure 2) ZU Academic Program Model

Problem identification and analysis: Graduates will be able to recognize, define, and classify problems.

Problem solving: Graduates will derive solutions and evaluate their success.

Internet technologies and applications: Graduates will understand the capabilities, use, and application of information technology.

Systems principles and practices: Graduates will demonstrate understanding of system types, structures, standards and metrics.

Technical communication: Graduates will organize, develop, present and evaluate technical material.

There are six ATAPA Learning Outcomes (ATLOs), which are the overarching requirements for students to graduate from their major. ATLOs identify five critical areas that are significant for students. These are: Critical Thinking and Reasoning, Information Literacy and Communication, Information Technology, Global Awareness, Teamwork and Leadership. During their last semester students need to participate in the internship program and complete a capstone project (Academic Program Model, 2002). ATLOs, which form the framework for the

APM, are designed to help students develop higher order intellectual abilities needed for life-long learning and success. All students must demonstrate accomplishments in the following ATLOs before they graduate: Information Literacy and Communication: Students who graduate will be able to recognize information needs, access and evaluate appropriate information to answer those needs, and communicate effectively to a variety of audiences in English.

Information Technology: Graduates will be able to use information technology to solve problems and communicate in an ethical way. They will also be critically aware of the impact of information technology on the individual and society.

Critical Thinking and Reasoning: Graduates will be able to use information, reasoning, and creative processes achieve goals and make responsible decisions.

Global Awareness: Graduates will be able to relate to communities beyond the local, perceive and react to differences from an informed and reasoned point of view, and be critically aware of implications and benefits of cultural interactions.

Teamwork: Graduates will be able to work efficiently and effectively in a group.

Leadership: Graduates will be able to assume leadership roles and responsibilities in a variety of life situations and accept accountability for the results.

Conclusion

A new concept for developing and assessing an outcome based educational model is proposed. This academic model responds well to challenges of a rapidly changing world. The framework that constitutes the model is composed of sets of well chosen learning outcomes, technology (laptop, wired campus), e-portfolios, assessments and reflection, and learning communities. The learning outcomes are used at all stages of the students' academic life. These outcomes are derived from the university learning community's vision of the knowledge and skills that students need to acquire in order to be life-long learners and effective members of the society. Students develop electronic portfolios to demonstrate their academic achievements and record their progress over time. Furthermore, students reflect on their learning experiences. Assessment panels review the student work and provide feedback. Finally, this new model is a dynamic model that will evolve with demands from the learning community and the country at large.

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