Keynote Speeches

New Knowledge for a Global Community

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Introduction

Information technology has significantly changed how individuals, business, government and education operate. In higher education advances in information technology have impacted how teachers teach and how learners learn. University faculty today must not only have a sound foundation of their content area and scientific research methods, but they also need a strong foundation in the integration of technology into their teaching, research and outreach activities.

This paper will describe key elements in providing a technical and scientific foundation for academic faculty in the 21st century including:

- a professional development plan to provide faculty with the knowledge and skills to effectively integrate technology into their teaching and research activities to increase their personal quality and performance;
- a process to develop knowledge using new educational technologies to enhance and improve excellence and access through eLearning;
- deployment of an advanced infrastructure to enhance and expand the teaching and scientific research activities of faculty;
- a quality improvement plan
- collaborative efforts

A model program that addresses these key elements will be described to provide conference participants with a working example of a university partnership in the Middle East.

Providing a Foundation for Academic Faculty in the 21st Century

A Vision for the Future

A fundamental transformation continues to take place in higher education. The convergence of new technologies such as Internet 2, desktop video-conferencing and publishing, streaming media, video-on-demand, intelligent tutoring systems, adaptive learning systems, and virtual reality are changing how we teach and how students learn; how research is developed and conducted; and how a university contributes to the economic vitality, culture and well-being of its community.

The ubiquity of powerful and affordable personal computers is creating networked learning and research environments on and off-campus. Increasing numbers of non-traditional students require a wide range of learning opportunities outside the traditional university campus-based models. The need for lifelong learning is a reality to business and industry and their employees, as the half-life of knowledge grows increasingly shorter. Continuing financial pressures require responses to growing demands while simultaneously there is a need to control costs. Colleges and universities across the world are responding to these issues in a variety of ways. A continuum of initiatives from enhancing on-campus classes by incorporating instructional technologies into existing teaching and learning processes; creation of "virtual universities" to increase academic reach; establishing distributed research and teaching activities among collaborative institutions; re-development and re-configuration of curricula; or re-evaluation of processes and policies to improve quality are being undertaken by most colleges and universities.

It is critical that universities develop a vision for their preferred future; a vision where they can successfully accomplish their mission within an ever-changing world; a vision that meets the educational requirements of the next century. This vision must include a vision of what the institution's faculty will be in the 21st century. All universities will need to respond to these challenges; some that dare to create a shared vision for the future can be leaders.

A Strategic Plan

The importance of a strategic plan cannot be over-emphasized. It provides the blueprint for an institution to build its programmatic efforts in order to accomplish its preferred vision. It is the university's roadmap to move the institution from where it currently is, to where it desires to be. The strategic plan must be structured in such a way as to challenge the institution to move forward, to stretch its limits; yet it must also be flexible enough to adapt to opportunities and constraints. It must provide the pathway for all stakeholders of the institution to contribute to the success of accomplishing strategic objectives, goals and ultimately become part of a shared effort to accomplish the institution's preferred vision. Since academic faculties are the heart of the university, a university's strategic plan must not only address the faculty's development process, but also include the faculty in determining the end goal as well as the process.

Quality and Accreditation

"Accreditation signifies that an institution has a purpose appropriate to higher education and has the resources, programs, and services sufficient to accomplish and sustain that purpose.[1]" This definition by the Commission on Colleges of the Southern Association of Colleges and Schools further states that, "Accreditation indicates that an institution maintains clearly specified educational objectives that are consistent with its mission and appropriate to the degrees it offers, and that it is successful in achieving its stated objectives." In essence, accreditation is the official "seal-of-quality" for higher education. It is a public statement indicating that the institution is providing effective programs and services based on a set of standards that have been mutually agreed upon by like minded institutions.

Accreditation is a process of examining the institution against mutually agreed upon higher education standards and continuously working to ensure that the institution's educational programs and services meet or exceed these comprehensive standards. Accreditation is a process that examines the whole of the institution as it seeks to fulfill its mission. This holistic process typically involves a self-study process where the institutional community examines itself against core standards and develops a process to enhance the quality of the institution; and an external evaluation process conducted by representatives from peer institutions against these same standards and the effectiveness of their quality enhancement plan. Major areas of review include:

- institutional mission
- institutional governance and administration
- institutional effectiveness
- educational programs
- faculty
- library and other learning resources
- student affairs and services
- physical and financial resources and processes

A shared vision for the future, a strategic plan to achieve that vision, and a quality enhancement plan all support the foundation for an institution of the 21st century. Providing new knowledge for a global community however also requires an institution to effectively integrate information/instructional technology throughout the fabric of its teaching and learning efforts, especially those efforts involving technical and scientific realms.

Key Elements for a Technical and Scientific Foundation

Moving an institution of higher education forward to meet the challenges of an ever changing environment is most effectively and efficiently accomplished when the institution is viewed from a systems perspective. In this way, institutional variables that interact, inter-relate and/or are inter-dependent can be addressed with an understanding

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[1] Principles of Accreditation: foundations for quality improvement, Commission on Colleges, Southern Association of Colleges Schools, Decatur, GA. 2001

of the relationship they have on other variables. Enhancing the technical and scientific foundation of an institution through information technology contains several key elements including: a professional development plan for faculty, staff and administrators; knowledge development through eLearning; deployment of an advanced infrastructure; and a quality improvement plan.

Professional Development Plan

An institution's faculty, administration and staff of the 21st century need new knowledge and skills to effectively integrate technology into their teaching and research activities. Administrators and staff also need this knowledge to effectively integrate technology into their efforts and activities. The creation and implementation of a comprehensive professional development plan provides faculty, staff and administrators with essential knowledge and skills in information and instructional technology that establishes a strong technical and scientific foundation from which to educate their students, conduct research, and contribute to the economic development, culture and quality of life in their community.

Institutional professional development plans may be comprehensive or targeted to meet a specific need. In either case, they are most effective when they begin with an analysis of the gap between what knowledge and skills an employee possesses and the knowledge and skills needed by the institution to achieve its vision. An institutional professional development plan is comprised of a series of lower-level development plans, each building on the other, and scaffolding towards achieving the institutional plan. Individual professional development plans are created which feed into the goals and objectives of a department or college, which then feed into the institution's strategic plan, which is focused on achieving the institutional vision.

(Fig. 1)

Individuals within an institution are different, each possessing their own set of skills and knowledge derived from their educational, work and life experiences. Therefore, while professional development plans of institutions are often thematic, they also need to account for individual differences in knowledge and skill levels among participants. Below is an example of a comprehensive faculty development program at Virginia Tech's which illustrates not only a breadth of content learning opportunities, but also opportunities based on knowledge and skill level. Each of the seventeen tracks is approximately three days long and offered over the summer to faculty.

Track A - New Faculty Computing
Track B - An Introduction to Blackboard
Track C - Using the Web for Instruction: Blackboard and Other Tools
Track D - Advanced Use of the Web for Instruction (Spring Only)
Track E - Creating Media Content for Instruction
Track F - Developing and Delivering Effective and Interactive Online Instruction
Track G - Creating Learner-Centered Instruction
Track H - Using Mathematica for Research and Instruction
Track J - Using LabVIEW
Track K - Furthering Your Research Agenda (Spring Only)
Track L - Creating Database-driven Web Sites with PHP & MySQL
Track M - Parallel Programming
Track N - Northern Virginia Center: Using the Web for Instruction
Track O - Independent Project Development (See Spring for Details)
Track P - Using Tablet PCs in the Classroom: Teaching in a Mobile Environment
Track Q- Statistics, SAS and Experimental Design
Track R - An Introduction to Geospatial Technologies

To be fully effective, an institution's professional development activities must not only support its employees with access to new knowledge and skills, but time to engage in development activities, resources to effectively utilize the new knowledge and skills they have learned, an understanding of how their individual development integrates and supports the institutional objectives, and an environment of support and collaboration. An example of institutional commitment to faculty development can again be seen in Virginia Tech's Faculty Development Institute (FDI). The following is taken from the Virginia Tech FDI website(https://www.fdi.vt.edu/) :

FDI Mission

The Virginia Tech Faculty Development Institute (FDI) has two major objectives in its mission that have been the underlying force since its inception in 1993.

1. Provide the opportunity for all faculty in the University to participate in the Faculty Development Program. The overarching goal is to motivate faculty to investigate, create, and utilize alternative instructional strategies.
2. Provide participants who complete the program with access to state-of-the-art instructional technology, the knowledge to use it, and the motivation to collaborate with their colleagues in leveraging instructional technology in

their courses.

FDI is part of a large-scale effort to invest in faculty. The investment is realized not only in the direct infusion of new technology (hardware and software) to the faculty on a regular basis, but also creating an environment in which they can gain the needed skills to use the technology effectively in the context of their specific teaching or research. FDI provides the faculty with the opportunity to:

- Rethink their teaching methods and goals,
- Explore potential of specific instructional technology applications,
- Improve the effectiveness of their teaching-learning practices.

The FDI program uses standard instructional design techniques to create learner-centered instruction, structured around participant needs, interests, preferences, availability and expectations for immediately usable information. Workshops are offered by computer operating system (Windows, Macintosh or Unix)

Knowledge Development through eLearning

The development of new knowledge can be expanded and enhanced through the effective integration of eLearning into a university's academic agenda. To successfully address the myriad needs of today's learner, institutions can adopt a holistic approach to the design, development, implementation, and assessment of eLearning environments. However, identifying the elements that constitute a holistic approach to eLearning can be a challenging task because these threads are so subtly woven into the fabric that fortifies an educational community. The challenge for educators is to recognize these traditionally transparent factors.

It is helpful to view eLearning from a time and place perspective as depicted in Fig. 2. Each of the four components of the time and place matrix has its own system of requirements with respect to instructional design, development, delivery, assessment, marketing, student and faculty support, availability of human resources, technology, learning resources, and costs. The three component systems that are actively involved in eLearning can be connected to the others to create an even larger system. The fourth component, "traditional classroom" can also be combined with any or all of the eLearning components to create an effective, blended approach to education.

eLearning from a Time and Place Perspective

To understand eLearning, let alone develop an effective model, it must first be viewed as a system (Moore, 1996). Like any system, eLearning is composed of all the various elements that comprise it. These interrelated, interacting and interdependent elements possess their own sub-systems, each with systems of their own. The eLearning system(s) reside in a context that is constantly changing, influenced by internal and external factors that require the system to adapt, modify, or significantly change to be successful. Clearly, in developing an eLearning model or program, one size does not fit all. However, like other systems, generalized models can be developed to serve as guides or templates, which can then be modified, shaped, or adapted to fit a particular context.

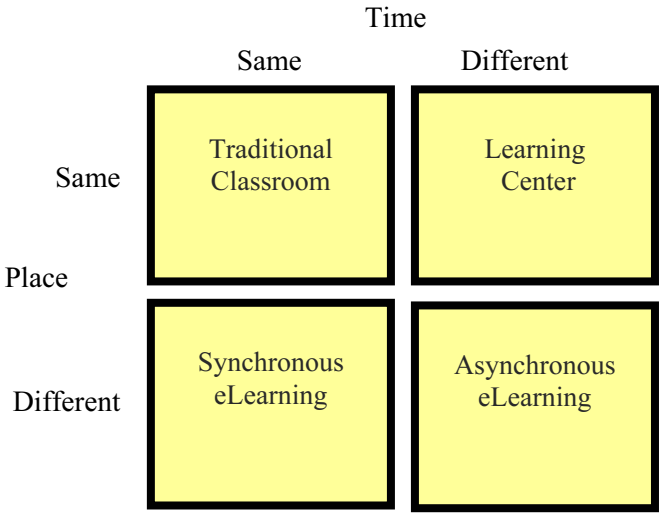

Fig. 2

The context in which an eLearning system resides varies and impacts the system. The internal and external factors that impact the context where the system resides create points of tension and constraint, slack and flexibility, or unexplained phenomena on the system. At extremes, these points appear as barriers or opportunities to eLearning, and at their minimum they appear as the normal ups and downs of the work day. Similar to other systems, the elements of an eLearning system are interrelated, interactive, and interdependent (Moore, 1996). Each can be broken down into sub-systems, which in turn can be broken down into other sub-systems, which can be broken down even further and so on, until all aspects of the system are present to represent the "whole" of the system. It is only through the realization of the complexities of an eLearning system that one begins to more fully understand the importance that context plays in the development of an eLearning model. Change in a sub-system element, for example - language - may present limited problems in one context, but significant problems in another.

The breadth of an eLearning system depends on how wide or narrow a view is taken. A view too narrow, such as eLearning as a technology system, may result in a limited perspective of what eLearning is all about and will require connecting a series of narrow-view systems. A view too wide, such as eLearning as higher education, may result in a perspective so large that it becomes impossible to understand and work with because of all the interactive, interrelated, and interdependent elements. A "You can't see the forest for the trees", effect.

The depth of the eLearning system is determined by drilling down through the elements into sub-systems, and further and further into deeper sub-systems. The depth of an eLearning system, like the breadth of the system, depends on the view that is taken. The deeper the drilling, the more the connectedness and the more

interrelationships, inter-activeness, and interdependence among the various elements are revealed.

What is most important in developing a model for eLearning is recognizing the depth and breadth of the system, and to understand that whenever a decision or action is taken involving a specific aspect of the system, it will have an impact somewhere else in the system. The inter-connectedness of the system requires it.

In looking at what makes a successful eLearning program, the following ten criteria often surface among those programs that are successful. These criteria are also reflected in the answers to the questions above. These ten criteria can provide a view of the breadth of an eLearning system and can serve as key elements in a first level view of an eLearning system.

Key Criteria of Successful eLearning Systems

- Top level leadership, support and a shared vision
- An identified and viable market or need
- eLearning champion(s) and risk takers
- Programs and courses of need and interest that are marketable
- Engaged faculty, departments and support units
- Innovation and dedicated people
- Appropriate and scalable technology and support systems
- An appropriate organizational structure and staffing
- Appropriate finances and facilities
- Continuous improvement processes

It is less important how many key elements are identified in the breadth of the eLearning system. What is more important is the identification of an accurate and workable system from which to view the entire system holistically.

Advanced Infrastructure Deployment

Deployment of an advanced infrastructure to enhance and expand the teaching and scientific research activities of faculty is essential for a university of the 21st century. An advanced information technology infrastructure provides faculty with the tools and resources needed to transform teaching and learning processes, and to effectively and efficiently grow the scientific research. Investment in an advanced information technology infrastructure, while costly, should not be viewed as a one-time or periodic capital expense. Instead, an information technology infrastructure should be viewed as a critical university utility, just like electricity and water. An advanced IT infrastructure is the engine that allows faculty to test their hypotheses, experiment with ideas, generate new knowledge, and transfer that knowledge to others. A university then must budget its infrastructure with a priority at or near what it does for electricity, water and people.

Most institutions do not have the luxury of creating an advanced information technology infrastructure from inception. Usually, the process is incremental as funding becomes available and budgets can sustain advanced deployment. . However, if an institution has the ability to significantly enhance its infrastructure then careful

decisions must be made to ensure that the infrastructure deployment tracks in the correct direction, meets the desired goals, objectives and vision of the institution, and is scalable.

The scalability of an institution's infrastructure should be viewed from all perspectives: technology resources, human resources, support systems and processes. Fig. 3 and Fig. 4 below present two examples of the implementation of scalable systems at Virginia Tech's Institute for Distance and Distributed Learning. Fig. 3 represents the use of adjunct faculty to support tenured research and teaching faculty who serve as master faculty in the development and delivery of online courses. Scalability is achieved from both a faculty availability perspective and a cost perspective.

A Scalable Online Course Delivery Model

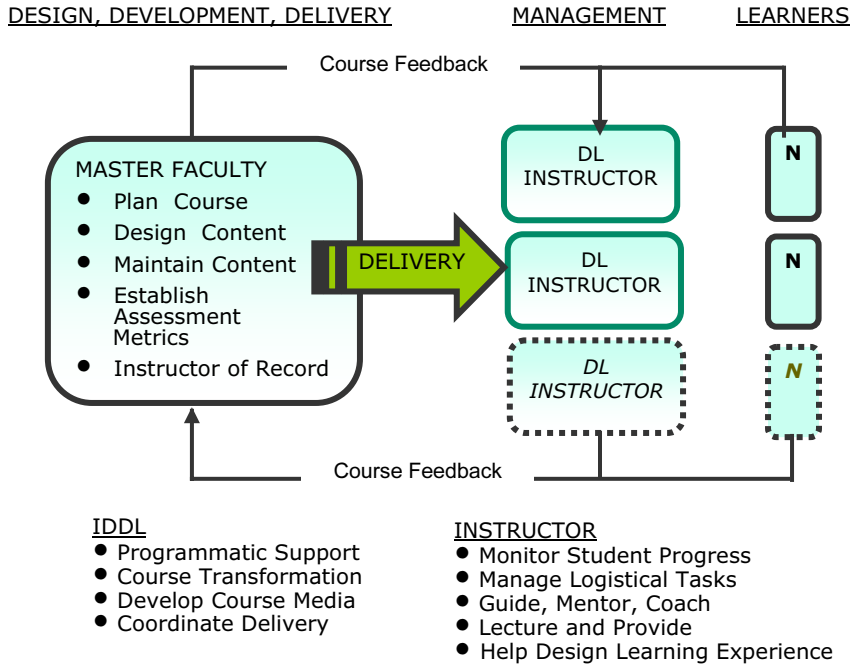

Fig. 3

Fig. 4 represents scalability in the development of courseware. Scalability is achieved through a systems approach to instructional design and development as well as a centralized center to maximize resources and achieve economies of scale.

Quality Improvement Plan

A plan for quality improvement is essential for a university aspiring to be a leader in the 21st century. A holistic approach to viewing the plan is helpful and allows the university community to focus on key institutional areas to be assessed. Fig. 5 depicts a quality improvement plan used by Virginia Tech's Institute for Distance and Distributed

Learning (IDDL) which is based on the Sloan Consortium's five pillars of quality (٢). In the IDDL model a sixth pillar is added – systems effectiveness - which addresses how well the systems involved in the operation of eLearning at Virginia Tech do what they are intended to do. In this model, systems such as enrollment, course development, course evaluation, and technology replacement, upgrade and identification can be identified.

Course Development Model
…a blended and scalable system

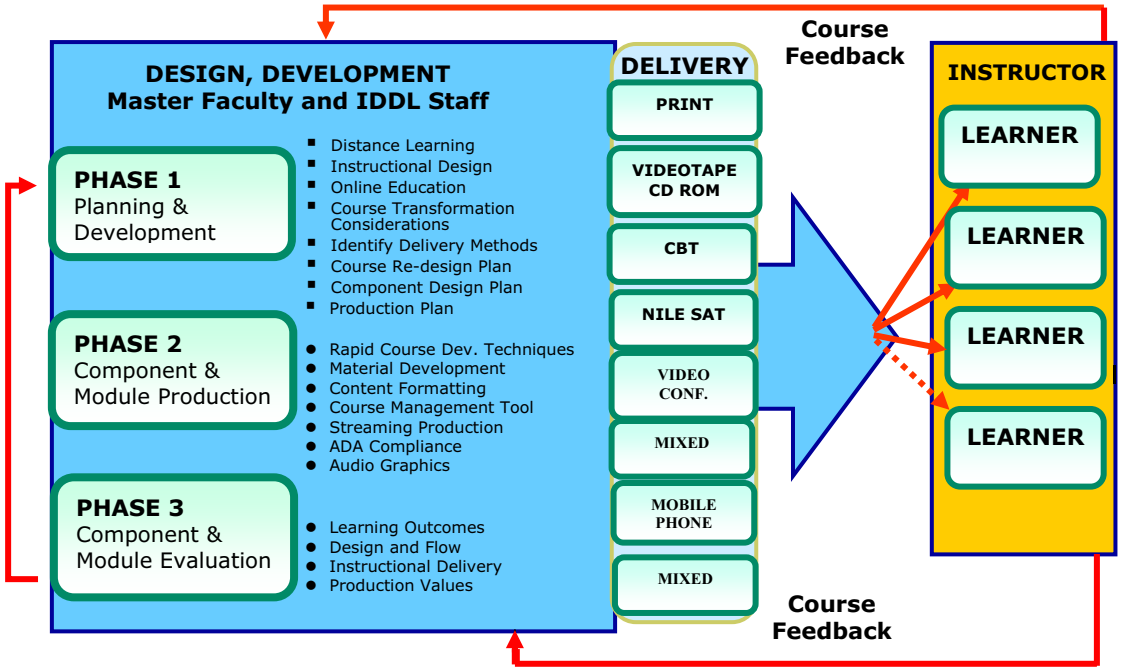

Fig. 4

(٢) Allen, I. E., and Seaman, J. *Sizing the Opportunity: The Quality and Extent of Online Education in the United States, 2002 and 2003*. The Sloan Consortium, 2003.

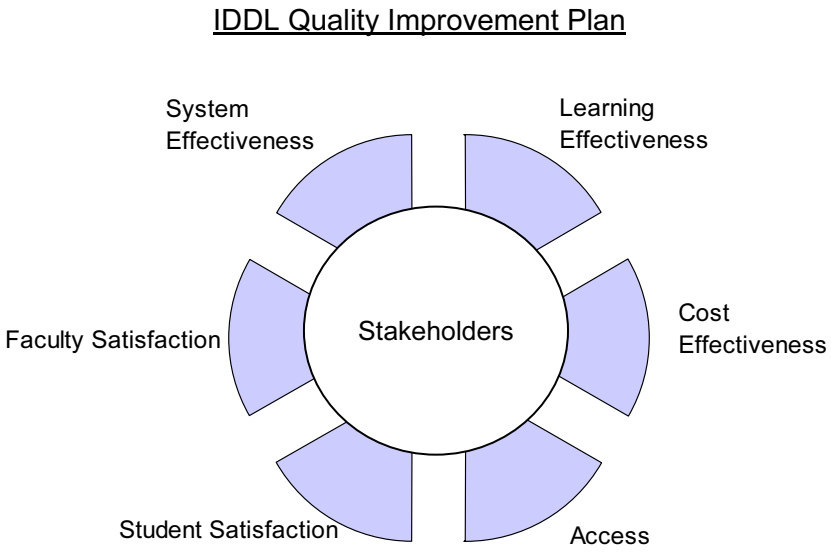

Fig. 5

An on-going continuous improvement process as identified in Fig. 6 provides an institution with the ability to measure its effectiveness across whatever factors it deems important. The process begins with the institution's strategic plan. The strategic plan is based on a shared vision and inclusive process that is focused on and supports the university's mission. The continuous improvement process includes:

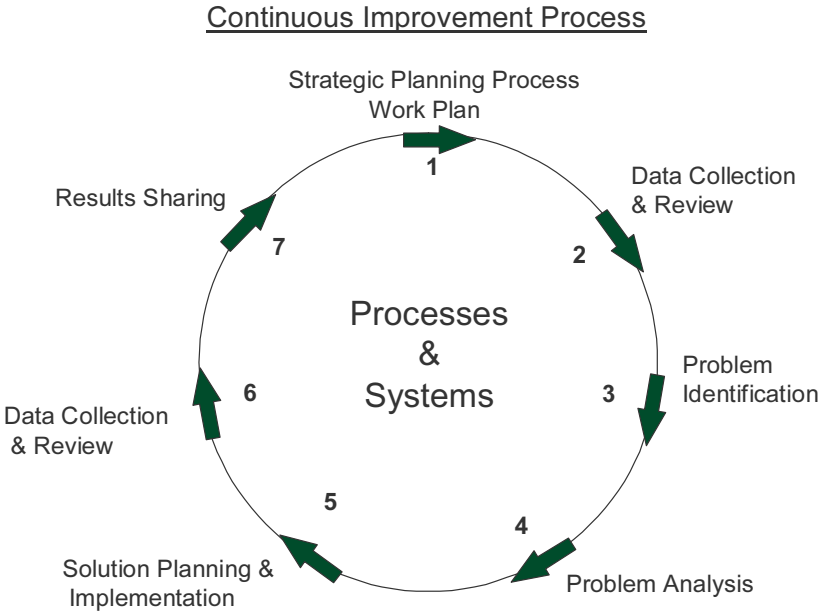

Fig. 6

Work Plan: From the institution's strategic plan work plans are developed across the institution designed to focus effort on achieving departmental and institutional goals and objectives. These work plans can be sub-divided into components where assessment data can be collected.

Data Collection and Review: As the strategic plan is implemented data are collected on various program components. These data include: grade analysis, student demographics, course material review, student satisfaction, faculty satisfaction, course evaluation, non-completion rates, technology access, enrollment trends, assignment completion rates, instructional delivery methods, faculty/student interaction methods, student orientation evaluation, support services and faculty orientation and training.

Problem Identification: As data are collected and reviewed trends are identified and potential problems are flagged and targeted for further analysis.

Problem Analysis: A variety of quality assessment techniques are used to identify the cause and effect relationships of the identified problem.

Solution Planning & Implementation: Solutions are planned and implemented based on the complexity of the problem. Some problems can be solved through individual intervention, others through continuous improvement teams, cross-functional teams, action teams and/or process improvement teams.

Data Collection & Review: Data are collected again after the solution(s) are implemented through a variety of assessment techniques.

Sharing Results: Results are shared with the program and the University to increase the university's knowledge base and provide opportunities for replication.

Work Plan: Improvements are continuously incorporated into the institution's strategic and work plans. The cycle continues always seeking improvements.

Collaborative Efforts

Among the many changes that have occurred because of advances in information technology has been the ability to communicate more effectively with more people. Communities are able to learn and exchange ideas and resources with their neighbors. New knowledge developed and disseminated by universities world-wide have changed local communities into global communities. There are many benefits to these changes, one of which is key to the success of all universities – collaboration. Those universities that actively and successfully collaborate with others will not only increase their knowledge and skill capacity, but they will also position themselves to better leverage their resources – both human and capital, for what the future brings.

A Case Study
The Virginia Tech Partnership with the Arab Academy for Science & Technology

The VT-AAST Partnership aims to establish a resident graduate degree programs at the AAST facilities in Egypt to help the MENA countries to meet the serious demand

for qualified faculty and professionals in areas of modern technology and sciences.

The program is intended to serve the region's universities and technical research institutions, the private sector technology companies, and the Egyptian government, by facilitating the production of Masters and Ph.D. graduates that meet the immediate needs of the region and supports its long term technology vision and objectives.

Several factors make this program appealing to the Egyptian and MENA region students and their sponsoring institutions:

- Cost: annual program tuition is expected to be of the same order as that of the VT out of state tuition. This results in students' savings of all additional costs of travel and living abroad. The resident program is estimated to cost about 25%-30% of the study abroad cost.
- On the job: Participating students can continue to serve their sponsors while studying as opposed to spending years abroad away from their jobs.
- Female Students: This program would be extremely appealing to female students who would, otherwise, may not be able to travel alone for a study abroad program as is typical in Islamic and Middle Eastern traditions.
- Convenience: Some students would prefer to do their studies at home as opposed to living abroad for extended periods due to family and other personal reasons.
- Visa and travel to the US: Visa constraints may deter some perfectly legitimate and highly qualified students from considering a study abroad program in the US. The resident program offers an alternative for such cases.

The VT-MENA Resident Graduate Program Features

The VT-MENA graduate program is to allow Middle Eastern and North African, MENA, region students to pursue Virginia Tech's graduate studies towards Virginia Tech's M.Sc. and Ph.D. degrees at the AAST facilities in Egypt.

- Ph.D. students will need to meet the graduate degree's residency requirement as determined by the VT graduate school and the respective VT department regulation. In some degree programs, residency requirement necessitate that students join VT in USA at an advanced stage in their study/research program.
- The resident program starts the Ph.D. studies for the enrolled students at the AAST facilities and offers selected courses for the students to prepare for their Qualifying Examination as well as for their planned Ph.D. studies and research. This program provides the student participants with an opportunity to study the early part of their Ph.D. in their home region, and hence reduce the cost and the duration of their stay abroad.
- Subject to program accreditation approval and the availability of resident research programs, students working towards Masters and Ph.D. degrees may be able to complete all their degree requirements in Egypt.
- A long term goal of this program is to establish resident Research Center(s) through which program students would be able to complete their degree research requirements locally.

Some important features of the program are:

- Virginia Tech's Graduate Degrees offered at AAST Campus(es)
- Typically all Master's degree requirements can be completed at AAST
- Doctoral programs would require 1-2 years at VT in USA
- Doctoral students would take the required qualifying examination in Egypt prior to coming to the US, and hence would be allowed to focus on their dissertation related course and research work during their VT residency.
- Initially, some feasible research may be carried out at AAST. In the long term, a resident research facility would allow the program to become a stand-alone one.
- Students requiring specialized courses and research can complete their degree requirements at VT in USA

Initially, the program will start by offering graduate courses leading to the Masters and Ph.D. degrees in Communication Engineering, Computer Engineering and Computer Science. Other engineering, science, and technology related fields will be phased in as the program is implemented.

Conclusion

The technical and scientific foundation of academic faculty in the 21st century will play a major role in the success of institutions of higher education world-wide. Critical to this foundation is faculty knowledge and skill in the integration of information technology, in both teaching and learning, and in research. The effective use of this new knowledge will allow universities to transform educational processes, enhance and expand research activities, and contribute to the economic, cultural and quality of life of their communities and globally. The development of this new knowledge must be focused towards achieving a shared vision of what the university wants to be. The creation of a strategic plan provides the university with a blueprint to achieve its vision. A university's reputation will be based in large part on the quality of its educational programs, its research and its services. Quality in higher education will in part be measured by accreditation standards. Institutions of higher education that are serious about enhancing and expanding the technical and scientific foundation for their faculty can focus on five key elements:

- a professional development plan to provide faculty with the knowledge and skills to effectively integrate technology into their teaching and research activities to increase their personal quality and performance;
- a process to develop new knowledge using new educational technologies to enhance and improve excellence and access through eLearning;
- deployment of an advanced infrastructure to enhance and expand the teaching and scientific research activities of faculty;
- a quality improvement plan
- collaborative efforts

Reform of Higher Education in Japan
Fostering Responsiveness to Society

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1. Introduction

Japan is a newly developed country, although its development was not so recent as some new members of the OECD (Organization for Economic Co-operation and Development) were. For several decades after the World War Two, Japan enjoyed economic growth driven by well-configured Industry-Government-Education collaboration. The mission and role of education, being regarded as a vital factor in achieving the general aims of society were as a rule defined to serve to society in this framework.

The framework came to an end in the period following the fall of the Berlin Wall in 1989. In 1990, the "bubble economy" collapsed and the Japanese economy has been stagnant ever since. The recession forced structural changes to industry, followed by governmental administrative reform up to ministerial level. Under such circumstances, as the key to progress, it is increasingly demanded that universities should contribute to society –education of students with skills, development of mission –oriented research, participation in joint research projects with industry and government, etc. University reform progressed rapidly in the1990s.

On the other hand, Japan is an aging country. Japanese society will experience a decrease in the number of its younger population, which is supposed to supposed to cause divers problems including notably the lack of workforce and the reorganization of the pension scheme. For universities, students' enrolment number is expected to plunge over the next decade, and they will be faced with enhanced competition to attract increasingly diversified students.

2. Education System in Japan

2.1 Development of the Modern Education System

Throughout its history, Japan has attached great importance to education. Even

before the Meiji (1) era (1868-1912), under the feudal regime (the Edo period), Japan had number of schools called Terakoya, open to children of commoners and samurai (warriors). At the end of the Edo period, there were around ten thousand terakoya, and according estimation, the literacy rate was 40%.

The Japanese modern education system was introduced immediately after the Meiji Revolution. In 1872, the Government promulgated the Education System Order (Gakusei) with the objective of generalization of school education and others. Since then, first elementary schools, then secondary schools were rapidly set up throughout the country, generally based on the existing system. At the beginning of the twenty-century, elementary education became universal both for boys and girls (figure1).

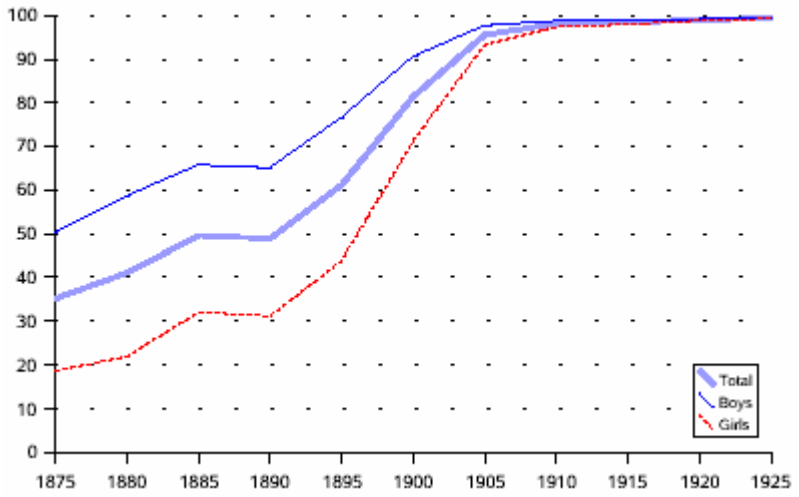

Fig. 1. Percentage of children in full time elementary education between 1875 and 1925.

Nowadays, with very exceptions, all school-aged children (from 6to 16 years) attend elementary and lower secondary schools (junior high schools) which are compulsory; and almost all the lower secondary school graduates attend secondary schools (senior high school). In 2004, the upper high school attendance rate was 987. 5% of the lower secondary school graduates and 96. 3% of the age cohort. Slightly less than half of the age cohort goes on to higher education institutions (excluding non-university institutions). In 2004, the percentage of students enrolling in universities of junior colleges rose to 49. 9% (figure 2).

2. 2 Organization of the School System

Since the introduction of a modern educational system through promulgation of the Education System Order in 1872, the Japanese school system has undergone a number of amendments and revisions. Ultimately, the pre-war school system was characterized by a relatively short period of compulsory education, common to all and

(1) From the name of the reigning Emperor Meiji. The Meiji era began with a revolution called the Meiji Restoration which marked the opening of modernization of Japanese society.

also by a multiple track system after that period. During wartime, under extraordinary circumstances, the school system became very complicated. (Figure 3).

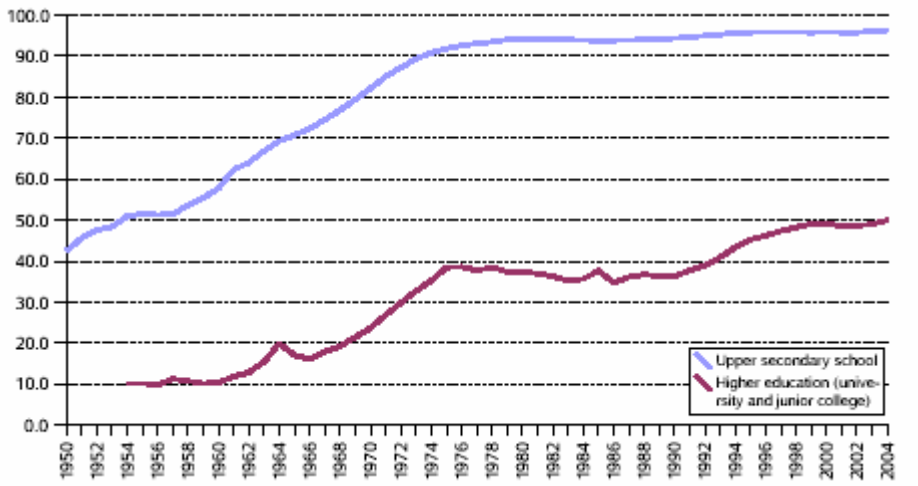

Fig. 2. Percentage of students enrolling in upper secondary schools and higher education institutions (universities and junior colleges).

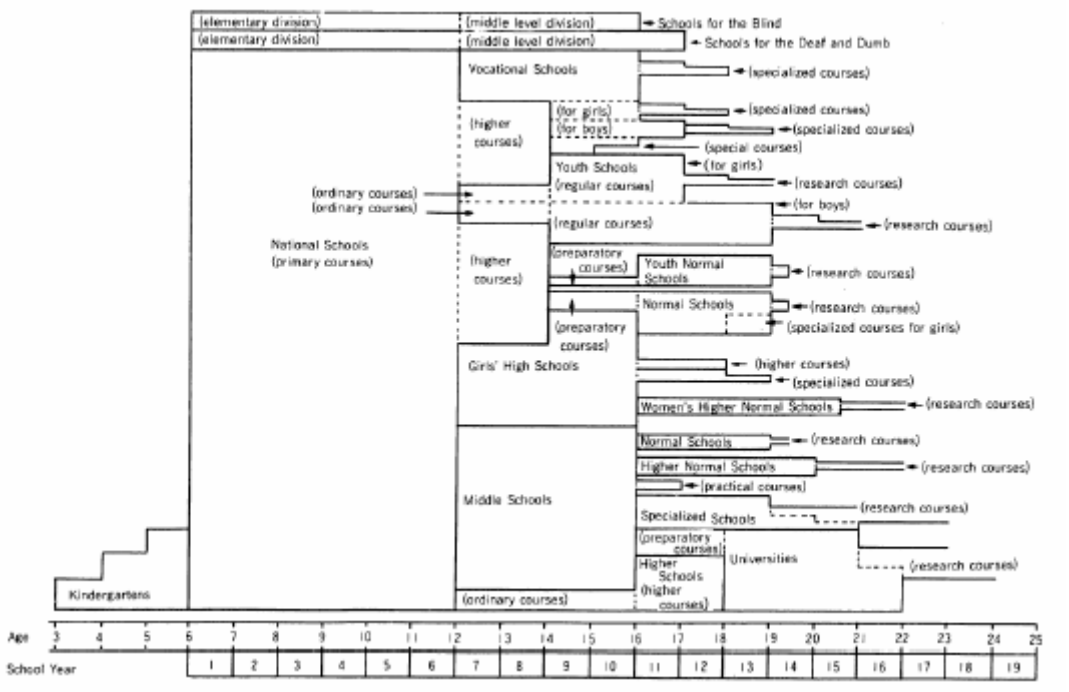

Fig. 3. Organization of the school system in 1944.
(Source : Ministry of Education, 1989).

After World War Two, the Japanese education system was entirely revised under the occupation. The school system, from kindergarten to universities, was structurally rationalized and unified into a single-track format. The duration of compulsory education was extended from six years to nine years. The varying types of higher education institutions were consolidated into a single four–year university system(٢) consisting the last part of the new 6-3-3-4 education system. Under the new system, any graduate of an upper secondary school was entitled to apply for entrance to a university. The door of the universities were opened much wider than in the pre–war period.

As a rule, the school system established in the post–war has been maintained until today, although some new structures were created, including colleges of technology (1961) and secondary education schools displayed a very good performance. According to a survey by the OECD in 2000 (PISA 2000), which assessed 15-years old students in 43 countries in the world concerning their attainments in mathematics, science and reading, Japan was classed in the first group for mathematics and science and the second group for reading. However, since educational programs in schools, from pre-school level to higher education, have been gradually diversified and are now offering a range of options, it is becoming more difficult to assess students' academic ability with an achievement test (٣).

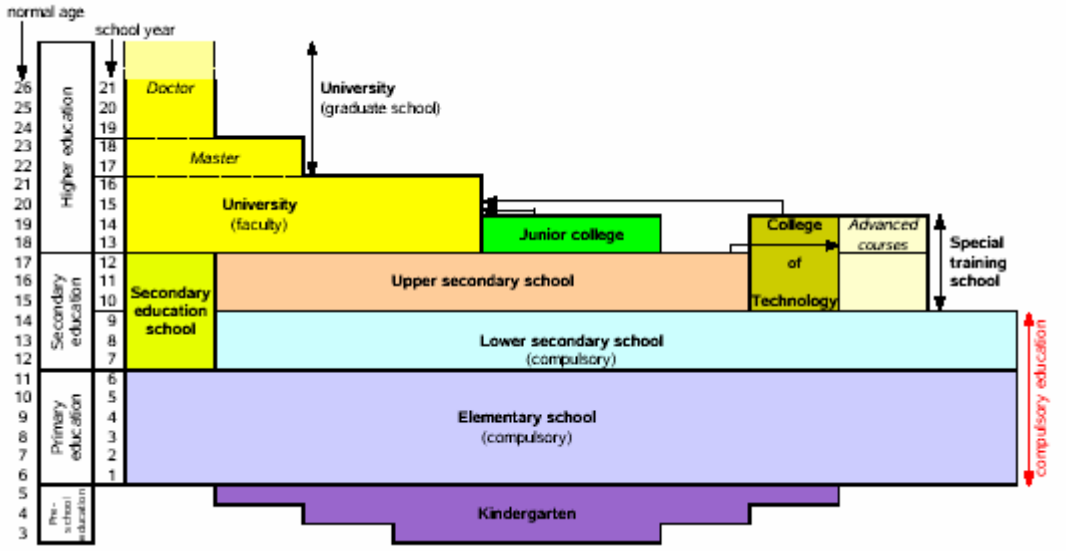

Fig. 4. Organization of the present school system.

(٢) Although the junior college system offering 2-year higher education was set up alongside universities, the system was considered as provisional at that time. After its perpetuation in 1964 by a revision of the School Education Law, it would considerably develop throughout the country.

(٣) In fact, according to the results from PISA 2003 which had assessed the attainments in reading and mathematics as well as the problem-solving ability, Japan lowered its ranking in terms of reading literacy and mathematics in comparison with the PISA 2000 ranking.

3. Higher Education in Japan

3.1 Foundation Of Modern Higher Education Institutions

The modern higher education system began in the late 19th century in Japan when the university of Tokyo (later Tokyo Imperial University) was founded in 1887 by the Meiji government through the merger of two existing higher education institutions. Other imperial universities were subsequently established in several major cities in Japan, resulting in a total of 7 imperial universities (Tokyo, Kyoto, Tohoku, Kyushu, Hokkaido, Osaka, and Nagoya), apart from those located in overseas territory. All these were comprehensive universities and were organized on the continental European model (especially Germanic), that led to a bureaucratic system with quasi-autonomous academic units (faculties).

Apart from the imperial universities, a number of governmental, local public and private higher education institutions were founded in the same period. In 1903, the government enacted the Specialized School Order to codify the establishment and activities of institutions previously classed as miscellaneous schools. Specialized schools increased remarkably since then. They were later given, with single-faculty institutions in special cases, the opportunity to seek the status of university by the promulgation of the University Order in 1918 (implemented the following year).

The pre-war Japanese higher education system was thus characterized (but not exhaustively) by the well-organized bureaucratic administration system in governmental institutions and also by the coexistence of the three sectors of higher education institutions governmental (national), local public and private, with massive investment in the national sector by the Government. Although they were not many in number (Table1), governmental institutions, especially imperial universities, enjoyed the prerogative of acquiring abundant staff, facilities and prioritization in other parts of budget distribution in comparison with institutions of other sectors.

Table 1. Number of higher education institutions by type and sector as of 1943.

	Universities [imperial universities]	Specialized Schools	Total
Governmental (national)	19[7]	58	77
Local public	2	24	26
Private	28	134	162
Total	49[7]	216	275

After the war, in 1949, 70 institutions opened their doors as national university number of national universities started either from old normal schools or as branch schools responsible for two-year course. The imperial universities and other governmental universities were integrated into the newly created university system without differences in terms of legal status. However, in contrast to the former imperial universities and other governmental universities, these new national universities would remain weak for a long time in terms of prestige, staffing, facilities, and budget

allocation and management ability. In addition, 17 local public universities and 81 private universities also began teaching in 1949. Some of the other specialized schools reopened as junior colleges.

3.2 The Expansion of Higher Education and its Decline

After the reorganization during the occupation period, the 1960s and early 1970s witnessed the most rapid growth of the higher education system. Numerically, whereas there had been 245 universities and 280 junior colleges in 1960, there came to be 420 universities (Figure 5) and 513 junior colleges by 1975 (Figure 6). In terms of student numbers, by 1975 the population attending universities (including graduate schools) increased to 1, 734, 082, or 2. 77 times the 1960 student population (Figure 7), and in junior colleges to 348, 922, or 4. 28 times the 1960 figure. The percentage of school students continuing to university or junior college by 1975 increased from 10. 3% to 38. 4% of the corresponding age group (Figure 8).

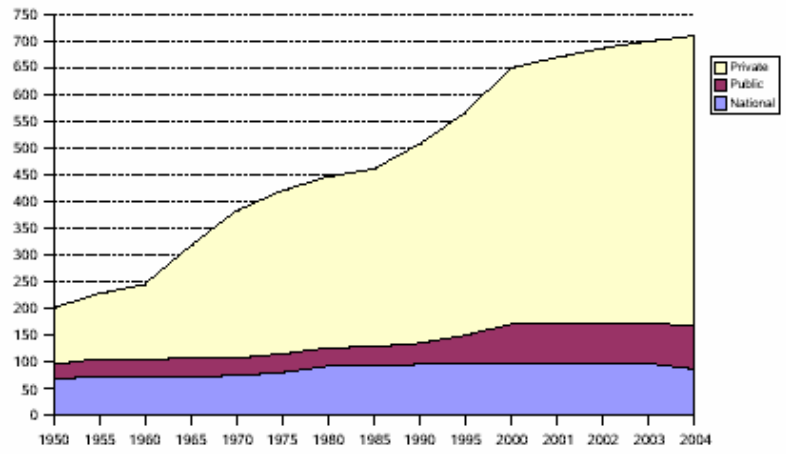

Fig. 5. Number of universities by sector.

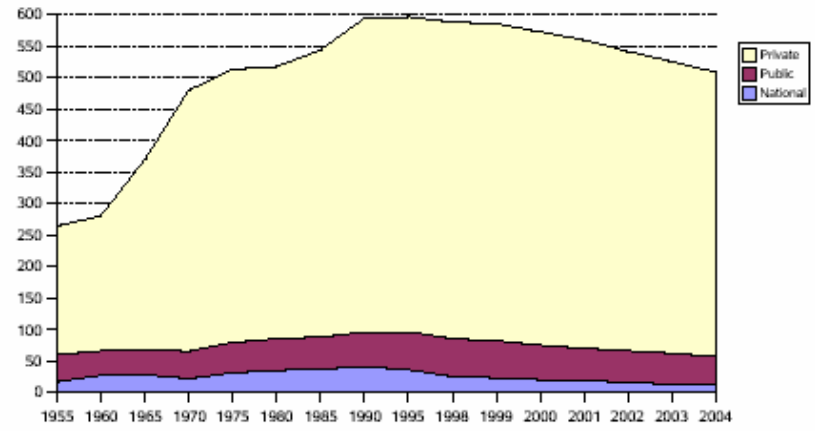

Fig. 6. Number of junior colleges by sector.

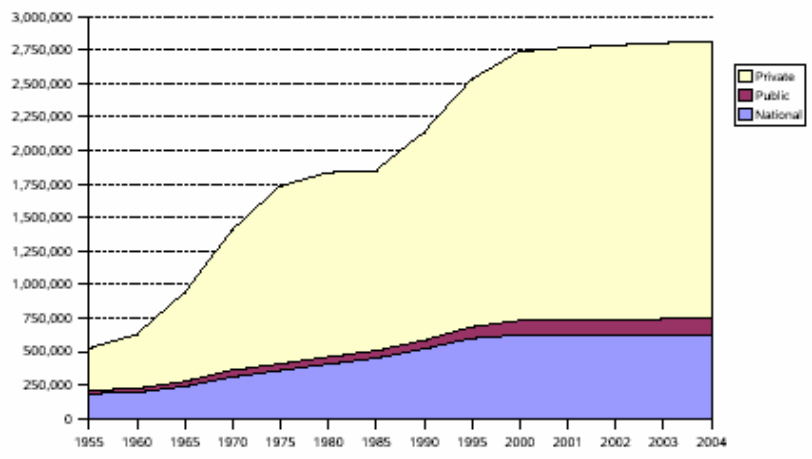

Fig. 7. Student enrolment in universities (including graduate students) by sector.

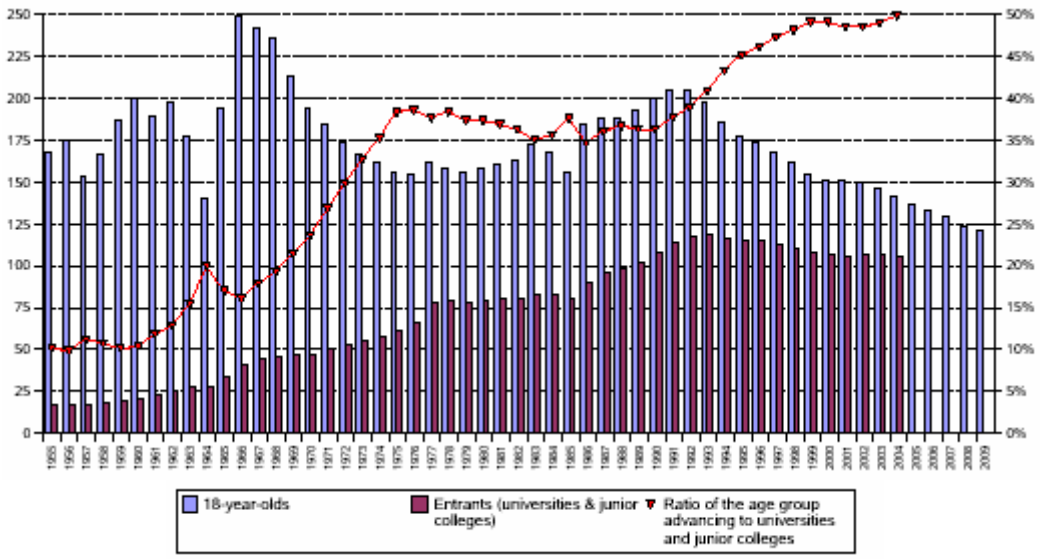

Fig. 8. Trends in 18-year-old population and access to higher education.

During the growth period, it was private universities that developed very rapidly. Its development was illustrated by the sharp increase in the percentage of their enrolled students out of the total student population: students enrollment in private universities and junior colleges rose from 64. 4%for universities and 78. 7% for junior colleges in 1960 to 76. 4% for universities and 91. 2% for junior colleges in 1975.

The second rapid expansion of higher education occurred in the 1980s and early 1990s. The number of universities increased from 446 (93 national, 34 public and 319 private) in 1980 to 565 (98 national, 52 public and 415 private) in 1995, and 709 (87 national, 80 public and 542 private) in 2004. However, the number of 18-year-olds reached its peak in 1992, and has been decreasing ever since. Although the number of

universities is still increasing, the number of junior of colleges reached its peak (596 in number) in 1996 and is now gradually decreasing (Figure 6). In addition, the proportion of the age group advancing to universities and junior colleges reached 49. 1%in 1999, and has been stagnant at around 49% since then (Figure 8).

4. Reform and Deregulation in Higher Education

4.1 Student Movements in the Late 1960s and University Reform(٤)

The system conceived after the war was not capable of coping with the sharp increase in applications and the popularization of university education in the years following 1965. In addition to the greatest number of students seeking admission to universities, pressures for expansion of the system also arose from societal needs in the wake of the scientific innovations and rapid economic growth of the preceding decade. As a result, universities came to be overloaded without making necessary adjustments in administration or educational structure.

Struggles within the universities caused by students broke out first in 1966, over increase in tuition fees and the administration of the students halls, and the spread throughout the country. In particular, against protests raised at the university of Tokyo in 1968, riot police were mobilized the next year and resulted In fierce confrontations between students and police. The disruptions began to subside following the enactment of the Law concerning Emergency Measures on the Operation of Universities of August 1969.

The prolonged struggles had revealed problems that existed both inside and outside the universities and produced a debate over university reform. In June 1971, the Central Council for Education(٥) submitted recommendations for reform to the Minister of Education on various aspects of higher education, including, including 1) diversification of higher education; 2) curriculum reform; 3) improvements of teaching methods; 4) opening of higher education to the general public and establishment of a system of certification; 5) organizational separation of education and research; 6) establishment of ‘’ research institutes’’ (kenkyuin); 7) rationalization of the size of higher educational institutions and their administrative structure; 8) improvements in personnel policies and treatment of teachers; 9)change of the form for establishing national and local public universities; 10)improvements in governmental financing of higher education, a system of costs being borne by the beneficiaries, and a scholarship system; 11) a national plan for the co-ordination of higher education ; 12)improvements in the students' environment; and 13)improvements in the selection procedures of students.

Upon these recommendations and others, the Monbusho(٦) took various measures

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(٤) The description in this chapter largely due to Ministry of Education (1980).

(٥) An advisory board for the Minister of Education.

(٦) The official appellation of the ministry was “Ministry of Education, Science, Sports and Culture” (“Monbusho” in Japanese) until the merger with the Science and Technology Agency in January 2001. Monbusho became then the Ministry of Education, Culture, Sports, Science and Technology (MEXT). In this paper, the Minister in charge of Monbusho or the MEXT is referred to as the “Minister of Education”.

to enable universities to make their structure more flexible so as to enable individual universities to carry out appropriate reforms on their own initiative in response to a variety of demands from society. For example, in 1972 the Ministry created arrangements for credit transfers between universities (in 1982 these arrangements were extended to credit transfers between universities and junior colleges). In 1976 the Ministry authorized universities to admit students (or to allow students to graduate from a university) at the beginning (or the end) of a school term, rather than at the beginning (or the end) of an academic year(٧). In 1985 the Ministry gave more flexibility to the qualification of university teachers so as to enable universities to appoint working people from other sectors as university teachers.

4.2 The University Council and the deregulation in higher education

The National Council on Educational Reform (Rinjikyoikushingikai), established in 1984 as an advisory body to the Prime Minister, submitted reports on a wide range of issues, including the improvement and individualization of university education, the enhancement of graduate schools, fiscal policies relating to higher education, the organization and management of universities, and the establishment of a 'University Council", which would be inaugurated in 1987(٨) as an advisory body for the Minister of Education to deliberate on basic aspects of higher education in Japan. Immediately after its inauguration, the council was asked to study specific measures for university reform in the light of the following social changes.

١. Progress in scientific research and changes in human resources.
٢. A rise in the percentage of students continuing to higher education and diversification of students.
٣. A growing need for lifelong learning and rising social expectations of universities.

Ever since the establishment of the Council, measures such as quantitative and qualitative improvement of graduate schools as well as deregulation and improvement of university administration have been taking place. On of the most important recommendations was the abolition of subject areas to enable universities to structure curricula reflecting their own educational ideas and objectives, which resulted in 1991 in amendment of the Standards for the Establishment of Universities. It was decided that there should be no definition of subject areas, such as general education and specialized education. It was also decided to discontinue the practice of requiring students to obtain a certain number of credits in each subject area as a prerequisite for graduation and to make the acquisition of a minimum total number of credits the only requirement. Another most important recommendation was the qualitative and quantitative improvements of graduate schools.

In 1998 the University Council submitted as report, A Vision for the University of the 21st Century and Future Reform Measures: Distinctive Universities in a Competitive Environment, which built upon the progress of university reform at that time. The report

(٧) In Japan, an academic year is composed of two terms.
(٨) The council existed until the governmental reorganization in 2001 (mentioned before) and was integrated into the Central Council for Education (Subdivision on Universities).

presented the basic policies of university reform in the perspective of the 21st century as follows:

١. Improve the quality of education and research with the purpose of nurturing the ability of investigate issues;
٢. Secure university autonomy by making the educational and research system structure more flexible;
٣. Establish university administration and management with responsibility for the decision-making and implementation ;and
٤. Individualize universities and continuously improve their education and research by establishing multiple evaluation systems.

In 2001, to further promote the reform, Policies for the Structural Reform of Universities (National Universities) defined the future direction of the reform, with a view to making universities more dynamic and internationally competitive. It stipulated (1) that the realignment and consolidation of national universities should be boldly pursued; (2) that management methods of the private sector should be introduced into national universities; and (3) that a competitive mechanism with third-party evaluation should be adopted by universities. The private sector management methods referred to in (2) above were meant to turn national universities into independent administrative institutions (mentioned later) and require outside participation in university administration and merit –based human resources management.

In 2002, the School Education Law was revised and provided more flexibility to institutions for a reorganization of faculties and departments, while a continual third-party evaluation system was introduced. Under the revised law, only notification to the ministry is required of the institution in cases of reorganization without change in the kinds and fields of degrees awarded by the institution, the ministerial authorization itself is no longer necessary.

4.3 Incorporation of National Universities. (٩)

National universities were until March 2004 a part of the national government, and are directly operated by the latter. By acquiring the status of "national university corporations", they were given a legal personality and became more autonomous from the government. This reform was regarded as one of the most significant reforms of Japanese University since the Meiji era.

4.3.1 *Progress towards incorporation*

The idea of incorporating national universities is not a new one. The earliest appearance of the idea can be found in the proposal Teikokudaigaku dokurituan shiko (Private study on independence of the Imperial University) in 1899 where academics suggested placing the Imperial University under the patronage of the Emperor conferring legal personality on it. In the 1960s, a certain number of proposals were made by academics, such as Michio Nagai's Daigakukosya (university corporation) in

(٩) As for the details of the incorporation of national universities, refer to Oba (2003) and Oba (2004).

1962. In 1971 the Central Council for Education proposed, as one alternative, incorporating national universities to help self-development by giving them more institutional autonomy.

In the late 1980s, the National Council on Educational Reform vehemently discussed the possibility of incorporating national and public universities. At the same time, the incorporation of national universities came to be studied as part of governmental administrative reform. In the 1990s, some governmental advisory bodies suggested the incorporation of national universities as one option, but universities and the Monbusho unanimously rejected the suggestion.

Meanwhile, a new administrative system called the " Independent Administrative Institution (IAI)" was set up in 1999, which was to separate some organizations from the central government, giving them autonomy to enhance the effectiveness and efficiency of their operation in providing administrative services(١٠). In April 2001, 57 new autonomous governmental corporations were created. The incorporation on national universities came then to be studied as part of this organizational reform in the Government.

The study of incorporation of national universities came to be officially undertaken by the Monbusho in September 1999. In 2001, a study group composed of academics and non-university people was set up in the Ministry and proceeded with the study on the incorporation of national universities in close consultation with the Association of National Universities (ANU). The study group put the final report in March 2002 on a framework of the incorporation of national universities. In July 2003, the National Universities Corporation Law and other related five laws were legislated. Finally, all the national universities were incorporated on 1st April 2004.

4.3.2 *Goals /plan and evaluation*

Each national university was individually given a legal personality and became a national university corporation(١١). This policy – individually incorporating national universities aimed at extending individually by enhancing the institutional autonomy of each institution.

The budget is now being allocated by the Government to each university as a lump sum (operational grant) without earmarking on the medium-term plan prepared by each university according to its medium term goals and approved by the MEXT, which are elaborated on the basis of the views of each university . The duration of medium-term goals/plan is six years. In addition, the allocation of the budget for the next period will come to vary according to the results of the evaluation.

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(١٠) Article 2 of the Law concerning the General Rules of the Independent Administrative Institutions defines independent administrative institutions as "legal entities established pursuant to this Law or other specific laws enacted for the purpose of efficiently and effectively providing services or businesses that may not necessarily be offered by private entities or that need to be exclusively offered by a single entity, from among those services or businesses that must be reliably implemented for the public benefit, such as for the stability of socio-economic or national life, but that need not necessarily be directly implemented by the Government on its own."

(١١) More precisely, each national university was founded by a national university corporation (see below).

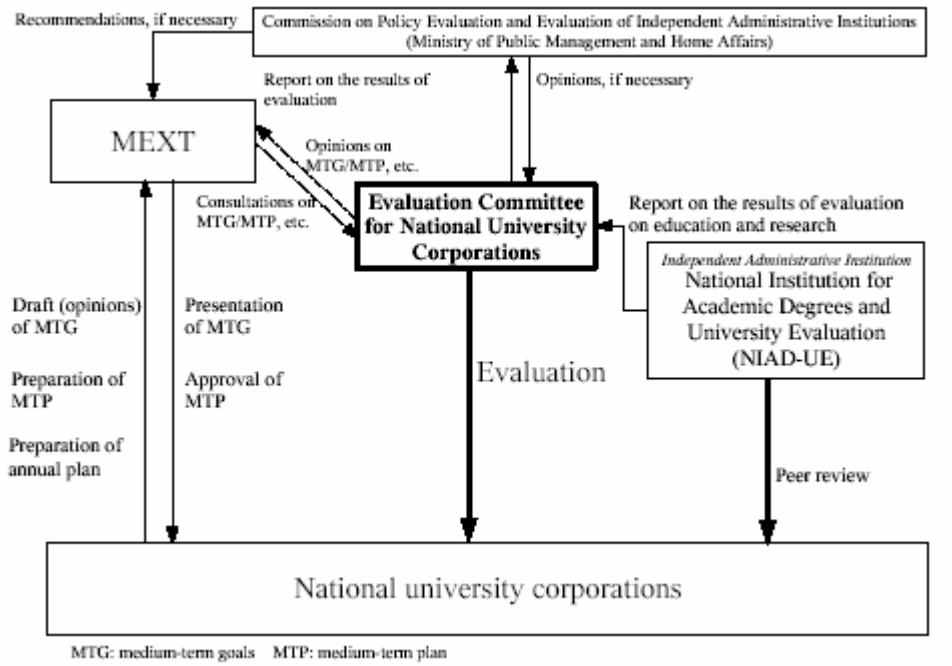

Fig. 9. Evaluation system of national university corporations.

Prior to the definition of the medium-term goals by the MEXT, the Ministry should consult the Evaluation Committee for National University Corporations (hereafter referred to as the "evaluation committee"). With respect to matters essentially related to education and research, the evaluation committee is to receive a report from the National Institution for Academic Degrees and University Evaluation (NIAD-UE), in order to respect the specialized nature of the education and research of universities. The evaluation committee was, prior to the foundation of national university corporations, set up on 1st October 2003. It held its first general meeting on 31 October, and selected Ryoji Noyori (2001 Nobel laureate in chemistry) as its chairman.

4.3.3 *Governance and management*

Each national university corporation has the president of the university and executives in its governing body. In contrast to the former national universities having the sole deliberative organization (council), three deliberative organizations are set up in each corporation (1) board of directions, the highest deliberative organization before the final decision by the president, (2) administrative council, to deliberate on important matters concerning the administration of the national university corporation, and (3) education and research council, to deliberate on important matters concerning education and research. The governance is shared by these three organization. In addition, the structure of the secretariat is now at the discretion of each university.

In order to ensure the accountability and the responsiveness to society of national

universities, people from outside the university participate in their management. At least one of executives, who compose the board of directors, should be a person from outside the university. In addition, an administrative council, which deliberates on important administrative matters, is composed of insiders and outsiders. Not less than half of its total members should be appointed from outside.

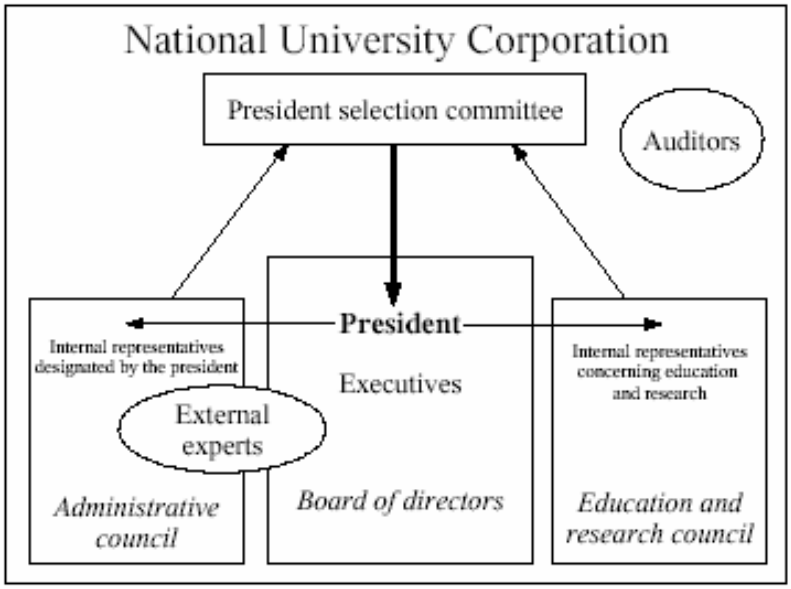

Fig. 10. Governing bodies of national university corporations.

5. Higher Education and Social Needs - How Can Universities Be More Responsive to Society?

5.1 The Transition from Elite to Mass Higher Education

Every country experiences increasing demands on higher education during its economic development. As shown before, Japan witnessed rapid expansions in the 1960s and early 1970s as well as in the late 1980s and 1990s. The percentage of students enrolling in universities and junior colleges rose from 10. 1% in 1960 to 49. 9% in 2004. Similarly, the number of entrants rose from 205 thousand to 705 thousand, although it reached its peak in 1993 (810 thousand).

According to M. Trow's very well-known model of the transition from elite to mass higher education (and subsequently towards universal access), a higher education system that enrolls under 15% of the relevant age group of young people is considered an elite system, and if the transition is made successfully, the system is then able to develop institutions that can grow without being transformed until the enrollment ratio reaches 50 % of the age grade (TROW, 1974). Although he recognized the existence of variations among countries, Trow pointed to several elements particular to each system.

Table 2. Characteristics of the three phases of higher education system defined by Trow (1974).

	Elite	***Mass***	***Universal***
Enrolment ratio	Under 15%	Between 15 and 50%	Over 50%
Attitude towards access	Privilege	Right	Obligation
Primary functions of higher education institutions	Shape the mind and character of the ruling class; Prepare students for broad elite roles	Prepare a much broader range of elites; Transmission of skills	Prepare large numbers of people for life; Maximise the their adaptability to society
Curriculum	Highly structured; Highly specialised and governed by the professor's notion	More modular, marked by semi-structured sequences of courses; Credit system; Movement between fields	Less structured and boundaries between courses being broken down; Rejection of academic forms and standards
Forms of instruction	Tutorial or seminar, marked by a personal relationship between teachers and students	Emphasis on the transmission of skill and knowledge; Large lectures, often by teaching assistants	Direct personal relationship being subordinated; Heavier reliance on correspondence, TVs, computer and other technological aids
Academic career of the student	Entrance directly after finishing secondary school; In-residence	Growing delayed entry; More heterogeneous students; Higher waste rate	Much postponement of entry and stopping-out; Large number of students with working experiences; Life-long learning
Academic standards	Broadly shared and relatively high	Variable among institutions	Different criterion of achievement
Selection	Meritocratic achievement	Additional non-academic criteria	Wholly open

In Japan, the enrollment ratio is estimated to have reached beyond 15 % as early as 1963; if we believe in Trow's model, Japanese higher education system should have passed from the elite phase to the mass one. In the 1960s, the growth of higher education was boosted by the economic and social development in the late 1950;s which had made it possible for many parents to bear the expenses of higher education for their children. This same development created increased social demand for the growth of scientific techniques and the expansion of science and engineering courses to train modern technologies.

Subsequently, corresponding changes were made within the higher education system. They included the creation of colleges of technology in 1961, combining three years of upper secondary education and with two years of university level of

vocationally oriented education. It aimed at training professional workers having a good scholastic foundation, to meet the needs of an industrial society. Together with the institutionalization of junior colleges in 1964, Japanese higher education system passed to a multitrack system, as seen in the pre-war period.

In universities, the growth of the enrolment ratio and changes in social demands resulted in the percentage distribution of students according to field of specialization in favor of the science courses (figure 11). In 1957 and in 1961, two campaigns were made in order to attract students into the science and engineering fields and new departments were created, such as electronics, nuclear energy, urban and pollution problems, urban planning and environmental engineering, and later information technology, before the dawn of the age of information.

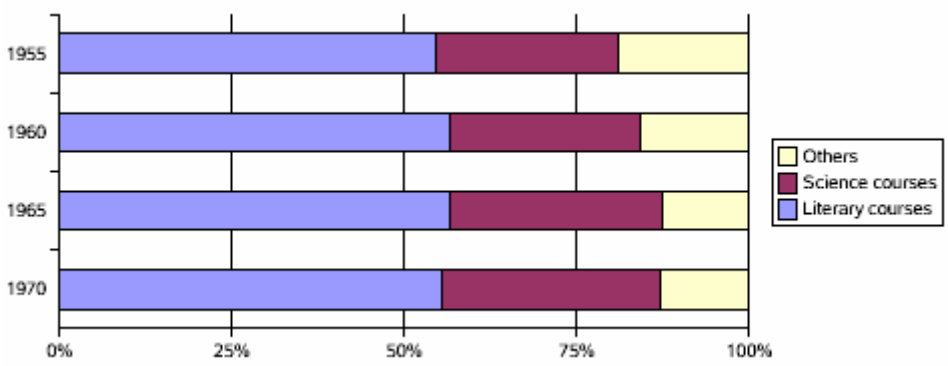

Fig. 11 Changes in the percentage distribution of the university according to field of specialization from 1955 to 1970.

However, adjustments made to the growth of higher education were not sufficient in the end, particularly in terms of physical infrastructure to accommodate students and teaching methods based on the elite system, and as seen before, it resulted in student movements in the late 1960s.

5.2 The Planned Expansion of Higher Education After 1975

The growth of higher education, which had continued through the 1960s and early 1970s, came finally to end in 1975. The rapid expansion of the scale of higher education led to a deterioration of the conditions of the educational process and to an excessive concentration of universities in large cities and consequently, regional imbalances in access to higher education.

In order to expand and improve higher education with a long-term perspective, a decade plan for higher education was formulated for the years from 1976 to 1986[(١٢)]. During this decade, the number of 18-year olds was expected to remain at the level of 1.5 million to 1.6 million. The plan envisaged improving the conditions of the

(١٢) The plan included a first phase (1976-1980) and a second phase (1981-1986).

educational process through restricting the further quantitative expansion of higher education. The plan also envisaged rectifying regional imbalances in access to higher education through restricting the establishment or expansion of institutions of higher education in large cities.

Additionally, along side the university, as a non-university higher education institution, the social training school (advanced courses) (١٣) was institutionalized, which was to offer in particular vocational training courses such as information technology, foreign languages, cookery, and so on. Special training schools have contributed to democratization of higher education through absorbing secondary education graduates who could not or did not wish to go on to a university or a junior college.

After the decade plan 1976-1986, as a rule, policies for a planned improvement of higher education were still maintained. Such policies came finally to an end in the 1990s, as seen before, in the course of structural reform of the Government.

5.3 Diversification of Higher Education Institutions and their Programs

Towards the end of 20th century, one could finally conclude that Japanese higher education reached the universal phase when the enrolment ratio of the age cohort of 18 years attained 49.1 % in 1999. I f the non-university sector is included, the enrolment ratio had already reached 50% in 1987. According to Trow's model, with a much more diversified student body, universities and other higher education institutions of universal access(١٤) should now offer courses that are less structured and more vocational or problem solution oriented in diversified components.

The 1998 report of the University Council (mentioned before) recommended the definite abandonment of the planned higher education policy and the acceleration of diversification of higher education institutions, in order to respond to increasingly changing societal needs and a more diverse student body's demands. The deregulation on the curriculum organization in 1991 and the incorporation of national universities in 2004 were both decided in accordance with the policy towards the diversification of higher education, although the latter was achieved in the process of governmental administrative reform.

After the aforesaid deregulation, curriculum reform has been implemented in almost all universities. Various types of curriculum reform have been attempted (figure 12). Most of these reforms, in principle, placed importance on general education and aimed to realize a systematic study of a subject over four years (Ministry of Education, 2004), often to the detriment of the former however.

5.4 Development of Human Resources in Knowledge –Based Society

Today knowledge is regarded as the most important asset for social development (knowledge –based society) and knowledge creation and its inheritance is the key to the development. In such an environment, the principle role of higher education is not only

(١٣) This kind of school offers secondary level education as well as tertiary level education.
(١٤) It should be noted that Trow did not mean that the forms of the prior phase would disappear after the transition from one phase to another but that each phase would survive in some institutions.

to provide learning opportunities to those having just finished secondary education, but also to offer higher learning to all people in need of knowledge and skills required by their career planning.

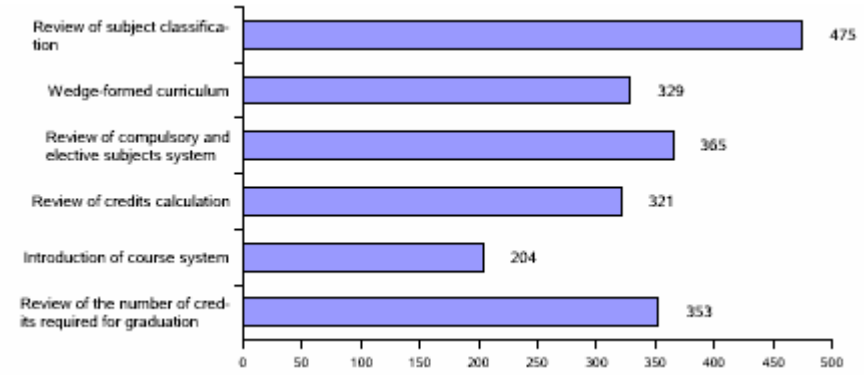

Fig. 12. Implementation of curriculum reform in universities (2001).

Due to the unprecedented advancement of science and technology in recent years, Japan has witnessed important changes in the demand for human resources. In particular, an increasingly borderless economy and progression of information technology have brought about a fundamental change in the abilities that employers are seeking in their human resources (Figure 13, Figure 14). The appearance of new vocational courses in universities is principally due to such a shift in the employment market.

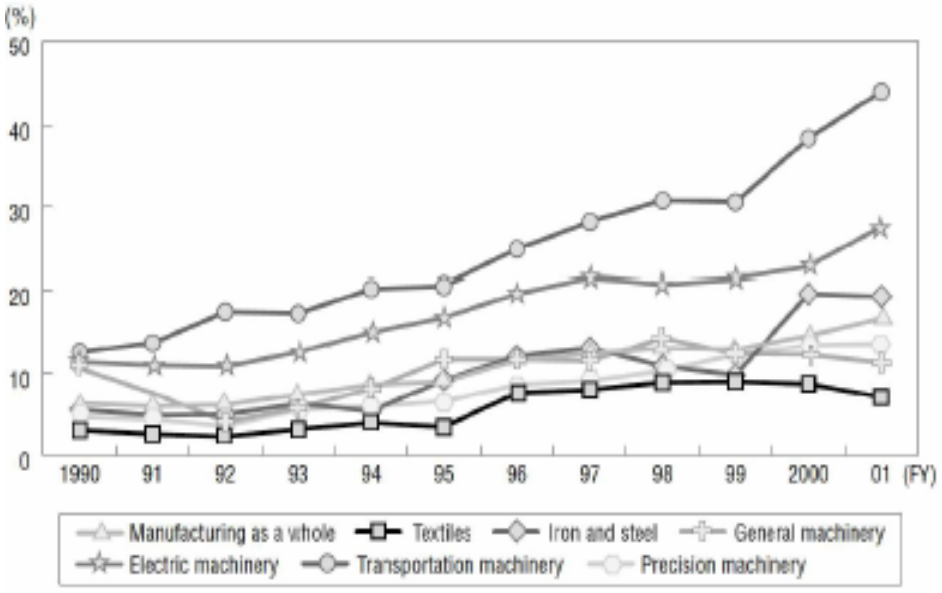

Fig. 13. Japan's foreign production ratio by industry.
Source : Ministry of Education, 2004

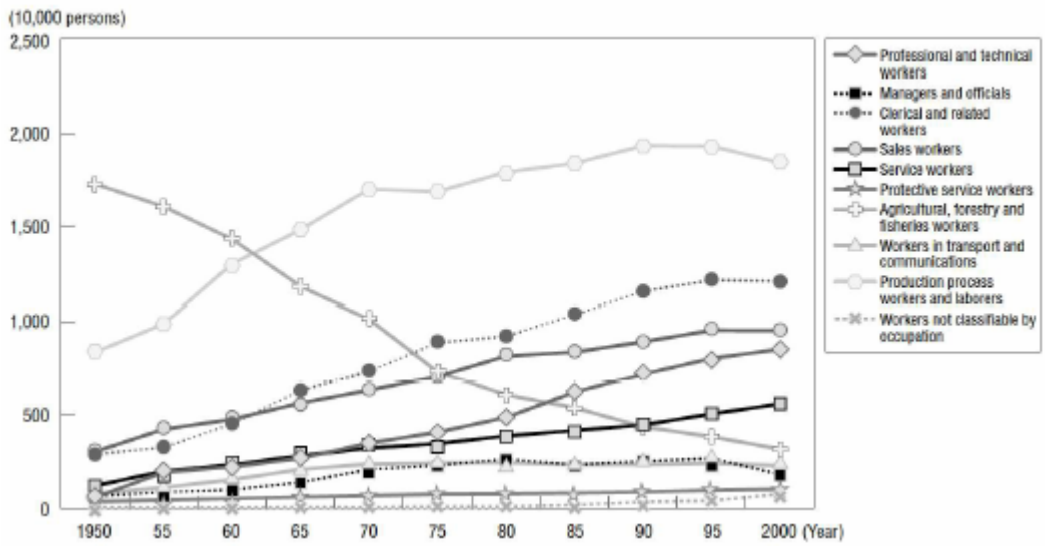

Fig. 14. Number of employees by occupational classification.
Source : Ministry of Education, 2004

From a research perspective, industry –academia co-operation has become a very important issue. Universities are increasingly required to engage in full-fledged co-operation with industry. The number of co-operative research cases by national universities and that of TLO (technology licensing office) have rapidly increased in recent years (Figure 15). The incorporation of national universities is expected to boost such co-operation.

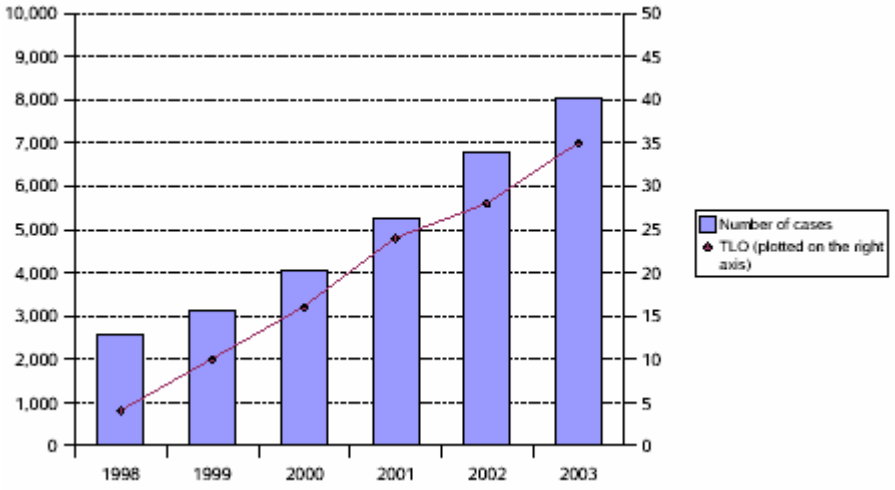

Fig. 15. Number of cases of co-operative research implemented between national universities and the industry / Number of TLO recognized by the Government.

Closing Remarks

Various factors have underlined the necessity for higher education reform. Among them, three major factors should be noted (Ministry of Education, 2004). The first is the diversification in students, due to popularization of higher education, increase in adult and international students, etc. The second is changes in the demand for human resources, due to the advent of the knowledge-based society in particular. And the third is the increased reliance of industry on academic research activities. All of these factors led to deregulation of higher education, followed by diversification of institutions and their increased autonomy.

For Japan, in order to overcome current economic and social difficulties, it is critical to prepare well-educated citizens with talents and abilities, by producing and transmitting knowledge in an excellent environment. Such a condition will be realized only through continual university reform initiated by people in universities.

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Readers interested in further reading about the reform of Japanese higher education are advised to procure author's papers cited above. They are available on his Web site: (home.hiroshima-u.ac.jp/oba/index-e.html).

(١٥) In the references list, for simplification purpose, the term "Ministry of Education" has been employed to designate the ministry in charge of education policy.

The UNDP / RBAS Project for Assessing the Quality of Education in Arab Universities: The Methods, the Findings and the Outcomes

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ABSTRACT. The UNDP/RAB 01/002 Project entitled "Enhancement of Quality Assurance and Institutional Planning at Arab Universities" was initiated and sponsored by the Regional Bureau for Arab States of the United Nations Developed Program (UNDP / RBAS) and implemented over a period of 30 months (January 1, 2002 – June 30, 2004). Its overall aim was to assist partner universities, in real academic time, in introducing, applying and demonstrating the benefits of three, internationally-based instruments of quality assurance, each of which organised as one component of the project. These are: (i) evaluation of the quality of programs, starting with the fields of Computer Science and Business Administration (Component A); (ii) testing the performance of the senior students of reviewed programs (Component B) and (iii) building comparable statistical profiles of participating universities (Component C). The project was carried out in partnership with 29 leading universities (24 public and 5 private) in 12 Arab countries (Morocco, Algeria, Egypt, Sudan, Yemen, Oman, Bahrain, UAE, Jordan, Palestine, Syria and Lebanon). Under Component A, a thorough process of program reviews involving internal and external evaluation of each program, was carried out in two successive cycles: 15 Computer Science programs were evaluated in the first cycle (2002-2003) and 16 Business Administration programs were evaluated in the second cycle (2003-2004). For this purpose, the Academic Subject Review method of the UK Quality Assurance Agency was adapted and used by the Project. Under Component B, the performance of senior students of all 31 (Computer Science and Business Administration) programs that were reviewed through the Project was tested using the Major Field Test of the American Educational Testing Services (ETS). The test was administered in English (in the spring of 2003) for those programs that use English as the medium of teaching. The students of reviewed programs that use Arabic or French as the medium of teaching were tested in the spring of 2004, using translated versions of the test that were developed for the Project by the UNESCO Beirut Office. A total of 1761 Arab senior students in these two fields sat the tests. Under Component C, a regional statistical database was developed by a group of 15 universities where detailed data was

compiled by each university on its main activities and resources ('academic programs, staff and student demographics and finances), all in accordance with common data definitions and specification. An adapted version of the statistical database model developed by the UK Higher Education Statistical Agency (HESA) and used by all British universities was employed by the project. The Project relied mainly on the appointed academic representatives of the participating universities, backed by intensive training and technical advisory support from the Project, in implementing each of its components. The adapted forms of the models used by the Project and the main findings revealed through its implementation will be outlined. The outputs of the project in terms of published regional reports, built capacities of knowledge and skills and created awareness in the area of quality assurance will be analysed. The elements of the project's second phase will be highlighted.

1. Introduction

The Higher Education Project entitled "Enhancement of Quality Assurance and Institutional Planning at Arab Universities" was initiated and sponsored by the Regional Bureau for Arab States of the United Nations Developed Program (UNDP / RBAS) and implemented over a period of 30 months (January 1, 2002 – June 30, 2004).

The project's overall aim was to assist partner universities, in real academic time, in introducing, applying and demonstrating the benefits of three internationally-based instruments of quality assurance, each organised as one component of the project. These are: (i) Evaluation of academic programs, starting with the fields of Computer Science and Business Administration (Component A); (ii) Testing the performance of the students of reviewed programs (Component B) and (iii) Developing comparable statistical profiles of participating universities (Component C).

The project was carried out in partnership with 29 leading universities (23 public and 6 private) in 12 Arab countries (Morocco, Algeria, Egypt, Sudan, Yemen, Oman, Bahrain, UAE, Jordan, Palestine, Syria and Lebanon). These are the countries that responded to a formal invitation letter that was sent in November 2001, by the RBAS Director, to all Arab ministers of Higher Education. The names of the universities and their modes of participation are shown in Table 1. It is now hoped, as the project's first phase is completed and its methodologies are better known that leading universities from other leading countries in the region, especially Saudi Arabia, will play an active role in implementing its second phase.

The project was intended as a regional collaborative service that supports and reinforces national efforts in each country (without duplicating or competing with these efforts). This is mainly achieved through launching of regional platforms for training and planning and development of regional standards of quality that promote healthy collaboration and competition across the Arab region.

Primary emphasis is placed on capacity building in that each project component is designed to be mainly implemented by the academic representatives of each university, in accordance with commonly agreed plans and methodologies. This is accompanied by intensive training, advisory and organisational support from the project and by institutional, organisational and moral support from their universities. The local UNDP

offices in the participating countries provided valuable support in processing and organising the extensive travel arrangements for the project's workshops and review missions.

Table 1: Participating Universities.

Country	University		Reviewed Programmes	Student Tests	Database Development
Algeria	1	Houwari Boumedien U for S & T	CS	CS (F)	-
	2	Oran Es-Senia U	BA	BA (F)	-
Bahrain (visited)	3	U of Bahrain	CS, BA	CS (E), BA (E)	Yes
Egypt	4	Cairo U	BA	BA (E/A)	-
	5	Arab Academy for Science & Tech.	BA	BA (E)	-
	6	Helwan U	CS	CS (E)	Yes
Jordan (visited)	7	U of Jordan	CS, BA	CS (E), BA (E)	Yes
	8	Zarqa Private U	CS	CS (E)	Yes
	9	Yarmouk U	BA	BA (E)	-
	10	Jordan U for S & T	-	-	Yes
Lebanon (visited)	11	U of Lebanon	CS, BA	CS (E/F), BA (E/F)	Yes
	12	Jinan U (private)	BA	BA (E/F)	-
	13	Balamand U (private)	BA	BA (E)	-
Morocco (visited)	14	Al-Akhawayn U (private)	CS, BA	CS (E), BA (E)	Yes
	15	Mohammed V	CS	CS (F)	Yes
	16	Abdel Malek Al –Saadi U	BA	BA (F)	-
Oman	17	Oman U	BA	BA (E)	-
Palestine	18	Al-Najah U	BA	BA (A)*	-
	19	Al-Azhar U	BA**	BA (E)	
	20	Islamic U Gaza	CS	CS (E)	Yes
	21	Palestine Polytechnic U	CS	CS (E)	Yes
Sudan	22	Sudan U for Science & Technology	CS	CS (E)	Yes
	23	Khartoum U	BA	BA (E)	-
Syria	24	Damascus U	CS	CS (E)	Yes
	25	Aleppo U	BA	BA (A)	-
UAE	26	Ajman U for Science & Tech. (private)	CS	CS (E)	Yes
Yemen	27	U of Aden	BA	BA (A)	-
	28	Sanaa U	CS	CS (A)	Yes
	29	U of Science & Technology (private)	CS	CS (A)	Yes

Abbreviations: CS: Computer Science; BA: Business Administration; E: English; A: Arabic; F: French

* Test was not administered, as test books could not be delivered to university due to imposed military restrictions.
** Review was not completed, as external review team could not enter Gaza due to imposed military restrictions.

Feedback comments received from participating academics and universities in the course of project evaluation and the results of an independent evaluation of the project's outcomes and impact that was commissioned by UNDP/ RBAS (July-December 2004) confirmed strong and unanimous support by the participating academics for:

- The project's methodologies and delivery of training and advisory support
- The use and adaptation of the three instruments of quality assurance.
- The continuation of the project's regional services under the three components and their extension to other universities and disciplines.

On the basis of these results and the recommendations of the Project's Advisory Committee (in October 2003) a second phase for the project was approved by RBAS for a minimum further period of three years. The aim of the new phase is to expand the network of participating countries and universities and to extend the project services to other disciplines.

In the sections below the methodologies and main outputs and findings of each of the three components will be outlined briefly together with an indication of the plans envisaged for their continuation into the second phase of the project.

2. Project Component A: Evaluation of Programs: Methodologies, Outputs and Main Findings

2.1 Review Cycles

This component was carried out in two cycles, each of about 15 months duration. Computer Science programs were evaluated in 15 universities during the first cycle (2002-2003) and Business Administration programs were evaluated in 16 universities during the second cycle (2003-2004).

The method of review is an adapted version of the Academic Subject Review method which was developed by the Quality Assurance Agency (QAA) in the UK and used by the Agency to review all academic programs in all UK universities during the last decade. The method consists of three stages:

- Internal review or self-evaluation of each program by its providers and submission of a Self-Evaluation Document (SED)
- External peer review of each program. .
- Final Reporting.

The three stages were translated by the project into a structured cycle of sequential and overlapping activities that included:

- Three intensive carefully spaced training / planning workshops of total of 10 working days. Each workshop is used as a multi-purpose platform for:
    - Intensive interactive training.
    - Discussion and adaptation of used model.
    - Review of progress achieved to date through group discussions and individual tutorials.
    - Planning and agreement on future project tasks and associated time schedules.

- Implementation of agreed project tasks by the representatives during the weeks and months that follow each workshop.
- Provision of intensive technical advisory support (through email and phone) to the representatives between workshops
- Review of submitted SEDs by the project consultants and provision of detailed feedback comments before final submission and approval.
- Provision of interactive training on the external review process and identification of successful candidates for participation as external reviewers in the review missions to other Arab universities.
- Formation of external review missions from QAA (UK) reviewers and qualified Arab reviewers (who act as full team members as well as language and cultural facilitators).
- Conduction of review missions in a accordance with agreed regional schedule and method.
- Production and distribution of a (confidential) detailed report on each reviewed program.
- Production and public distribution of an overview regional report on all reviewed programs.

2.2 Main Outputs and Capacity Building

- On the completion of the first cycle of Computer Science reviews, a confidential review report that provides detailed analyses of the program's strengths and weaknesses and identifies recommended lines of needed improvements was sent (February 2003) by the UNDP/RBAS Director to the university president and providers of each CS program. On completion of the second cycle of Business Administration reviews, confidential review reports were similarly sent (August 2004) to the president and program providers of each reviewed BA program.
- A dual overview regional report that is based on the outcomes of the individual reviews and evaluates the current state of Computer Science and Business Administration education in the Arab region has also been produced for public distribution throughout the region.
- A handbook that defines in details all aspects of the review process (internal, external and reporting) was prepared for the project by its training consultants who are themselves leading training and developing QAA consultants. Three successive editions of the handbook have been produced which reflect the series of adaptations that were incorporated into the model in the light of the experiences gained by the project representatives, management and consultants, in the course of implementing the two cycles.
- Sixty two academic representatives (two per university for each program) participated in all the training workshops and in the self evaluation process and in hosting the peer review missions to their universities.
- Of these 39 academics (15 from CS programs and 24 from BA programs) also

participated successfully in the external review missions to other universities, where each took part in at least one mission to a university in a different country. This is perhaps the first cohort of trained and experienced quality assurance specialists in the region.

2.3 Model Adaptation

Without affecting any of QAA model's core standards or criteria significant adaptations were introduced (mainly through three additional annexes) with the aim of:

- Accommodating the variations between the educational systems and curricular structures between universities and providing detailed guidance on the preparation of the all important Intended Learning Outcomes (ILO) document.
- Providing the reviewers with additional background data and information on each program with regard to admission, staff, students and facilities, thus informing the reviewers' expectations and understanding of the developmental conditions of each program.
- Amplifying the process of final reporting by the reviewers to ensure that each judgment is explicitly backed by the relevant factual evidence and supporting sub-judgments, thus maximising the value of the report to the providers, as a detailed, albeit non-prescriptive, guide for quality improvement and reform.

2.4 Scope of Findings

The outcomes of the two cycles and their implications for the individual programs are presented in detail, in the (already distributed) final review report for each of the 31 reviewed programs. The outcomes and implications for the region are presented in detail in the regional overview report which has been prepared for public distribution. Both levels of reporting address eight aspects of each programs as shown below under three main headings:

- Academic Standards
    - Intended learning outcomes
    - Curricula
    - Student assessment
    - Student achievement
- Quality of learning opportunities
    - Teaching and learning
    - Student progression
    - Learning resources
- Quality maintenance and enhancement

Table 2 shows a summary of the outcomes of the Computer Science cycle which includes the reviewer's judgments on the above aspects as well as their sub-judgments (indicators) on a number of underlying academic and developmental issues. No attempt will be made here to present or discuss any of these issues in detail. Only few of outcomes will be highlighted below by way of example:

Table 2: Summary of Judgments and Key Indicators

		University 1	University 2	University 3	University 4	University 5	University 6	University 7	University 8	University 9	University 10	University 11	University 12	University 13	University 14	University 15	TOTALS
	Main review judgments																
1	*Academic Standards*	A/S	A/S	A/S	A/S	A/S	A/S	A/S	A/S	A/S	A/S	A/S	A/S	A/S	UN	A/S	UN=1;A/S = 14; A/C = 0
2	*Teaching and Learning*	S	G	S	S	G	S	S	S	S	G	G	G	S	S	G	U =0; S =10; G = 5
3	*Student Progression*	S	S	S	S	U	U	S	S	S	G	G	G	S	S	S	U = 2; S = 10; G = 3
4	*Learning Resources*	U	S	U	U	S	S	U	S	S	G	G	S	U	S	S	U = 5; S = 8; G = 2
5	*Quality Assurance & Enhancement*	U	U	U	U	S	U	S	S	S	S	S	S	S	S	S	U = 4; S = 10; G =0
Indicator	Other selected aspects																
1	*Sufficiency of academic staff numbers*	U	S	U	U	U	U	U	U	U	S	S	S	U	S	G	U =9; S = 5; G =1
2	*Academic standards and rank structure of existing staff*	G	G	G	G	U	U	G	U	G	G	G	G	S	U	G	U =3; S = 1; G =10
3	*Mathematics component of curriculum*	S	S	S	S	S	S	S	S	S	S	S	G	G	S	S	U =0; S = 13; G =2
4	*MFT core areas that are covered to 70% or more**	0	1	1,2,5	1,2	1	1,2	1,2,3, 5	1	1,2,3, 4,5	1,2,3	1,2,3	1,2	1,2,3, 4,5	1,2	2	Area (Number) =1(14), 2 (11), 3 (5),4(2), 5 (3)
5	*Total % coverage of MTF curriculum***	47	37	78	63	56	74	73	55	82	81	80	84	90	66	59	Average = 71%
6	*Role and organisation of graduation project*	G	G	G	G	G	G	S	G	S	S	S	G	G	G	G	U = 0, S = 3, G = 12
7	*Number and academic quality of books and journals*	U	U	S	U	U	U	U	U	U	G	G	U	U	U	S	U = 11, S = 2, G = 2 13
8	*Library organisation and space accomodation*	S	U	U	U	S	S	U	S	G	G	G	U	U	G	G	U = 6, S = 4, G = 5
9	*Facilities and arrangements for internet access and use*	U	U	U	U	S	U	U	G	S	S	S	G	G	S	G	U = 6, S = 5, G = 4
10	*Number and Organisation of PCs*	U	U	U	U	G	S	U	U	G	G	G	S	U	G	G	U = 7, S = 2, G = 6
11	*Students copmetence in technical English*	S	S	U	U	S	U	S	U	G	G	G	S	G	S	G	U = 4, S = 6, G = 5

Notes: Abbreviations: For Academic Standards only. UN: Unapproved; A/S Approved /Satisfactory; A/C: Approved with Commendation
For Quality Assurance and Enhancement only: U: Unsdatisfactory; S: Satisfactory
For other indicators: U: Unsdatisfactory; S: Satisfactory; G: Good
* MTF curriculum core areas (Spring 2000): (1) Programming Fundamentals, (2) Software Systems, (3) Computer Organisation and Architecture, (4)Theory and Computational Mathematics, (5) Special Topics (5). See paragraph 32 of the report.
** See paragraph 32 of the report.

Flourteen out of the 15 programs were judged to be satisfactory reflecting the reviewer's confidence in their ability to continue and improve.

- No program was judged to be Satisfactory with Commendation which represents the level of excellence expected from a modern university. A quality gap that needs to be bridged by all universities is thus identified.
- The universities vary widely with respect to their readiness to bridge that gap.
- Developmental conditions under which most universities operate need urgent improvement, especially with regard to the sufficiency of available academic staff, library holdings and Internet facilities.
- Both the individual and regional reports make detailed recommendations for improvements with respect to each of the eight aspects. They also identify areas of strength to build upon. These include among other things the mathematics component in the curricula and the graduation project but above all the readiness of the academics to face up to the facts revealed by the reviews and use them as an agenda for improvement and reform.

2.5 Planned Review Activities for the Second Phase

These include the following**:**

- Reviews of programs in the fields of Education and Law which are estimated to include 25% of Arab undergraduates.
- Follow up support to reviewed Computer Science and Business administration programs with a view to supporting their efforts to improve their programs in the light of the reviews findings.
- Support of efforts by participating countries to extend the methodologies of program self-evaluation to other disciplines (through training of trainers programs).

3. Assessment of Students Performance in International Tests (Project Component B): Methodologies and Findings

3.1 Testing Cycles

The performance of the senior students of the reviewed (Computer Science and Business Administration programs) in their respective fields of study was assessed using the Major Field Test of the Educational Testing Service (ETS) in the USA. This is a two hour multiple choice test which is sat annually by large number of American and international students. The objective of this component is to:

- Enable objective comparisons of student achievement within region and with international standards of student performance.
- Independently validate and complement the outcomes of program review

The test was administered in two cycles:

- In the first cycle (spring of 2003) it was administered in English to 788 senior students of Computer Science (in 9 universities) and of Business Administration (in 8 universities).
- In the second cycle the test was administered in Arabic and in French to 921

senior students of Computer Science (in 6 universities) and Business Administration in 9 universities. The Arabic and French versions of the test were produced for the project by the UNESCO Beirut Office, in collaboration with the project management and university representatives. .

3.2 Methodology

The main reasons for choosing the MFT include:

- It is a psychometric objective multiple choice test.
- Its topics (with their relative weights) are updated periodically by ETS and represent the common core of what is taught at main American universities.
- ETS provides each institution with the results of its individual students together with a statistical analysis for its whole group of international test takers. It also provides each institution with the analysed results for the whole international group of participating students and institutions.
- The test results also enable comparison of performance by sub-topics.
- By organising the test administration on a regional scale the project can analyse the results for the whole group of participating Arab universities, thus enabling comparison of performance between universities and with international standards.
- The outcomes of the test can be compared with the outcomes of the program reviews and enable shedding new light on some of the main issues.

The tests were administered in accordance with a regional schedule. A workshop was organised where the ETS Manual was discussed in detail. A set of test administration guidelines were agreed, published and followed by all universities. In addition to strict adherence to the ETS Manual these guidelines ensured that:

- Each test was monitored by an independent test observer, appointed by the project from the local UNDP or UNESCO Office, who also handled all matters related to test security.
- Student test takers were admitted in accordance with lists of students authorised in advance by the project.
- Demographic information on students was adapted to suit Arab systems of education.

3.3 Main Outputs and Scope of Findings

The test results were sent by ETS simultaneously to each university and to the project.

The results of the English-based first cycle of tests were discussed with the universities.

A detailed regional overview report has been produced by the project for wide regional distribution. The results of the second cycle of tests (Arabic and French-based) were only recently received from ETS. As this was the first time the tests were produced and administered in Arabic and French special software had to be developed for scanning the answer sheets and added analyses had to be carried out to identify any language or cultural bias.

The regional report on the first cycle provides detailed comparisons of performance between the Arab universities and also between the whole Arab group and the whole international group of test takers. The latter group consisted of 3029 students from 133 institutions (for Computer Science) and 24715 students from 359 institutions (for Business Administration). The comparative analyses cover overall performance as well as performance in sub-topics which included three sub-topics for Computer Science and eight for Business Administration. Figure 1 provides one illustrative example of these results. (Other figures will be shown in the presentation.). The following features will be noted from Figure 1:

- The distribution of grades for the Arab group of Computer Science students is fairly normal.
- The A+ and A grades are strongly depleted, as if students with A + and A potential are delivering B performance and those with B potential are delivering C performance.
- This down shift is consistent with the quality gap identified by the reviewers.
- Given the conditions under which most Arab universities operate these results are encouraging as both the test results and the reviews identify areas that have significant potential for improvement.

3.4 Planned Testing Activities in the Second Phase

The feedback responses from the university representatives showed strong and unanimous support for the testing component and its implementation on a regional scale and especially for conducting and publishing comparative regional analyses of the test results. Apart from one sub-topic Business Administration (Legal and Social environment) very little cultural bias was detected or reported by the universities. The plans for the second phase include:

- Arabic and French versions of the MFT in Education and Law (Criminal Justice) will be produced.
- The test will be administered to students of reviewed programs in these two fields.
- Follow up support will be provided to programs in Computer Science and Business Administration who took measures to improve the performance of their students in the light of their analyses of the previous tests. This may include second administrations of CS and BA MFT tests.

4. Statistical Database Development

4.1 Objectives and Cycle of Implementation

The objective of introducing this instrument of development is:

- To enable, through a regional collaborative effort, the development of validated and updated statistical database profiles of the main resources and activities (programs, student and staff demographic and finances) of [participating universities, in accordance with commonly agreed (and internationally-based) data definitions and specifications.

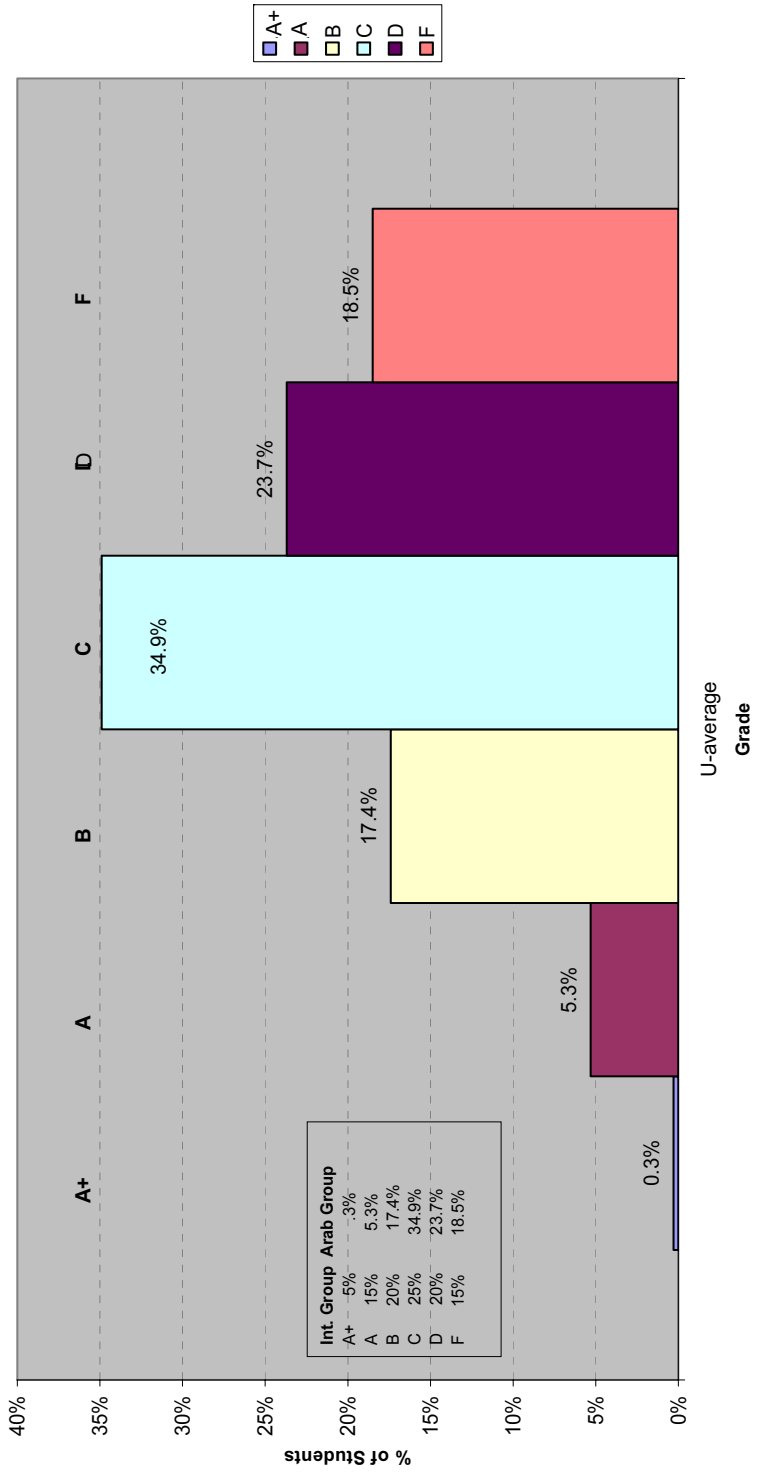

Fig. (1): Computer Science English-based Tests
Distribution of scores for Arab test-takers by grade
(Spring of 2003: 374 students from 9 universities)

To enable Arab higher education and university planners and researchers to compare (through the use of international indicators) the statistical profiles of the universities with each other and with international norms and identify aspects of imbalance, weakness or strength.

- To promote the culture and practice of information transparency and public accountability within the Arab higher education community where universities are committed to providing the public with validated up to date data on their activities, programs and resources.

As a result of the challenges encountered in launching this initiative for the first time in the region and given the diverse systems of data handling and management among the different universities, it was decided to concentrate on full implementation of one cycle of development (rather than two) to the full required standards and with a view to ensuring that experience will provide a solid foundation for expanding the network of universities during the second phase.

This was done with the participation of 15 universities (Table 1). A regional database was developed in 14 tables (on programs, students, staff and finances) with each regional table representing a combination of 15 similarly structured sub-tables, one from each university. The regional database will be made available to all participating universities, where each is referred to in the database by number to ensure confidentiality. A regional report summarising the methodologies and main findings that are revealed by the developed will be publicly distributed.

4.2 Methodology and Capacity Building

The adopted model is that developed by the Higher Education Statistical Agency in the UK (HESA) which compiles updated validated data on all UK universities in accordance with common specifications and definitions. All UK universities are obliged to provide HESA with this data as part of their funding requirements and their public accountability.

A number of adaptations were introduced through the project which ensured that:

- Some of the data definitions were modified to accommodate differences of systems and special needs of Arab universities. For example academic ranks and staff categories were modified. The teaching language used in each program was added as a variable.
- Interface tables were introduced by the project as important preparatory tasks. These required each university to match each of its departments to the appropriate database Cost Centre and each of its programs to o the appropriate database Subject Area. Once completed, this enabled the university to compile all needed data within its own system of departments and programs before projecting the whole compilation onto the regional database system of Course Centres and Subject Areas.

Apart from intensive training and progress reviews (which included public discussions and individual tutorials) that were enabled by the component's (two) workshops, all representatives were provided with continuous advisory technical support (through email and phone) at all other times by the project HESA consultant

and the project management.

Twenty representatives are assessed to have acquired the full experience of successful database development thus providing the region and the project with a valuable resource for future development. Further, the fully documented adaptations and data compilations provide a solid foundation to build on in the new phase..

4.3 Scope and Examples of Findings

The findings revealed by the complied data on the sample of participating universities will be presented in detail in the regional report on this component. Few examples will be highlighted here:

Student Population

- The total student population of the 15 universities increased from 452,000 in 2000-2001 to 485000 in 2001-2002, a 7.3 increase.
- The size of universities vary widely between 1000 and 106, 000 with an average of 32,300 (compared to 16,500 in the UK). (This gives a rough estimate of 937 thousand for the total student population of the project's 29 participating universities)

Modes and levels of Learning

- Part time students are less than 1%, to be compared with 40% in the UK. This SSR indicates little opportunities for flexible modes of learning (e.g. distant, extended and life-long learning).
- First degree undergraduates amount to 83% of all students with only 5% post-graduates at Masters Level and 1% at doctorate. 11% study at sub-degree level (diplomas). In the UK 23% are post-graduate.

Subject Areas

- 29% of all undergraduates study Science , Engineering and Medicine compared to 40% in the UK
- Only 1% study fine arts.
- 46% of undergraduates study three subjects only: Law, Education and Business Administration.

Student Staff Ratios (SSR)

- SSR values are reasonable in the medical, science and engineering fields (of the order of 20:1)
- High SSR values prevail in other fields (of the order of 60:1), reflecting major shortages of staff in social and human sciences.
- Popular fields (IT and Business Administration) also suffer from high SSR values. (Similar evidence was reported by the program reviews). On the whole about 70% of Arab undergraduates suffer from staff shortages.
- Need for much increased investment in higher education (Similar recommendations

were made by the program reviewers)

4.4 Planned Database Development in phase 2:

- Expand database network, in stages, from 15 to 45 (leading) universities
- Add new data variables that are of interest to Arab planners.
- Make use of built capacities (experienced representatives) to support training and development in the new phase.