Higher Education Reform: Challenges towards a Knowledge Society in Malaysia

AKIKO KAMOGAWA*

ABSTRACT
The Malaysian government regards highly skilled human capital as the nucleus of a knowledge-based economy and has been attempting to reform higher-educational policies in both the public and private sectors since the mid-1990s. The research reported here seeks to evaluate higher-educational policy reform as it relates to the development of human resources in an era of information and communication technologies (ICT).

This research has three goals: first, to determine how Malaysian higher-educational policies have changed by looking at socioeconomic backgrounds; second, to examine case studies of the Malaysia Multimedia University (MMU), Malaysia National University (UKM), and University Malaysia Sarawak (Unimas); and third, to discuss whether ICT is affecting access and course selection in higher education in terms of gender equality.

The analysis reported here concludes that the new challenges facing Malaysia offer possibilities not only for bridging the digital divide, in some aspects, nationally, but also for Malaysia to emerge as fundamental to a South-South Corporation and as a Center of Excellence internationally. It will be pointed out how, and to what extent, the government of Malaysia should reconceptualize the Malaysia Super Corridor project (MSC)

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in order to become a fully developed nation, equipped as a knowledge society.

**Introduction**

The Second Global Knowledge Conference, hosted by the Malaysian government and the Global Knowledge Partnership, was held in Kuala Lumpur, Malaysia, from 7 to 10 March 2000. At this conference, Prime Minister Mahathir Mohamed made it clear that less-developed countries should not expect aid from developed countries, and he reported that Malaysia was going to move towards a knowledge-based economy by means of Malaysia’s Strategic Initiative One (SI1). In addition, Azzman Shariffadeen, serving as Secretary of the National Information Technology Council (NITC), noted at the forum that the government intended to upgrade the educational system in Malaysia in order to create a Malaysian workforce that will be better educated than their foreign, skilled knowledge-worker counterparts.

The Malaysian nation’s Vision 2020 (*Wawasan 2020*) promotes a paradigm shift from an economy based on labor-intensive and lower-end manufactured products to an economy based on knowledge as part of the process of becoming a fully developed nation. Prime Minister Mahathir Mohamed first referred to the Malaysia Super Corridor (MSC) on presenting a bill in Parliament; he announced the MSC concept publicly in August 1996 after launching the National IT Agenda (NITA). The MSC begins at Kuala Lumpur City Center (KLCC), in the world’s tallest twin towers, and ends at Kuala Lumpur International Airport. Between the two landmark towers are Putrajaya, the new Malaysian administrative capital, and Cyberjaya, the headquarters of the Multimedia Development Corporation (MDC), which constitutes the administrative body of the MSC.

**Smart Schools (Sekolah Bestari)**

Seven flagship applications are expected to constitute the main operations of the MSC: Electronic Government (E-Government), Smart Schools, Telemedicine/Telehealth, Electronic Commerce (E-Commerce), R&D Cluster, E-business, and Technopreneur Development. Several pieces of legislation have been amended and enacted, including the Digital Signature Act of 1997, the Computer Crimes Act of 1997, the Telemedicine Act of 1997, the Copyright (Amendment) Act of 1997, and the Communications and Multimedia Act of 1998, to facilitate this development.

As for education, the Ministry of Education conceptualized the Smart School (*Sekolah Bestari*) Project in 1997, when it revealed “The Malaysian
Smart School — A Conceptual Blueprint.” The four objectives of the Smart School Project are:

(a) emphasis on maturity of thought, application of information technology, and assimilation of high-minded values;
(b) proficiency in science and mathematics;
(c) enhancement of performance according to individual capabilities; and
(d) contribution to the development of knowledge.

The Ministry of Education and Telekom Smart School Sdn. (TSS) lead the Smart School projects, which involve government (national) schools and government-aided (national-type) schools at the secondary level. There are three pilot projects being implemented under the Smart School initiative: Teaching-Learning Materials, Assessment Systems and Management Systems, and Smart School Integrated Solutions (SSIS). After the implementation of the pilot project during the Seventh Malaysia Plan 1996-2000, the Smart School project involved a total of 90 schools, including nine newly constructed schools. These schools were equipped with state-of-the-art multimedia/computing equipment and were provided with comprehensive teaching and learning materials in four subject areas, *Bahasa Malaysia*, English, science, and mathematics (Malaysia 2000: 373).

Furthermore, the Malaysian government has presented the Smart School Project with some new challenges. For example, in 2002, it was stated that mathematics and science classes must be taught in English from primary schools. The Prime Minister-cum-Finance Minister, Mahathir Mohamad, announced a RM5 billion allocation to implement the teaching of Science and Mathematics in English in schools for a period of seven years from 2002 to 2008 to Parliament in his 2003 budget presentation on 20 September. For 2002 and in 2003, a sum of RM978.7 million would be spent from this RM5 billion programme.

The Malaysian language (*Bahasa Malaysia*) or Malay language (*Bahasa Melayu*) has previously been used as an instruction medium in schools. Since independence in 1957, the Malay language has been a compulsory subject for primary and secondary school and then in 1970 the Malay language was introduced as the medium language to standard 1 students. Finally, Malay became the language of instruction at all school levels and universities in 1983. It is significant for educational development to teach science and mathematics in English because it will create the human resources to meet IT market needs locally. It is also important that there be Malaysian human resources with English proficiency to face the era of globalization. However, there is still a considerable argument over educational policy related to language policy. The Malaysian government
has to preserve the mother tongue and culture of the Malay, the Chinese, the Indian, and the other indigenous peoples. Nevertheless, standard 1 students need to learn Malay language as the medium of instruction, English as second language, and the other languages, including Chinese and Tamil, as a third language at primary schools.

**Historical background of higher education**

Ever since the Federation of Malaya gained independence in 1957, the Malaysian education system has been developing so as to unify the nation-state and to promote economic growth. The Education Act of 1961, which followed educational reform efforts such as the Razak Statement of 1956 and the Rahman Talib Report of 1960, has governed the modern education system in Malaysia. These educational reforms correlated with socioeconomic conditions. In the early 1970s, the New Economic Policy (NEP 1971), or Bumiputera Policy, was implemented. The NEP aimed to bring about a better balance in enrollment among the different ethnic groups in Malaysia.\(^1\) It resulted in a steady increase in the number of Bumiputera students in Malaysian universities. Furthermore, since the early 1970s, the Malaysian government has sought to make more effective use of the nation’s Malay human resources in the process of economic development, and the percentage of Malay students at every educational level has increased steadily.

Basically, the Malaysian education system follows a 6-3-2 structure, with six years of primary school, three years of lower secondary school, and two years of upper secondary school (see Appendix 1). Eleven years of basic education are provided to all citizens. However, the higher-education system has been limited to the elite citizens of the country. Performance in the public examination, known as the SPM (Sijil Pelajaran Malsyaia/Malaysia Certificate of Education), which is taken after the eleventh year of school, determines whether five Form students can enter post-secondary education (matriculation, or six Form). Until the mid-1990s, the Malaysian government encouraged students to study overseas in the U.K., the U.S., Australia, or Japan.

The first phase of the establishment of public universities started in 1969 under the Universities and University Colleges Act. During this time, Universiti Sains Malaysia (USM 1969), Universiti Kebangsaan Malaysia (UKM 1970), Universiti Pertanian Malaysia (UPM 1971), and Universiti Teknologi Malaysia (UTM 1975) were established (see Table 1). Moreover, four public universities were established during the second phase (from

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\(^1\) **Bumiputera** literally means “the sons of the soil” in Malay. It includes the Malay and other indigenous peoples in Malaysia.
Table 1
Public Universities in Malaysia

<table>
<thead>
<tr>
<th>Establishment</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>Universiti Malaya (UM)</td>
</tr>
<tr>
<td>1969</td>
<td>Universiti Sains Malaysia (USM)</td>
</tr>
<tr>
<td>1970</td>
<td>Universiti Kebangsaan Malaysia (UKM)</td>
</tr>
<tr>
<td>1971</td>
<td>Universiti Pertanian Putra Malaysia (UPM)</td>
</tr>
<tr>
<td>1975</td>
<td>Universiti Teknologi Malaysia (UTM)</td>
</tr>
<tr>
<td>1983</td>
<td>International Islamic University Malaysia (IIUM)</td>
</tr>
<tr>
<td>1984</td>
<td>Universiti Utara Malaysia (UUM)</td>
</tr>
<tr>
<td>1992</td>
<td>Universiti Malaysia Sarawak (Unimas)</td>
</tr>
<tr>
<td>1994</td>
<td>Universiti Malaysia Sabah (UMS)</td>
</tr>
<tr>
<td>1997</td>
<td>Universiti Pendidikan Sultan Idris (UPSI)</td>
</tr>
<tr>
<td>1999</td>
<td>Universiti Institut Teknologi Mara (UiTM)</td>
</tr>
<tr>
<td>1993</td>
<td>Kolej Universiti Teknologi Tun Hussein Onn (KUiTTHO)</td>
</tr>
<tr>
<td>1999</td>
<td>Kolej Universiti Sains dan Teknologi Malaysia (Kustem)</td>
</tr>
<tr>
<td>2000</td>
<td>Kolej Universiti Teknikal Kebangsaan Malaysia (KUTKM)</td>
</tr>
</tbody>
</table>


the 1980s to the early 1990s): International University Malaysia (IIUM), Universiti Utara Malaysia (UUM), Universiti Malaysia Sarawak (Unimas), and Universiti Malaysia Sabah (UMS) (see Table 1).

It can be found that the number of universities had been limited for four decades. However, the Malaysian government regards highly skilled human capital as the nucleus of a knowledge-based economy and has been attempting to reform higher-educational policies in both the public and private sectors since the mid-1990s. The research reported here seeks to evaluate higher-educational policy reform as it relates to the development of human resources in an era of information and communication technologies (ICT).

This research has three goals: first, to determine how Malaysian higher educational policies have changed by looking at socioeconomic backgrounds; second, to examine case studies of the Malaysia Multimedia University (MMU), Malaysia National University (UKM), and University Malaysia Sarawak (Unimas); and third, to discuss whether ICT is affecting access and course selection in higher education in terms of gender equality nationwide. In conclusion, the future direction of the Malaysian case, including some of the challenges it faces, will be shown.

**Socioeconomic Impacts on Higher Education in the Era of ICT**

The Sixth Malaysia Plan 1991-1995 (1991) did not refer to information technology in “Progress 1986-90” or in Chapter 5 of “Prospectus 1991-
95,” entitled “Education and Training.” It was not until the Seventh Malaysia Plan 1996-2000 (1996) that information technology in education and training was mentioned, and even then the plan stated only that computer literacy and computer-assisted teaching and learning programs would be extended to all schools and training institutions over the following five years (1996-2000). No further projects were discussed in the Seventh Malaysia Plan. It was noted that the use of computers in educational and training institutions would enhance the teaching and learning processes and help to overcome the shortage of trained teachers and instructors in several subjects, including languages (Malaysia 1996).

The Malaysian population has been estimated as being 22,229,040 (July 2001). The Malaysian government has recognized the necessity of a workforce with first degrees in scientific and technical fields. There have been fewer science-stream students than arts-stream students at the secondary level; science students represented only 25.7 percent of the total number of students in 1998, well below the targeted 60:40 science-to-arts ratio (Malaysia 2000: 124). At present, although the overall level of educational attainment has improved, the percentage of those in the labor force with tertiary education is still small, at 13.9 percent, which is lower than that of many newly industrialized economies (NIEs) (Malaysia 2001).

**Higher educational reform and the roles of private universities in the mid-1990s**

In the mid-1990s, four educational acts were implemented: the Education Act of 1995, the 1995 Amendments to the University and University Colleges Act of 1971 (1995 Amendments to the UUCA 1971), the Private Higher Education Institutions Act of 1996 (PHEIA 1996), and the National Council on Higher Education Act of 1996 (NCHEA 1996). With the implementation of the Private Higher Education Institutions Act of 1996, the private sector increased its involvement in providing tertiary education (Malaysia 2001). The Act allowed private institutions of higher education and foreign universities to establish franchises and degree courses. In particular, private-sector universities were encouraged to offer science and technology courses in order to increase enrollment at higher-educational institutions and to produce a greater number of highly skilled graduates (Malaysia 1998: 122).

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2 The National Council was expected to play a role as the main governing body of higher-educational institutions, including the public and private sectors, to establish guidelines and rules and to maintain the quality of higher education.

3 There were three branch campuses of foreign universities until 2000: Monash University Malaysia (MUM 1998); Curtin University of Technology, Sarawak (1999); and the University of Nottingham in Malaysia (UNiM 2000).
Table 2
Private Universities in Malaysia

<table>
<thead>
<tr>
<th>Establishment</th>
<th>Name</th>
<th>Main campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>Universiti Telekom/Multimedia University (MMU)</td>
<td>Cyberjaya &amp; Malacca</td>
</tr>
<tr>
<td>1997</td>
<td>Universiti Tenaga Nasional (Uniten)</td>
<td>Bandar Sri Iklandar, Perak</td>
</tr>
<tr>
<td>1997</td>
<td>Universiti Teknologi Petronas (UTP)</td>
<td>Kajang</td>
</tr>
<tr>
<td>1999</td>
<td>Universiti Tun Abdul Razak (Unitar)</td>
<td>Kelana Jaya</td>
</tr>
<tr>
<td>1999</td>
<td>International Medical University (IMU)</td>
<td>Bukit Jali &amp; Seremban</td>
</tr>
<tr>
<td>1999</td>
<td>Universiti Industri Selangor (Unisel)</td>
<td>Shah Alam</td>
</tr>
<tr>
<td>2001</td>
<td>Open University of Malaysia (Unitem)</td>
<td>Kuala Lumpur</td>
</tr>
<tr>
<td>2002</td>
<td>Malaysia University of Science and Technology (MUST)</td>
<td>Kelana Jaya</td>
</tr>
<tr>
<td>2002</td>
<td>Universiti Tunku Abdul Rahman (Utar)</td>
<td>Petaling Jaya</td>
</tr>
</tbody>
</table>


Six private universities, Malaysia Multimedia University (MMU), Universiti Tenaga Nasional (Uniten), Universiti Teknologi Petronas (UTP), Universiti Tun Adbul Razak (Unitar), International Medical University (IMU), and Universiti Industri Selangor (Unisel), began offering degree-level courses in engineering, business studies, medicine, and multimedia. Since that time, the number of private universities has increased, as seen in Table 2. IT-focused universities from both public and private sectors, such as Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM), Multimedia University, and Universiti Tenaga (Uniten), operate in the MSC (see Table 2). Their challenging cases will be examined as follows: the case studies of the Malaysia Multimedia University as the newly established core university of MSC at first; second, the Malaysia National University as the traditional university which might have some difficulties in attempting the new challenges; and third, University Malaysia Sarawak (Unimas) which shows a need for distance learning because of its location on the island of Borneo.

Case Studies

*Malaysia Multimedia University (MMU) as a pioneer*

Malaysia Multimedia University (MMU) was established as the core institution of the MSC in July 1996, and was the first private university to be given accreditation by the government. MMU has two campuses that offer faculty in several fields: technology, IT, creative multimedia, and adminis-
tration at the Cyberjaya Campus in the MSC; and technology, information science technology, business, and law at the Malacca campus. There are 9,000 undergraduate and post-graduate students, including foreign students from 31 countries (e.g., Brunei, Sudan, Bosnia, Malawi, Tanzania, India, Sri Lanka, Bangladesh, Indonesia, Turkey, China, Thailand, and Guinea) enrolled in MMU. MMU uses English as the language of instruction.

The Center for Multimedia Education Development (CMED) began operations in 1997, with the aim of providing a “one-stop solution center” for the entire campus of MMU. An integral component, located in Cyberjaya, it incorporates all the aspects of software engineering, including software development, consultation, and resource training, that are available to its students. The Distance Education Center established its distance learning program in 1998. Students can obtain a Bachelor of Management degree and can take selective subject programs through the distance learning center; 41 online courses (122 credit hours) are offered which comprise university subjects, foundations, core management subjects, management majors, and three elective subjects.

MMU also has an e-learning campus, an online virtual campus. The e-learning campus consists of affordable university credit programs and professional courses, such as a Bachelor’s degree in e-business (first intake December 2002), a Diploma in IT (May 2003), and a Certificate in English Language Proficiency (May 2003). Other programs and courses to be introduced include a Bachelor’s degree in IT and Master’s degrees in Business Administration and Corporate Training (including business communication, image enhancement and professional etiquette, and negotiation skills).

Knowledge-Campus (K-Campus) projects of Universiti Kebangsaan Malaysia

Not only newly established universities, but also the nine historical universities (public universities established before 1994) conduct IT-related projects. All nine public universities have embarked on open- or distance-learning programs (Siowek-Lee and Rinalia 1998). Universiti Kebangsaan Malaysia (UKM, Malaysia National University), one of the most prestigious universities in Malaysia, formed a special ICT committee to implement the blueprint of ICT projects and established the Faculty of Information

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4 This refers to the address by the President of Multimedia University, Ghauth Jasmon, on the Web site. According to a speech by Prime Minister Mahathir Mohamad at the official opening of the Multimedia University at Cyberjaya, on 9 July 1999, 100 international students from Asia and Africa are studying at MMU.
Science and Technology in 1994.\(^5\) In addition, UKM administers the K-Campus projects; K-Campus services are divided into two categories, ICT education services and ICT management services.

There are five main K-Campus projects: e-learning, intellectual knowledge archiving (IKA), global community support services (GCSS), virtual network for research and development resources (VNRDR), and virtual campus communication network (VCCN) (Aziz 2003). Well-established Web pages, called \(e\)-pelajar (e-students) and e-UKM, offer e-learning content to students, as well as official materials to staff, administrators, and external clients; some Malay pages are not yet translated into English.

**Distance learning: the case of Unimas, Sarawak**

University Malaysia Sarawak (Unimas), which is not located on the Malay peninsula but on the island of Borneo, established its Faculty of Information Technology in 1993. By July 1994, the faculty offered undergraduate programs in software engineering, information systems, internetworking technologies, computational science, and interactive multimedia. There were 34 students at the undergraduate level and a few at the post-graduate level in 1994; by July 1995, the first Master’s students in IT graduated from Unimas. The computational science program was introduced during the 1995-96 academic year; the joint program in cognitive science, offered by the Faculty of Cognitive Science and Human Development and the Faculty of Information Technology, began in 1996.

Unimas, in collaboration with Kolej Latihan Telekom (Telekom Training College), has begun offering diploma programs in multimedia (business and computing) and in multimedia technology, which have been accredited by the Lembaga Akreditasi Negara (National Accreditation Board) (1 March 2000). Moreover, the Network Multimedia Education System (NMES) was launched in October 2002. The e-learning lab (Faculty of Information Technology) in Unimas is connected with Penang, Sabah, Sarawak, Kuantan, and MMU at Cyberjaya, Selangor through video conferencing. Unimas initiated the E-Bario project, which constitutes a government project to promote ICT awareness and usage. The E-Bario project provided computers and Internet access to schools that became community centers for learning (Malaysia 2000: 366).

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\(^{5}\) UKM provides 12 faculties: Applied Health Sciences, Business Management, Dentistry, Economics, Education, Engineering, Information Science and Technology, Islamic Studies, Law Medicine, Science and Technology, Social Sciences, and Humanities.
Discussion: From the Gender Perspective

Many ICT challenges are being met in both public and private institutions of higher education, and these institutions are offering a variety of ICT-related courses to Malaysian and international students. At the same time, the challenges presented by ICT are having social and cultural implications, as discussed below.

Access and course selections

First, higher education reforms toward a knowledge society are affecting access and social selection with respect to ethnic and gender equality. Educational policy implemented since 1969 has provided educational opportunities to a less privileged population, the Bumiputera. Government policy can have an effect on aspirations and, thus, the demand for higher education. This has clearly been the case in Malaysia, which is both an Islamic and a multicultural country made up of the Malays, Chinese, Indians, and indigenous peoples. The implementation of the New Economic Policy (NEP) in 1971, or Bumiputera Policy, attempts to bring about a better balance in enrolment among the various ethnic groups and has led to a steady increase in Bumiputera students in Malaysian universities.

The government of Malaysia has encouraged Bumiputera students to pursue science courses in particular. According to the National Economic Recovery Plan, in addition to maintaining the Bumiputera/non-Bumiputera ratio of 55:45, the Ministry of Education (MOE) is to ensure that at least 55 percent of Bumiputera students are enrolled in science and technology fields of study at institutions of higher learning (Malaysia 1998:123). This mandate is in response to the growing need for highly skilled human resources, both to encourage economic growth and to unify the nation, following its independence in 1957.

Female Malaysian students earn better grades, in general, than do male Malaysian students. Yet, female Malaysian students have experienced difficulties in obtaining higher education in the past. Structural and attitudinal barriers to the equitable participation of women at the highest educational levels have existed during the last few decades (Aminah 1998:25). Hence, their past underrepresentation was not a result of their inability but rather their cultural backgrounds. As some scholars (Jamilah 1992; Aminah 1994; Fatimah and Aminah 1994; Jamilah 1994; Kamogawa 2003b) have noted, the stereotypical Malaysian way of thinking is that arts and teaching fields are suitable for women and that science and technology fields are suitable for men. Consequently, Malaysian female students have had a tendency to choose art and educational courses.
Nevertheless, the number of female university students has increased steadily since the 1970s. In fact, there were more female students than male students at the university level in the year 2000 (see Table 3). One of the reasons for this seems to be that the Bumiputera policy has, thus, enhanced educational opportunities for female Bumiputera students to enter higher education. Since the early 1970s, the implementation of the NEP has resulted in a steady increase in the numbers of both male and female Bumiputera students. In other words, the Bumiputera policy has contributed to the advancement of Malaysian women by giving them enhanced educational opportunities.

Equally important, the Bumiputera policy has thus enhanced educational opportunities for female Bumiputera students to enter courses of study in the sciences. Many female students have obtained (or have been granted) opportunities to study in the science fields as a result of the Malaysian government’s emphasis on meritocracy recently, as part of its effort to push Malaysia into becoming a fully developed country by the year 2020. In fact, the percentages of female university students (first-degree course) in various areas of study in 1998 were: arts, 68.2 percent; economics, business, and administration, 64.0 percent; civil law, 54.5 percent; science, 56.1 percent; arts education, 66.9 percent; science education, 66.9 percent; agriculture, 43.7 percent; and engineering, 26.6 percent. Female students with high educational achievements will meet the government’s needs in the near future.

With regard to ICT fields, Malaysian male students are more likely to choose ICT courses in tertiary education than are female students. There are no specific data covering the whole country of Malaysia that show the ratios between male and female students in ICT fields; however, the figures in Table 4, for example, indicate that male students have a greater interest in ICT fields than do female students at UPM. The Institute for Distance Education (IDEAL) at UPM, which was established in 1995, offers a technology degree course leading to a Bachelor of Computer Science via distance learning. IDEAL is the first program in Malaysia to

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6 In the Prime Minister’s speech on Women’s Day 2002, it was mentioned that there were more female students in local universities than male students. (Utusan Malaysia “M: Wanita mungkin tentukan hala tuju negara” 2002/8/26, The Star “Women may set pace” 2002/8/26).

7 Apart from higher educational institutions, it is reported that the provision of dormitories for women and the increase in the number of technical and vocational educational institutions generated greater access of these institutions to women (Aminah 1998:27).

Table 3
Number and Percentage of Female Students 1970-2000

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>6,728,398 (47.3)</td>
<td>975,419 (48.6)</td>
<td>1,190,411 (48.6)</td>
<td>1,425,889 (48.6)</td>
</tr>
<tr>
<td>Lower secondary</td>
<td>155,641 (41.1)</td>
<td>386,865 (47.8)</td>
<td>468,802 (49.7)</td>
<td>620,296 (49.5)</td>
</tr>
<tr>
<td>Upper secondary</td>
<td>35,298 (39.5)</td>
<td>115,562 (46.7)</td>
<td>184,931 (51.2)</td>
<td>365,396 (52.4)</td>
</tr>
<tr>
<td>Post secondary</td>
<td>6,363 (33.8)</td>
<td>26,606 (45.5)</td>
<td>41,962 (58.2)</td>
<td>45,071 (66.5)</td>
</tr>
<tr>
<td>Colleges</td>
<td>30,582 (46.2)</td>
<td>39,688 (47.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities</td>
<td>2,513 (29.1)</td>
<td>9,363 (35.5)</td>
<td>26,198 (44.9)</td>
<td>118,945 (56.2)</td>
</tr>
</tbody>
</table>


Table 4
Student Enrolment by Program and Gender (Institute for Distance Education: IDEAL, UPM)

<table>
<thead>
<tr>
<th>Programmes</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS (Human Resource Development)</td>
<td>155</td>
<td>63</td>
</tr>
<tr>
<td>Bachelor of Computer Science</td>
<td>211</td>
<td>122</td>
</tr>
<tr>
<td>Bachelor of Education (Guidance &amp; Counseling)</td>
<td>774</td>
<td>539</td>
</tr>
<tr>
<td>Bachelor of Education (Teaching of Malay)</td>
<td>1021</td>
<td>649</td>
</tr>
<tr>
<td>Bachelor of Education</td>
<td>355</td>
<td>756</td>
</tr>
<tr>
<td>Total</td>
<td>2516</td>
<td>2129</td>
</tr>
</tbody>
</table>


be delivered entirely via the Internet. Among the students in the Bachelor of Computer Science program, 37 percent, or 122 out of a total of 333 students, are female (Siowek and Rinalia 1998).

However, other research shows that more and more female upper-secondary students have preferences to choose IT-related universities and fields (Kamogawa 2003a). According to Sugimoto’s interview with MMU (2003), there are as many female students as male students in MMU. It is not necessarily concluded that the ratio of female students in the distance-learning institutions, as opposed to the brick-and-mortar institutions, increased. Apparently, the number of computer and peripheral equipment operators as well as clerical jobs has increased since the 1990s. It is pointed out that female workers have new opportunities in the computer professions, such as system analysts and programmers at the middle level (Cecilia et al. 1992). The new trend on the labour market in 2000s is likely to cause the increase of female students in higher education.
Employment

The changing structure of the Malaysian economy is an important determinant of the demand for higher education which informs students’ access and course selection. Therefore, expanding and upgrading higher education towards generating educated manpower, especially in the fields of science and technology, determines the quantity and orientation of higher education. Furthermore, the Malaysian government has sought to make more effective use of the nation’s female human resources in the process of economic development since the early 1970s. The percentage of female students at every level has increased steadily, and Malaysian female students have better opportunities to work in management or the professions. The participation of women in the formal sector of the labor force increased from 38.9 percent in 1970 to 62.9 percent in 1990, with the majority of women being concentrated in low-salaried and semi-skilled jobs in the manufacturing sector and in “feminine-related fields” such as clerical, teaching, and nursing services, amongst others (Fatimah and Aminah 1994:40-41).

Employment in the clerical group more than doubled between 1975 and 1987. There has also been dramatic growth in occupations associated with computerization, including programmers, during this period. The creation of new jobs has opened up new opportunities for women in mid-level computer professions, which has prompted female students, in turn, to seek higher education. However, these changes have also created gaps between the more highly skilled and less-skilled female workers. Male workers, generally, have received more benefits from computerization (Cecilia et al. 1992).

In the Eighth Malaysia Plan 2001-2005 (2001), it is clear that the government of Malaysia regards female human resources, as well as the country’s youth, as important contributors to the nation’s development objectives (Malaysia 2001:16). It is projected that the demand for workers in core ICT occupations, such as hardware engineers, software engineers, systems analysts, computer programmers, and technical support personnel, will increase from 108,000 in 2000 to 181,600 in 2005 (Malaysia 2001:382). These projections are part of the impetus to encourage more women to pursue nontraditional fields of study, such as science, engineering, and vocational and technical education, at higher levels; however, higher education in technological and engineering fields is still male dominated. One of the quickest ways for the government of Malaysia to meet the demands for human resources and move toward a knowledge society is to make better use of more Malaysian women as highly skilled and as multiskilled workers.
Conclusion

Malaysian higher education reform is progressing rapidly because the government needs to develop highly skilled human resources locally to enable the nation to move toward a knowledge society, in the era of ICT. Malaysian public universities had been traditionally restricted to the elite; however, they began to be corporatized in the mid-1990s. Private universities have taken on more important roles in expanding enrollment and maintaining the quality of higher education in science and technology related to ICT. According to the Eighth Malaysia Plan 2001-2005, more ICT and related engineering courses will also be introduced at both public and private institutions of higher learning. It is said that a total of 122,910 students will be enrolled in these institutions by 2004, mainly at the diploma and bachelor’s degree levels; the private sector’s involvement in the provision of ICT education will continue to be significant, as 71 percent of total student enrollment is in private institutions (Malaysia 2001:383). Multimedia University remains one of the pioneering universities in the ICT-centered fields (see Appendix 2).

Additionally, the MSC should be more substantively contextualized, both nationally and internationally, by way of preparation for the analysis of higher education reform and conversion. Nationally, the demands for computer and Internet access are still increasing among women. Internationally, the experiences of Malaysia will be useful, from a gender perspective, to other developing nations, especially Islamic countries where traditional attitudes and values that militate against higher education for women still exist (although the number of female students in Islamic countries has been increasing). The analysis reported here concludes that the new challenges facing Malaysia offer possibilities not only for bridging the digital divide in aspects of gender and ethnicity, nationally, but also for being a strong move towards gender parity in higher education, internationally.

As compared with the IT strategies of other nations in the ASEAN (Association of South East Asian Nations), such as IT2010 of Thailand, the ICT policy Framework of Indonesia, and IT21 of the Philippines, it seems clear that the MSC of Malaysia is emerging as a successful strategy. In spite of that, there remain some serious challenges to higher education with respect to this success, in that the MSC has not been expanded throughout Malaysia, as has been noted by Mohamad Ariff Nun (Senior Vice-President, Multimedia Development Corporation of Malaysia). According to Mohamad Ariff Nun, the government of Malaysia has been experimenting with the MSC as a development plan in just one area, rather implementing it nationwide. He has emphatically noted that the enrollment rate in higher education has increased, and that this
necessitates a greater effort on the part of the Malaysian government to continue to upgrade university education in order to train more human resources. The existing policy has the potential to create a digital divide between rural areas and urban areas, in that some schools would be equipped with computer networks and some schools would not.

Once the MSC has been expanded to a nationwide project, the government of Malaysia will be poised to become an educational center of excellence (pusat kecemerlangan pendidikan), according to Najib Tun Razak, the Minister of Education (Dewan Masyarakat, 1998). Moreover, the Government of Malaysia is expected to provide the basis for south-south cooperation in the era of information and communication technologies. Therefore, Malaysian institutions of higher education, both public and private, will need to play important roles in developing such vital projects as distance learning and e-learning.

References

AHMAD, AMINAH

ARiffin, Jamilah
1994 Reviewing Malaysian Women’s Status, Kuala Lumpur: Population Studies Unit, Faculty of Economics and Administration, University of Malaya.

ASIA NETWORK RESEARCH

DERAMAN, Aziz B.

DEawan Masyarakat

HAMIid DON, Fatimah and Aminah Ahmad

KAMOGAWA, AKIKO
2003a “Gender Roles and Career Choices of Upper Secondary Students: Field Study

Furthermore, he implied that MSC should develop globally, including into the Middle East, the U.S., Japan, Australia, Africa, and Europe. International Conference “IT and International Corporation,” Japanese government, UNDP and World Bank, 3-4 July in Tokyo.

**2003b**


**LEE, MOLLY N.N.**

**2001**


**MALAYSIA**

1991


1996


1997a


1997b

*The Malaysian Smart School — A Conceptual Blueprint.*

1998

*Malaysia National Economic Recovery Plan: Agenda for Action*, WENCOM.

1999


2000

*The Third Outline Perspective Plan 2001-2010.*

2001


**CECILIA NG CHOON SIM AND JAMILAH OTTHMAN**

1992


**SIDIN, ROBIAH**

1996?


**SUGIMOTO, HITOSHI**

2003


**SIOWEK-LEE GAN AND RINALIA ABDUL RAHIM**

1998


**TAN AI MEI**

2002

Web Sites

Department of Statistics
http://www.statistics.gov.my/

Loo Seng Piew
The Smart School MSC Flagship Application of Malaysia: Possibilities For Commercialisation By MSC Status Companies
http://el.usm.my/academic/sploo/smart.htm

Malaysia Super Corridor

Multimedia University
http://www.mmu.edu.my/

Multimedia University Center for Multimedia Education Development
http://www.mmu.edu.my/~cmed/

Multimedia University Distance Education Center
http://www.mmu.edu.my/~cirde/

Multimedia University E-learning Campus
http://e-univ.mmu.edu.my/

Prime Minister’s Office of Malaysia
http://www.smpke.jpm.my/website/webdb.nsf/?Opendatabase

University Malaysia Sarawak
http://www.unimas.my/en/

Unit Pemodenan Tadbiran dan Perancangan Pengurusan Malaysia
http://www.mampu.gov.my/
Appendix 1

Educational System in Malaysia

<table>
<thead>
<tr>
<th>Age</th>
<th>Primary</th>
<th>Lower Secondary</th>
<th>Upper Secondary</th>
<th>Post Secondary</th>
<th>Higher Education</th>
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</tbody>
</table>

- National Schools
- National-Type Chinese Schools
- National-Type Tamil Schools

R: Remove Class  ▼: Level 1 Assessment (PTS)  ◼: Primary School Achievement Test (UPSR)
■: Lower Secondary Assessment (PMR)  ●: Malaysia Certificate of Education (SPM)
□: Malaysia Certificate of Education (Vocational) (SPMV)  □: Malaysia Higher School Certificate (STP)

Appendix 2

Information and Communications Technology Prospects, 2001-2005

Towards becoming a developed nation with a knowledge-based society, the strategic thrusts for the development of ICT will include:

- Positioning Malaysia as a major global ICT and multimedia hub;
- Upgrading and expanding the communications infrastructure to increase accessibility throughout the country as a means of bridging the digital divide;
- Enhancing human resource development in ICT to increase the supply of highly skilled and knowledge manpower;
- Promoting e-commerce and enhancing its use to enable Malaysia to compete more effectively in the global market;
- Fostering local capabilities in creative content development;
- Rolling out the MSC flagship applications to further provide the momentum for the development of the MSC;
- Nurturing a critical mass of ICT-based SMEs; and
- Promoting R&D activities on soft factors of ICT and Information Age developments that affect individuals, organizations and societies.

Source: Malaysia 2000:379-80