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(as of 14 February 2000)

PROJECT PROPOSAL

ASEAN VIRTUAL UNIVERSITY OF SCIENCE AND TECHNOLOGY (VUST)

Jointly prepared by:

The Engineering Working Group, composed of
The Association for Engineering Education in Southeast Asia and the Pacific (AEESEAP)
The Federation of Engineering Institutions of Southeast Asia and the Pacific (FEISEAP)
UNESCO Regional Informatics Network for Southeast Asia and the Pacific (RINSEAP)
The Association of Universities of Asia and the Pacific (AUAP)
The Asian Institute of Technology (AIT)
The National University of Singapore
The University of the Philippines
The University of Malaya
Chulalongkorn University
Thailand Graduate Institute of Science and Technology (TGIST)

And

The Science Working Group, composed of
UNESCO Regional Network on Microbiology
UNESCO Regional Network on Chemistry of Natural Products
The Southeast Asian Mathematical Society
Asian Physics Education Network
The Nanyang Technological University, Singapore
Thailand Graduate Institute of Science and Technology (TGIST)

Project Title: ASEAN Virtual University of Science & Technology (VUST)

Problem to be addressed

The economic and monetary crisis that hit ASEAN nations in 1997 and 1998 has been affecting higher education and R&D in respective countries. Universities in the region have been suffering from government budget cuts and a decrease in other sources of funds. Equipment procurement and personnel development activities (e.g., scholarships, attendance in international and regional meetings and training courses) are becoming increasingly difficult. At the same time, technology advances have provided new opportunities for effective learning and collaborative R&D. In order to optimise limited funds and to make use of new technological opportunities, universities are to strengthen the solidarity among them through networking. The project proposes an Information Technology based networking rather than traditional networking or university twinning . The long-term goal is to establish a virtual university of science and technology (VUST), which is envisioned initially as a network of universities in ASEAN and later, even beyond. The VUST will have two components, one in engineering and one in sciences.

Background, problem analysis and justification

2.1 Background

The economic crisis that affected the region in the past two years, after decades of relative prosperity, has led ASEAN to face the new millennium with uncertainty and diminishing global competitiveness. Human resource development is viewed as a key factor for the reversal of the downward slide, and for propelling it towards sustainable development and prosperity. To properly prepare the ASEAN workforce to function effectively in the emerging knowledge-based economy, the leading component of human resource development efforts should focus on development of scientific and technological manpower. While this task should primarily be done by various institutions in individual countries of ASEAN, the present environment and resources for doing so are inadequate. However, cooperation among them should lead to synergistic results not attainable by the individual institutions separately.

The strategy of networking of universities is not new to ASEAN. It has already embarked on a university networking scheme through its ASEAN University Network (AUN). However, since the lead universities in science and technology in the region are not necessarily the same as those now participating in the AUN, and AUN's concerns are of a broader nature than science and technology education alone, an initiative such as the VUST would be valuable in addressing the urgent problem of human resource development in science and technology. The VUST would then complement the activities of AUN.

Among the current initiatives in ASEAN that are expected to be implemented by the AUN, the Sub-Network on Higher Engineering Education (SHEED-Net) is relevant to this proposal for a VUST. SHEED-NET was proposed by the Japanese government, and was among those highlighted in the Obuchi Plan unveiled at the ASEAN Informal Summit in Manila in November 1999. While it is also a university networking scheme for addressing higher engineering education, the focus of SHEED-Net is on mainstream university education for engineers, and its proposed methodologies are in the traditional forms of inter-university cooperation, such as exchange of faculty and researchers, acquisition of degrees by young faculty, and collaborative research. On the other hand, VUST seeks to pursue and facilitate programmes in non-traditional IT-based asynchronous learning, promote lifelong and continuing education for practising engineers, scientists, science teachers, develop iinteractive teaching and learning tools and resources, and meet other training needs of S&T human resources that are outside the mainstream of university programmes. In this sense, the activities of SHEED-Net and the Engineering component of VUST would be complementary.

New advances in information and distance-learning technologies have made possible the VUST concept of synergistic cooperation in a cost-effective manner on an unprecedented scale. It is therefore

important to make use of the new opportunities made available by this development, in order to strengthen the scientific and technological manpower through cooperation among the institutions in the ASEAN region which share common needs.

2.2 Problem Analysis and Justification

Problem Analysis

As more and more applications are created and as the internet infrastructures further develop in individual countries, it seems reasonable to expect that such applications can be shared by schools in the region and indeed throughout the world under a suitable framework. It would be a pity if indeed this did not follow as a natural extension or a desired objective of present regional cooperation activities.

One other major problem that needs to be addressed is the lack of coordination and lack of real in-depth cooperation between universities in the ASEAN region, especially in the field of science and technology. Universities in this region would almost always seek cooperation and linkage with universities in developed countries like the United States, Australia and Japan, rather than universities in the region. While this is necessary and convenient in most cases, it deprives the possibility of sharing experiences and knowledge which are regional in nature. In cooperating only with Western countries, we also experience the brain drain and resource drain. This drain on the ASEAN human resources is expected to escalate as economic growth becomes heavily based on knowledge-intensive industries.

Regionality

The proposal relates to regional networking among key universities and R&D/S&T institutes engaged in human resource development in the region.

Participation

At the level of project implementation, all ASEAN member countries have shown interest in participating in the project, based on the endorsement of the 38th Meeting of the ASEAN Committee on Science and Technology in Singapore, 27-29 October 1999. However, it is to be realistically expected that not all member countries can identify universities who can be among the lead institutions. This does not preclude them from participating in the programmes and courses to be implemented by the VUST, and reaping full benefits from the project.

At the level of project proposal development, using the platform of ASEAN-UNESCO cooperation, two working groups have been organised to provide the depth of intellectual input and breadth of experience in IT-based science and technology education necessary for conceptualising the project. Participation from the following have been initially expressed:

Engineering component:
Key engineering universities and institutes in all ASEAN countries
Regional engineering non-governmental organizations
Association for Engineering Education in Southeast Asia and the Pacific (AEESEAP)
Federation of Engineering Institutions of Southeast Asia and the Pacific (FEISEAP)
Association of Universities of Asia and the Pacific (AUAP)
The Asian Institute of Technology
Thailand Graduate Institute of Science and Technology
UNESCO Regional Networks

Science component:
Key science universities and institutes in all ASEAN countries
UNESCO Regional Networks

At a later stage, the network may be expanded to accommodate the participation of universities from non-ASEAN countries in Asia.

Beneficiaries

Universities
Training and Research Institutes
Industry
Government

Commitment and sustainability

Commitment of the participating institutions and sustainability of the project can be assured by leveraging on current programmes which are already receiving allocations of national and regional resources. Among the strategies to be adopted by the project are:

Complement ASEAN University Network (AUN) activities. To this end, UNESCO has already initiated consultations with the Executive Director of the AUN, who responded positively to the idea.
Adopt current IT-based activities and infrastructure in key universities in ASEAN countries.
Align with mutual recognition initiatives among APEC member countries.

Possible Solutions

Recent developments in Information Technology (IT) enables university activities to be linked on the Internet in the delivery of IT-aided science and technology education, distance education, database sharing, library network, internet conferences and training courses. Its potential also enables virtual and collaborative R&D. In other regions (North America and Europe), IT-aided science and technology education and distance education are becoming popular and gradually replacing conventional teaching methods. IT-aided education is the world trend. If the ASEAN does not take any action, universities in ASEAN countries, individually, will certainly purchase course materials developed by universities in other regions. To acquire IT-aided education materials from elsewhere is one thing but to "jointly" produce and disseminate (including tutors training) the materials is another issue and is more important to enhance the solidarity among universities in the region.

The ASEAN VUST is envisioned to operate as a consortium of universities offering services and performing other functions. Effective cooperation is made possible by; information technology and distance learning, which can deliver instruction and self-learning materials to students effectively in the fashion of the open university. The virtual university learning and instructional model is designed around the use of interactive multimedia courseware and state-of-the-art telecommunication systems. Key instructional design components include: independent study, on-line interaction and virtual classrooms, simulated laboratory exercises and technical information library. In science and engineering education, an IT-enriched environment provides for one of the best interactive learning experiences.

The solution to the problems stated above is not easily achieved because the full range of technological advances is not a local product of this region. The knowledge accumulated is far from being self-sufficient in propelling development. To lessen this problem, universities in the region should start to cooperate in the science and technology education and help each other to upgrade S&T higher education in member countries. Mobility of professionals, students and academics should be encouraged. Upgrading of science and engineering programs should be promoted in order to attain competitiveness in the global market.

Collaboration should start from existing strength. Many universities as well as R&D and S&T agencies in the region have already started using modern information technology and telecommunications for

their teaching, learning and research activities. Within our present understanding of technologies and education, the proposed VUST would be able to reach and educate more people, and thus would be cost-effective in the long run. Resources, efforts and information could be shared even though the degree of development may be different. Effort by member universities should be complementary to begin with and a cost-sharing concept should be incorporated.

Objectives

General Objectives

This project aims to improve the quality of science and technology education in the region by pooling and facilitating access to regional resources. This goal may be achieved through the following lines of action:

Foster partnerships and solidarity among ASEAN universities in providing borderless science and technology education and human resource development.
Encourage the use of modern enabling technologies such as information technology in the light of the life-long learning concept.
Enhance and complement existing national science and technology programs.
Facilitate resource sharing among universities in the region.
Facilitate upgrading of science and technology programs in non-leading universities in the region.
Facilitate international mobility of science and technology professionals, students and staff.
Promote the science and technology profession in the region.

Specific Objectives of the Engineering Component

To establish a consortium of leading engineering universities in the ASEAN region;
To set up a network of engineering libraries;
To develop course materials for a few pilot programmes;
To implement a few pilot programmes in continuing engineering education;
To identify mechanisms for financially sustainable operations of the VUST;
To develop jointly with the Science component a longer-term action plan based on results of pilot programmes.
To establish jointly with the Science component a VUST website as platform for public relations efforts and information dissemination.

Specific Objectives of the Science Component

To establish a consortium of leading science universities in the ASEAN region;
To set up a regional virtual science teaching resource centre;
To develop course materials for a few pilot programmes;
To implement a few pilot programmes in professional enhancement of science teachers;
To identify mechanisms for financially sustainable operations of the VUST;
To develop jointly with the Engineering component a longer-term action plan based on results of the pilot programmes.
To establish jointly with the Engineering component a VUST website as platform for public relations efforts and information dissemination.

Success Criteria

At the end of the project, the following success criteria will have been met:

1. A consortium of lead universities in the field of science and technology, in information technology and in distance education in ASEAN countries shall have been established.
Pilot training programmes in continuing education of professional engineers and of science teachers would have been organized.
A number of professional engineers and science teachers from the region would have successfully completed the pilot training programmes
A virtual science teaching resource centre would have been established.
Engineering libraries of the consortium of lead universities would have been organized into a network.
A wider vision to expand the activities of the project from distance education to other modes of networking would have been developed. These other modes include, but are not limited to:
Virtual conferences, seminars and workshops
Joint R&D
Library network
Electronic publication of newsletters and periodicals
Continuing engineering education for practising engineers
A VUST website would have been put up.

Outputs

Engineering component

The engineering component of the project will deliver the following outputs:

E1. A consortium of engineering universities and R&D/S&T agencies operating under a memorandum of agreement signed by relevant authorities
E2. An agreed mechanism for financially sustainable operations and firm commitments by the participating institutions
E3. 3(?) IT-aided continuing engineering education courses on offer by the participating institutions
E4. At least 100(?) professional engineers who have received training under the pilot continuing engineering education program of the VUST
E5. A linked-up region-wide engineering library network

Science component

The science component of the project will deliver the following outputs:

S1. A consortium of science universities and R&D/S&T agencies operating under a memorandum of agreement signed by relevant authorities
S2. An agreed mechanism for financially sustainable operations and firm commitments by the participating institutions
S3. 3(?) IT-aided continuing education courses for science teachers being offered by the consortium
S4. At least 100(?) science teachers who have received training under the Science pilot programs of the VUST

S5. A virtual regional science teaching resource centre

Joint outputs

Jointly, the Engineering and Science components will deliver the following outputs:

J1. A wider and long-term vision for expansion of services and programmes offered by the virtual university network and an accompanying plan of action for implementation in terms of:
Infrastructure development: manpower, hardware, software, support and services
Content
Accreditation
Pedagogical issues
Costing

J2. A regularly updated VUST website

Indicative work plan

Please see attached tables on Outputs and Schedule of Activities.

Management and Implementation arrangements

At the project development stage, two working groups have been established comprising members from regional science and engineering non-governmental organizations, UNESCO regional networks in science and engineering and leading universities in the region, specifically those with top-level science and engineering faculty, as well as experience and resources in IT-aided and distance education programmes. Membership in the working groups are not exclusive.

The working groups will have a series of meetings to develop the project concept and draft a detailed proposal for submission to donor agencies. The ASEAN Secretariat and UNESCO Jakarta Office jointly coordinate the meetings of the working groups.

Progress of the working groups shall be regularly reported to the ASEAN Committee on Science and Technology (COST) through the Sub-Committee on S&T Infrastructure and Resources Development (SCIRD). COST as the sponsoring ASEAN body will exercise monitoring and oversight functions on the project proposal preparation.

At the project implementation stage, COST will be the interim executing agency until the VUST Consortium has been established. To handle project activities prior to the establishment of the VUST Consortium, an interim Project Management Committee consisting of potential members of the Consortium, COST, the ASEAN Secretariat, UNESCO and AUN shall be formed.

Members of the consortium will be identified through endorsements of relevant authorities of the member countries. Once the Consortium has been established and the MOA signed, the VUST Steering Committee (VUST-SC) will be set up to provide overall management and guidance on the implementation of activities and delivery of outputs of the project. The VUST-SC shall be composed of representatives of the Consortium universities, COST, the ASEAN Secretariat and UNESCO. The AUN shall be represented as observer, with the right to speak, in the VUST Steering Committee.

Academic staff of key Consortium universities will be responsible for day-to-day operations of the project.

Budget and funding arrangements

The initial stage of project conceptualisation and proposal development is being supported by seed funding from UNESCO.

It is proposed that the basic budget for the initial phase of operation be funded from allocations by donor governments including those from ASEAN countries, Japan, Australia, New Zealand, the European Union, USA and Canada, and donor agencies and institutions such as the ASEAN Foundation, as well as cost-sharing among the participating institutions. This proposal has been

packaged in such a way that donors who wish to support the project partially can easily extract an appropriate module for a specific project output.

At the later stage of full implementation, the VUST should have in place mechanisms for financial sustainability. The first programmes to be implemented are continuing engineering education courses and professional enhancement courses for science teachers. The target group of the continuing engineering education courses are practising engineers who would like to re-tool or upgrade their competencies, and as such are capable of paying their own way. Fees, based upon a mutually agreed schedule, will also be collected from the science teachers who enrol in the professional enhancement programmes. The income derived from course fees will start the momentum of revenue generation activities for the VUST. Other sources of income aside from direct student fees are royalties from institutional users of VUST programmes and courseware, and sale of teaching resources.

In the long run, participating institutions are expected to gain from VUST activities in terms of increased visibility, prestige, industrial linkages and registration fees for courses and other educational services. They are expected to make counterpart contributions in cash or in kind (hardware and software) to VUST under a mutually agreed guideline. Private donors, especially industrial partners, will be invited to make appropriate contributions. Corporate membership programs may also be established, in which private companies can either give general contributions or subscribe to specific programs such as on-site practical consultancy and continuing engineering education. Likewise, private, for-profit academic institutions may also wish to subscribe to consultancy services such as curriculum design and development and professional enhancement programs for science teachers.