1-1-2008

Educational Innovation in an International Setting

E.A. De Jong
UNESCO-IHE Institute for Water Education

De Jong, E.A., UNESCO-IHE, The Netherlands
Educational Innovation in an International Setting

E.A. de Jong

UNESCO-IHE Institute for Water Education
E-mail: e.dejong@unesco-ihe.org

ABSTRACT

How to make innovations in education at an Institute of Higher Education with a target audience from 60 different countries and as many different educational backgrounds? This paper discusses the educational innovations at UNESCO-IHE Institute for Water Education in Delft, The Netherlands. This UN institute, located in The Netherlands, offers Master and PhD programmes to mainly people from developing countries and countries in transition. Because of its UN-status and its special target group it is different from regular universities. To keep abreast of new technologies and educational developments, and to keep its programmes attractive for prospective students, the institute has initiated a complex process of educational innovations. More flexible learning routes for the students, more joint programmes with other universities in the world, a more learner centred approach and more e-learning are key elements of these innovations. The reasons why and the methods of, are discussed and described from the point of view of the students, the lecturing staff, and from an institutional perspective.

Keywords: Flexibilisation, joint programmes, learner centred approach, international programmes

UNESCO-IHE INSTITUTE FOR WATER EDUCATION

UNESCO-IHE, located in The Netherlands, is the only institute within the UN-system that offers fully accredited MSc programmes. The institute offers water resource policy, management, engineering and science issues in a wide variety of contexts – urban, rural and natural environments; in national and transboundary geographic settings. (Annual report 2006).

The main target groups of the institute are water professionals from developing countries. It is an international institute with students from all over the world, each with a different educational and cultural background. Although the basic principles of engineering and science are common all over the world, the content of the educational programmes is geared towards the problems in developing countries, and is aimed at connecting students to international research and contextualising local issues within global concerns.

UNESCO-IHE continues the work that was started in 1957 when IHE first offered a postgraduate diploma course in hydraulic engineering to practicing professionals from developing countries. In November 2001, UNESCO's 31st General Conference decided to make IHE an integral part of the Organisation. By March 2003, the necessary treaties and agreements between the IHE Delft Foundation, UNESCO and the Netherlands Government were signed, allowing for the entry into operation of the new UNESCO-IHE Institute for Water Education. UNESCO-IHE is governed by a thirteen-member Governing Board appointed by the Director General, and is managed by a Director and Deputy Director, both of whom are UNESCO staff members. The institute currently has 145 fulltime-equivalents staff members of which 54% are academics and 46% supporting staff.

The institute offers the following educational programmes:

- PhD programme with a duration of 4-5 years;

- 4 Master programmes, with a duration of 18 months;
- Short courses:
- regular modules, part of the Master programmes, but open for interested people;
- tailor made courses: special courses for specific target groups;
- refresher courses for alumni;
- 15 on line courses for professionals working in public and private institutions, NGOs, and academic institutions.

This paper will mainly focus on the innovations in the Master programmes.

CURRENT SITUATION MASTER PROGRAMMES

Institutional Set Up

Target groups

The target groups for all educational programmes of the institute are mid-career professionals from developing countries or countries in transition. The entry requirements are a bachelor degree, at least three years of relevant working experience and sufficient scores for English proficiency test (TOEFL 550 and IELTS 6.0 or higher). These target groups make the institute unique and therefore differs a lot with many regular universities in the world.

The interest in the programmes is high. Annually the number of applicants for the Master programmes exceeds by far the number of participants. This is due to the fact that the number of participants is completely dependent on the number of available fellowships (table1). These fellowships are received from many different donors, a.o. the Dutch government.

Table 1: Number of applicants and participants Master programmes 2003-2007
(source: Annual reports UNESCO-IHE)

	Applicants	Participants	Africa	Asia	L-America	M-East	Other	Female	Male
2003	1219	192	70	85	20	8	9	33	159
2004	1711	223	68	103	20	26	6	55	168
2005	1648	193	79	70	14	20	10	48	145
2006	1350	202	88	67	19	18	10	62	140
2007	1435	155	68	56	14	6	11	85	70

Programme structure: modular set-up

The Master programmes are set-up according to a modular structure. During the first year students follow 14 prescribed modules of their chosen specialisation. Each module has a duration of three weeks, is concluded with an examination, and has a study load of 5 ECTS. During the second year students spent 6 months (36 ECTS) on an individual research project, leading to a thesis.

After successful completion of all modules and the thesis examination students are awarded an MSc degree.

Accreditation

As the institute is hosted by the Dutch government, the Master programmes are accredited according to Dutch accreditation standards. This means that the Master programmes are implemented according to the criteria for university level master degrees as set out by the Netherlands Flemish Accreditation Organisation (NVAO). In the audit report of this organisation several remarks were made, which

amongst other circumstances, triggered the educational innovations as described in the following paragraphs.

Global developments

There are several indicators why higher education institutes, including UNESCO-IHE, should innovate their education to keep pace with the developments in the world.

Firstly there is a massification of higher education. There are increasing enrolments especially in China and India (Altbach 2007a). In China, higher education enrolments rose from 6.4 million in 1998 to more than 23 million in 2005 (Dunrong 2007). The demand for higher education has never been that high. Also UNESCO-IHE sees an increase in the number of applications for its educational programmes. Education is a public good, but is also seen as a private right to improve one's personal situation. Generally spoken, being higher educated means often a better life.

Grow of the knowledge based economies. Higher education becomes a more and more important driver for the knowledge economies of many countries. Universities play an important role in integrating information, training and research. Scientist of different disciplines have to work together to find integrated solutions for existing and emerging problems. (Altbach and Peterson 2007). Engineers will spend more and more time in international collaborations. This has important implications for the way universities offer a global perspective and an international dimension in their programmes (Borri et al 2007). Internationalisation is important, and goes beyond teaching in English, and to staff and student exchange within Europe only.

Expansion of the information technology. The nature of teaching and learning are being transformed through distance education and the use of technology in traditional classrooms (Altbach and Peterson 2007). Management has been influenced in many ways. A very visible aspect of information technology is the increasing massive storage of information.

However developing countries risk to be further marginalized in a competitive global knowledge economy because their education and training systems are not equipping learners with the skills they need. To respond to the problem, policymakers need to make crucial changes. They need to replace the information-based, teacher-directed rote learning provided within a formal education system governed by directives with a new type of learning that emphasizes creating, applying, analysing, and synthesizing knowledge and engaging in collaborative learning throughout the lifespan. (TechKnowLogica 2003)

Institutional challenges

As the institute's environment is dynamically changing, it is essential to grow along and to adapt the educational programmes in order to maximise the student learning experience. The ability for graduates to adapt quickly and effectively to a continuous stream of emerging challenges is crucial nowadays.

As stated in the strategic plan of 2007 'UNESCO-IHE wishes to serve as a standard setting body for post-graduate water education and life-long professional training.' Employers of water professionals expect their staff to continue learning throughout their professional lives to keep abreast with the latest knowledge and skills in the water sector. This was also stated in the audit report of the NVAO 'graduates need to have learning skills which allow them to continue to study in manner that maybe largely self-directed or autonomous.' (NVAO, 2006)

A Master degree nowadays is not the end station of a long learning process, but is a hallmark in a continuous process of cumulative knowledge gathering. This has serious implications for the way the

institute has to educate its students. As is stated in the Dublin descriptors (2004) graduates of university level master degree should:

- have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with Bachelor's level, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research3 context;
- be able to apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study;
- have the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments;
- be able to communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously;
- have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.

Pure knowledge transfer is not enough anymore. For life-long learners and global citizens it is also essential to be trained in solving problems themselves, to think independently, to have an critical attitude and to be able to communicate with people from other disciplines and other cultures.

OBJECTIVES

Realising the changes in the world and the changing demand from students and employers, serious thought was given on how to cope with this. Upon recommendation of an internal advisory committee on innovation, the institute has started a process where the education programmes will have the following key components:

1. Greater flexibility – education at UNESCO-IHE will provide greater flexibility with regard to access, content, breadth, depth, and duration of programmes, means of delivery and examination. This will involve a new approach to curriculum development taking into account interdisciplinarity and flexibility of choice, but in a coherent system which allows for modularisation and credit transfer.

2. More attention to Life Long Learning – education at UNESCO-IHE will provide opportunities for higher learning and for learning throughout life. The shift from teaching to learning implies self-regulated learning and a coaching role for the lecturer. It will also lead to a new definition of scholarship, balancing discovery and transmission as well as the integration and application of knowledge.

3. Innovative delivery – education at UNESCO-IHE will adopt new approaches for the packaging of information for course delivery. Modern ICT will have a major role in this, resulting in a in a fundamental restructuring of the ways in which teaching and learning objectives are delivered. UNESCO-IHE will place a high a value on this by ensuring that staff is adequately trained and that leaning spaces are redesigned.

4. Teaching and research – education at UNESCO-IHE will be more underpinned by its research. Tangible links between teaching and research will be key at UNESCO-IHE and can be viewed as convergent activities (research is the process of learning for academics - teaching is the promotion of learning for students).

IMPLICATIONS

In the following paragraphs the implications of each innovation will be discussed.

1. Flexibility of choice

Flexibility within UNESCO-IHE

The lack of flexibility in UNESCO-IHE's programmes was an expressed concern of the NVAO that the institute is getting a bit *'atomised'* and that students lack choice. They went on to say that '*this is not the trend in higher education where there is a move to have broader programmes....... with a lot of freedom',* and where students can '*make a free choice from a number of modules.* In response, UNESCO-IHE has stated in its strategic plan that it aims to provide greater flexibility and intensify cooperation in educational offerings both internally (within the institute), and externally (with other key institutions). In addition it has stated that '*it has a wish to offer distance, blended, and life-long learning courses for new target audiences in the world.*

A first step in the flexibilisation will be the possibility for students to select any of the modules offered at the institute. The notion of flexible learning paths and a modular curricular structure is seen as a crucial step for developing more flexible and interdisciplinary education at UNESCO-IHE. One of the main benefits of modularisation is that it will encourage wider and more diverse participation in the educational programmes, and encourage student mobility. The modularisation process will also guarantee that students are able to obtain full recognition of credits legitimately obtained at other institutions of higher education, and the transfer and / or accumulation of these, which is currently not the case.

Currently the responsibility for the content, structure and quality of the Master programmes is the responsibility of various programme committees. Increasing the freedom of choice for students is not an easy task as it means removing the walls between programmes, and removing some entry requirements for modules etc. To make this happen tactful and thoughtful manoeuvring at central level is essential. A framework for a flexible programme is under construction. It is expected that by 2009 the first steps in a flexible set-up can be taken.

The institute currently works towards a system whereby students can also obtain credits via short courses. After a successful pass of the examination credits are obtained, which may give exemptions for following parts of a full Master programme at UNESCO-IHE or another university.

As can be seen in the tables below the interest in short courses is increasing. There is a substantial grow in the number of participants (tables 2 and 3). Compared to 2003 the total number of applicants and participants for the short courses in 2008 has doubled. The number of applicants for the short courses almost reaches the figure of applicants for the Master programmes (see table1).

Table 2: Number of applicants and participants short courses (including online courses).

	# short courses	# applications	# participants	
2003	34	615	256	42%
2004	50	752	237	32%
2005	74	1191	488	41%
2006	70	1187	468	39%
2007	63	1266	499	39%
2008		1335	413	

Table 3: Number of participants online courses.
* this figure will rise as not all numbers are known yet for the 2008 autumn courses.

	# Participants
2005	85
2006	104
2007	131
2008*	105*
Total	425

In 2005 UNESCO-IHE offered 9 online short courses. This figure grew to 15 courses in 2008. The number of applicants and participants grew in a similar fashion. As can be seen in table 4 the highest number of applicants for the on-line short courses does come from the African continent. Relatively spoken however their participation level is unfortunately the lowest. To find more fellowships for these participants is one of the challenges for the institute.

Table 4: Number of applicants and participants on-line courses per continent for the period 2005-2008.

	# Applicants	# Participants	
Africa	295	112	38%
Asia	203	104	51%
Europe	157	138	88%
S-America	88	54	61%
N-America	14	9	64%
Australia	12	8	67%
Total	769	425	

Flexibility outside UNESCO-IHE

Credits for courses can also be earned by following courses at other universities. UNESCO-IHE has adopted the European Credit Transfer and Accumulation System (ECTS). In the ECTS system at least 60 credit points are divided over one academic year. An internal procedure for credit transfer to and from other universities is under construction. Credit transfer can only be established via an agreement between co-operating institutes. By ensuring that students receive appropriate recognition for learning already achieved, efficiencies in both time and money can be gained by students and institutions. Different programmatic set-up of programmes (modular, semester, trimester systems) makes it however sometimes difficult to change form one institute to another institute.

The ability for learners at all stages of their lives and careers to easily move into, between, and out of, post-graduate education is a key component in building an education system that makes lifelong learning a reality.

Joint programmes

Two types of arrangements can be discerned: collaborative and non-collaborative arrangements. The former include franchising, twinning and joint degrees whereby study programmes, parts of a course of study, or other educational services of the awarding institution are provided by a partner in another country. The latter include branch campuses, off-shore institutions, corporate and international institutions whereby study programmes, parts of a course of study, or other educational services are provided directly by an awarding institution in one country to another country or countries. UNESCO-IHE offers both types of arrangements with different partners. Under the Dutch law implementing a joint programme is not a problem, however issuing joint degrees is not allowed yet. Graduates of

current joint programmes are therefore awarded an UNESCO-IHE degree, mentioning the affiliation with the partnering institute(s) or two degrees; one from their own university and one from the host institute.

Experience has learned and many examples in the world have shown that it is necessary to describe the organisation, the responsibilities and all inputs and revenues before the start of a programme in a contract between cooperating institutes / faculties. Agreement on the set-up and the content of curriculum should be achieved. Quality assurance procedures should be clear and set.

UNESCO-IHE currently offers 2 joint programmes:

- the programmes are developed and/or approved on an equal basis with another institute;
- students from each participating institution study parts of the programme at other institutions;
- the students' stays at the participating institutions are of comparable length;
- periods of study and exams passed at the partner institution(s) are recognised fully and automatically;
- professors of each participating institution also lecture at the other institutions, work out the curriculum jointly and form joint programme committees;
- after completion of the full programme, the student either obtains two degrees: one from UNESCO-IHE and one from the other university

Several other joint programmes are currently under construction.

Advantages of joint and double degree programmes

The advantage for the student in such joint (or dual) degree programmes is the possibility to complete two, two-year courses in 3 years. It broadens a student's knowledge and skills base and improve their career options in competitive, increasingly interactive fields. They gain international experience and are able to develop an international network.

For UNESCO-IHE and the cooperating universities the advantages are that it is unnecessary to have all knowledge in house, and that teaching costs are reduced. Through these co operations unique programmes can be created, it creates closer cooperation with other universities and it enhances the global visibility of the institute.

Problems

Apart from a proper preparation by the institutes, still serious problems may be encountered, such as:

- Scarce legislations

As already mentioned above the majority of the European countries have no legislation specifically concerned with the development of joint programmes and the award of joint degrees. In The Netherlands it is by law still not allowed to issue a joint degree with a foreign partner. Issuing double degrees is not legally protected and occurs occasionally everywhere. In the United Kingdom and Ireland, the power to award degrees lies with the universities, so the lack of legislation implies that there are no restrictions on their award.

- Finances

Financial constraints lay mostly at the heart of the development of joint programmes. To be successful both (all) parties must to take a share in the costs of development and implementation. These costs refer to both programme and student costs. For the current (and for the future) joint programmes the management of the institute and the partner institutes developed a business plan, outlining the programme costs and revenues.

- Quality assurance

A specific issue related to joint programmes is quality assurance. As the UNESCO-IHE degrees are accredited by the Dutch government, the institute has to assure itself of the quality of the courses offered by the partner institutes. The quality of the teaching staff, the lecture materials, equipment etc. as defined by the Dutch accreditation system must be of the same level as at UNESCO-IHE. This requires a thorough system of quality assurance. An international system of accreditation does not exist yet. This may lead to concern about the mutual recognition of the degrees and global mobility of students (Patil, Godner 2007)

- Culture shock

For students it is sometimes difficult to adapt to a new environment. At the start of the academic year UNESCO-IHE always organises an introductory period, during which students are informed about living and studying in The Netherlands. A mentor is assigned to a group of students and counsellors at the student office are responsible for the social welfare. In case of problems help is offered.

2. Life long learning

In the coming years UNESCO-IHE will be an institute that promotes innovation in the design and delivery of teaching and learning activities, to improve the quality of the students experience. It will promote pedagogical and didactical methods that are learner-centred and will arouse curiosity, stimulate independent learning and encourage the development of critical thought in its students. The focus will be on enhancing student learning and encouraging sustained self-development (life-long learning). A tool for student learning is Problem Based Learning (PBL). Coming years this method will be promoted within in the institute, along the existing didactical methods.

An overwhelming body of research shows that students do not learn effectively from lectures and that lectures do not support/build competencies needed for life-long learning. On the other hand problem-based learning has proven to enhance students' critical thinking and independent learning. It does so by focusing on activities rather than knowledge gained, encouraging deep rather than surface learning (by increasing learning engagement and interaction with the learning material). In addition, it situates the learning in the context of a real-life situation and encourages an appreciation of teamwork and the value of others. More importantly, it teaches learners how to learn for themselves, carry out research and find new sources of knowledge. This component of the PBL approach helps to develop lifelong competencies (as it fosters the learning ethic).

For UNESCO-IHE, the distinct advantage of the PBL approach is clear, as it will produce better water professionals who have: knowledge more clearly linked to their specific areas of application; the ability to continue to learn throughout their career; the ability to work in multidisciplinary teams; ability to effectively articulate and communicate their ideas

The question is whether students will appreciate a PBL approach. A study by UNESCO-IHE among its students revealed that most students during their bachelor study were educated according to a lecturer centred approach: lecturer talks and the student is a passive receiver of information. They nearly all indicated that they would appreciate a more communicative or task-based approach. This is not surprising, as various adult learning theories (i.e. Knowles) indicate that adults want to know why they have to learn something, they learn experientially, they approach learning as problem solving and they learn best when the topic is of immediate value.

A study by Huang (2005) revealed that Chinese students studying tourism-related courses in the UK found PBL more interactive than their old learning style, and allowed them to learn on their own. However, some negative perceptions were also expressed. In particular, the students had a large psychological obstacle when it came to debating a subject with their lecturers. Debating among them was not a problem.

It is recognised that shifting to a PBL approach involves a large cultural change, both for students and lecturers, and that it can also be a daunting and time-consuming task (to restructure existing courses). However, by effectively managing the change process and encouraging staff to learn and adapt new skills progressively, the transition can be made successfully to reap the long term benefits. It should be noted that UNESCO-IHE already has excellent examples of this mode study in its MSc programmes, and the challenge is to mainstream this. Adequate and sustained staff development programmes will provided to staff to ensure they have the skills of learning and the ability to change, required to successfully implement the learner centred approach.

In addition, the institute will embark on a redesign of its learning spaces so that they become a physical representation of the institution's vision and strategy for learning.

3. Innovative delivery: Blended Learning/Distance Learning

Blended learning is the effective integration of various learning techniques, technologies, and delivery modalities, with the objective of optimising the learning outcome and cost of program delivery. For an effective problem based learning approach, blended learning is crucial as it offers an opportunity for moving beyond content acquisition to develop skills and dispositions needed for lifelong learning.

The integration of an e-learning environment and a classroom environment is likely to combine ideally the advantageous aspects of both types of instruction. Education through e-learning supports education in Delft as well as education on distance. It provides the flexibility and the efficiency which cannot be assured in a classroom environment, whereas a face-to-face education class ensures the social interaction in which the students will need guidance for learning. Combing delivery modalities provides an environment where the learners can study regardless of time and place restrictions according to their learning speed. The factors such as learners' individual differences, personal characteristics and learning styles have significant impacts on the learning environment.

UNESCO-IHE strives that all modules will be delivered in a blended format, where a combination of face-to-face, e-learning and collaborative learning environments will be used. In the near future students will take their own time to go through the lecture materials and study sheets that will be made available online, and also research relevant topics in greater depth using the web. Students will have the opportunity to be prepared for the face-to-face sessions, having gone through the relevant material beforehand. During the face-to-face sessions, the lecturers will reinforce topics and clarify issues and concerns of the students. Also all students will be using communication and collaboration tools like online forums, chat, and e-mail to facilitate discussion and learning among student peers and lecturers.

The implication of all this is the availability of an excellent virtual learning environment (VLE). Offerings are currently explored to integrate the existing programmes into one environment, where students, alumni and staff have easy access. The international dimension of the institute however puts high demands on the choice of a VLE. Easy communication with students all over the world is an essential feature, knowing that internet connection in several parts of the world is still slow or unavailable.

4. Teaching and research

One of UNESCO-Ice's research/teaching philosophy (as stated in the Research Strategy), is that the teaching/research link is a central/integral part of the research strategy and the teaching and learning strategy. UNESCO-Ice's aims to '*ensure that links between staff research and teaching and learning are made explicit in departmental strategies for research (and learning and teaching).*'

At a first glance the teaching-research link is about reporting on the latest research work in the courses.

The Engineering Subject Centre of the Higher Education Academy in the UK (2005) on their website reported how discipline-based research could benefit teaching, and vice-versa. Responses indicated the following possible links:

1. Content of curriculum - is partly or completely derived from research.
2. Processes - students are taught/learn in research-like ways, typically through enquiry/project based activity.
3. Tools - students learn how to use particular equipment, software packages, etc. and hence learn research skills.
4. Context and community - intangible links and benefits to students and staff flowing from students being part of a researching community.

Based on discussions within UNESCO-IHE the following conclusions were drawn:

- Students should be trained to approach learning with a research approach ("Process link"). In this students will develop critical skills. Due to cultural differences this may be easy for some students than others. However, it is important to produce "lifelong learners".
- This research approach will be taught from the beginning of the programme with state-of-the-art research being introduced later on. This is needed to ensure that teaching is at the forefront of knowledge and to maintain the standard of the MSc programmes.
- At an institutional level a clear difference will be made between research and project work. PhD students will assist in the MSc projects to both develop MSc students' skills and the general research culture within the institute.

REFERENCES

Altbach, P.G. (2007a). Fostering Asia's brightest. Far Eastern Economic Review January-February, 53-57

Altbach, P.G., McGill Peterson, P. (2007). Higher Education in the new century. Centre for International Higher Education, Boston College and Sense Publishers

Borri, C., Guberti, E., Melsa, J. (200). International dimension in engineering education. European Journal of Engineering Education, vol.32, December 2007, 627-637

Dunrong B., Shifting Demographics in Higher Education in Asia. International Higher Education, 47, Spring 2007

Huang, R. Chinese International Students' Perceptions of the Problem-Based Learning Experience. Journal of Hospitality, Leisure, Sport and Tourism Education Vol. 4, No. 2.

Patil, A., Codner, G. Accreditation of engineering education: review, observations and proposal for global accreditation. European Journal of Engineering Education. Vol.32, No.6 December 2007, 639-651

Strategic Plan UNESCO-IHE 2007 -2013

TechKnowLogica (2003). Life long learning in the Global Knowledge Economy: Challenges for developing countries. January – March, Knowledge Enterprise Inc.

The Higher Education Academy - The Teaching and Research Relationship: Developing Institutional Policy and Practice, A UK-wide conference on institutional policies, structures, processes and

practices to develop the relationship between teaching and research, London, 8 November 2005. http://www.heacademy.ac.uk/3849.htm

ACKNOWLEDGEMENT

The author wishes to thank the members of committee on Innovation of Education of UNESCO-IHE, who stood at the cradle of the current developments.

COPYRIGHT