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# Developing an International Competence-Based Curriculum for Environmental Health

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## Abstract

In 1998, the International Federation of Environmental Health (IFEH) commissioned the International Faculty Forum (IFF) of environmental health educators to develop an international curriculum for environmental health. In commissioning such a curriculum, IFEH implicitly recognised and sought to address the ongoing issues of professional identity, status and the transportability of qualifications for Environmental Health Practitioners (EHPs). A draft model for an international curriculum based on competence was proposed by Brennan, Konkel and Lewis and developed and supported by IFF members when they met in May 2008 in Brisbane, Australia. Development of the model and its underpinning concept of 'environmental healthness' ("EHness") is complete. "EHness" is defined as those abilities/skills that are uniquely possessed and focused on in professional practice by EHPs. The draft international curriculum details "EHness" by the specification of core knowledge, skill and competencies to be attained and maintained by EHPs during the initial qualification process and via lifelong professional development and learning. The draft curriculum represents these

elements as a curriculum 'daisy' where knowledge, skills and the resultant competencies ("EHness") sit at the daisy's centre and the additional knowledge, skills and competencies deemed necessary to be held by competent practitioners within each nation, state or region assume the position of the daisy's petals. This model ensures that, irrespective of the location within the world, all EHPs will be educated to the same 'core' curriculum but with divergence taking place via the 'daisy' petals. The authors recognise that the development and approval of an international curriculum for environmental health implies that the development of an international validation process is a future necessity.

## 2.0 Background

2.1 Environmental Health as a profession is not new; indeed, it emerged in the United Kingdom in 1848 following the enactment of the Public Health Act of 1848 and under the guise of 'Her Majesty's Inspectors of Nuisances'. Whilst the profession grew and evolved within the United Kingdom (UK), the founding principles of the profession namely, the controlling, mitigation and elimination of factors adversely affecting public health, were exported to a myriad of other nations, many of which had colonial links to the UK, but also to many others throughout the globe.

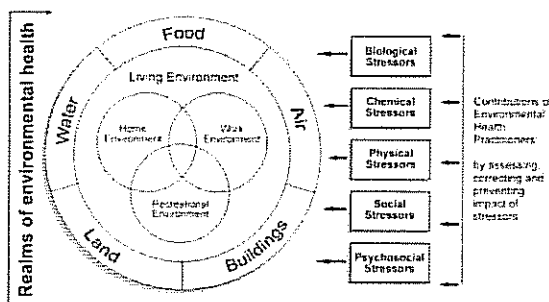
2.2 Over the ensuing 130 years the sphere of influence of environmental health evolved and expanded. Formal international recognition of the key principles of environmental health was provided by the World Health Organization (WHO). In 1972 a WHO Scientific Group developed a definition of environmental health that was subsequently

amended in 1989 and later in 1993. The latest version of the definition expresses the essential nature of environmental health as:

“.....all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments. This definition excludes behaviour not related to environment, as well as behaviour related to the social and cultural environment, and genetics.”<sup>1</sup>

This definition of environmental health was initially represented diagrammatically in Figure 1 by MacArthur and Bonnefoy 1998<sup>2</sup>

Figure 1 .....Environmental Health....



2.3 Despite the clarity offered by the WHO definition and the associated diagrammatic representation, the education of Environmental Health Practitioners (EHPs) is currently dependent on the requirements for practice within each nation state. Consequently and despite the WHO definition, there is little visible evidence of uniformity surrounding the curricula to be followed by those persons who elect to undergo a period of defined education and training/work-based learning in order to qualify as EHPs. This is evidenced by the difficulties experienced by practitioners who emigrate from their home state to other countries and who are then required to undertake additional study and/or work-based learning prior to being allowed to

practise. Such additional education can be extensive and is designed to support national requirements and environmental health delivery systems and produces practitioners who, despite developing and practising a common core of skills and professional behaviours, operate in very different environments, face different types of problems and generate solutions that, in the main, are consumed by their domestic systems alone.

2.4 Also problematic in terms of the development of international understanding of the identity of the profession is the fact that members are given a variety of titles, such as environmental health professionals, environmental health scientists, industrial hygienists, sanitarians, or environmental public health officials.

### 3.0 The Globalisation of Environmental Health

3.1 Over the last 20 years, the environmental health profession has come together every two years under the auspices of the International Federation of Environmental Health (IFEH) and its World Congress to share knowledge of good practice and to discuss new and emerging issues of concern. This is a necessary step, one that has led to sharing of cross-cultural insights and has built a network of committed environmental health leaders who seek to advance the profession while demonstrating the value of our critical thinking and problem-solving capabilities.

3.2 Despite this biennial cultural mixing at the international level, the profession's visibility and identity suffers from a lack of a coherent research and publication culture which should support its identity and this is, in turn, compounded by the absence of a common frame of reference that would naturally be afforded by a common curriculum for the education of EHPs. Furthermore, a number of states from which IFEH draws its member organisations are, in 2008, experiencing a

shortage of EHPs; this is certainly true within the UK where there is a shortage of about 1,000 EHPs, but this is also the position within Australia and Canada, and anecdotal evidence of this was provided to the authors by colleagues attending the 2008 World Congress. All of these factors contribute to the many members of the profession being uncertain as to their future direction and purpose and not addressing this in a timely and effective manner is expected to have significant negative consequences for the profession.

### Mutual Recognition

3.3 The lack of a common, internationally recognised educational base for environmental health acts as an inhibitor to the transportability of qualifications and mutual recognition of practitioners. However, within the Member States of the European Union (EU), legislation in the form of Directive 2005/36/EC of the European Parliament and of the Council on the Recognition of Professional Qualifications<sup>4</sup> has sought to address this situation. However, management processes under the Directive have proved to be somewhat cumbersome. The Directive does not apply to professionals from countries outside the European Union

3.4 The problems faced by practitioners wishing to move and practice within IFEH members states are illustrated by considering the case of EH professionals in Australia and England.

3.5 In England, Wales and Northern Ireland (EWNI), the Environmental Health Registration Board (EHRB) registers qualified EHPs. EHRB is a nominally independent company but one that draws a majority of its management board members from Trustees of the Chartered Institute of Environmental Health (CIEH). The Board does, however, also have members who are nominated by key Government departments and agencies. The Board sets the requirements for registration and these not only reflect key influences

brought to bear by the representatives of Government departments but, in turn, also to some extent determine the EHP qualification process that is operational within EWNI. A compounding factor exists in that some UK legislation, including the Food Safety Act 1990 which is substantially enforced by EHPs within the UK, specifies that those authorised to enforce it must *inter alia* be registered with the EHRB.

3.6 This presents a clear problem for Australian qualified EHPs. To work within key areas of environmental health in the UK requires an EHP to hold a valid EHRB registration and the attainment of that registration reflects the qualification process only available within EWNI. The choice for the non-EWNI qualified EHP is to either re-qualify under the EWNI system or to seek recognition by EHRB via the completion of an individual mapping of his/her Australian acquired qualification against the qualification operational in England and the backfilling of any identified shortfalls. This process is cumbersome, time consuming and often deflating to prospective EHPs who could perform well in EWNI posts. In addition, the qualification mapping process does not take into consideration or recognise the core skills and professional behaviours developed via experiential learning by non-EWNI qualified EHPs.

3.7 The key question, therefore, is as follows: Is there an education system for EHPs that focuses on common skills and professional behaviours and which is capable of taking its place on the international stage and being widely, if not universally, adopted amongst those nations that produce EHPs? If one can be developed and there is a consensus about its value, then the EHPs taking advantage of this opportunity will enrich the profession, whilst also increasing the skill base and diversity of the profession, further promoting its visibility and identity. This "system" could also make the profession more attractive to students who would like to work in a profession where travel across continents

is possible or even viewed as highly desirable.

3.8 An educational system based on a common set of skills and professional behaviours could also act as propagator for research and publication within Environmental Health. This would not only grow the evidence base that underpins practice, but would also help cement the often postulated, but largely unsupported claim that Environmental Health is as valid a profession as medicine or law.

#### 4.0 Competence not Qualifications

4.1 The question, posed in paragraph 3.7 above was originally considered by IFEH's governing Council in Sweden in 1998 and the problem was, in turn, handed over to the IFEH academic community (The International Faculty Forum - IFF) with a request for a solution, in the form of an international curriculum, to be generated and vetted so that it could be referred back to IFEH Council for potential adoption.

4.2 Charged with developing an international curriculum, the IFF considered the problem at each subsequent meeting (2000, 2002, 2004 and 2006) and consistently failed to generate a solution because the focus largely remained on the search for commonly held knowledge as being a means to generate a common curriculum.

4.3 2008 saw the IFEH World Congress convene in Brisbane and again the IFF met to consider the common curriculum. Once more the Forum itself was in danger of promoting a process that would likely result in an impenetrable problem. Somewhat fortuitously, circumstances that had been apparent within the UK for some months provided an opportunity for a possible solution to be developed. Since 2006 the Government of the UK had been focussing within its own departments on the concept of 'competence' rather than personally held qualifications as a means of ensuring that civil servants were fit to deliver efficient government services<sup>3</sup>. Furthermore, following the perceived success of this change

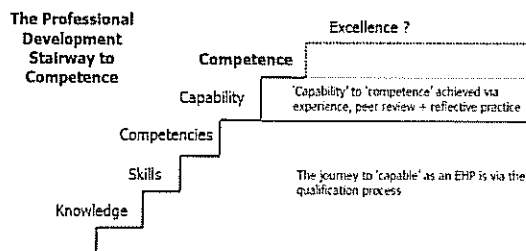
within Government, pressure for a similar approach was being applied to government agencies, some of which, such as the Health and Safety Executive (HSE), are involved in the delivery of key aspects of environmental health.

4.4 'Competence', as a concept, has its roots firmly in American educational reform of the 1920's which began to link educational outputs to industrial/business models that centred on the specification of outcomes in terms of behavioural objectives. The idea was quickly adopted within the medical and associated professions as a means of ensuring reproducible quality.<sup>9</sup>

4.5 Discussions took place at IFF in Brisbane on the possibility of 'competence' providing a solution to the international curriculum issue and it is these discussions that provide the foundations to this paper and the proposal that it in turn generates and which all IFEH members states are asked to consider.

4.6 To fully appreciate the proposal that follows, the 'glossary of competence' needs to be considered. Figure 2 generated by Brennan and Lewis (2006)<sup>6</sup>, is offered as an explanation:

Figure 2 The Professional Development Stairway to Competence



4.7 The model is quite simple and sees the learning process beginning with the attainment of knowledge that is then overlain by the development of key skills. Knowledge and skills applied in practice then develop into

competencies – also known as professional behaviours (not encompassing a code of ethics) which partly frame the way you operate in working life, whereupon practitioners assume a status of being ‘capable’ i.e. they have been set on the road to achieving competence. It is the progression through these stages that is normally delivered via the EHP qualification process. On-going development into a competent practitioner occurs via the addition of work-based experience, reflective learning and peer assessment with further development to a state of ‘excellence’ also being possible.

4.8 The model detailed above was accepted by IFF in Brisbane who additionally saw knowledge, skills and competencies as conferring an ability within practitioners to identify, assess and manage risks to (public) health that arise from the impact of a range of stressors on our world. This ability was regarded as being a unique feature of those who successfully complete the EHP educational process and was subsequently labelled as “EHness” i.e. those abilities/skills uniquely possessed and focussed on in professional practice by EHPs.

4.9 The IFF in Brisbane went on to populate the first three levels of the staircase (‘EHness’) as follows; although it should be noted that IFF renamed ‘Competencies’ as ‘The Method’ for this purpose:

#### Knowledge

Anatomy physiology and basic toxicology	The built environment
Social, physical and natural sciences	The principles of pollution prevention and control
Communicable and non-communicable diseases – vectors and control mechanisms (surveillance and control)	Health protection measures and methods
Research methods	Inequalities in health
Risk assessment/management principles	Principles of sustainable development
Principles of pest control and management	Legal principles and processes

#### Skills

Determine and articulate the nature of a hazard and quantify the level of risk associated with that hazard	Determine appropriate courses of action
Plan and execute statistically reliable sampling programmes, analyse and interpret data	Organise self and work within organisations
Plan, execute and report on inspections, investigations and audits	Demonstrate effective communication skills
Obtain admissible evidence and apply due legal processes	Become a reflective practitioner
Design, implement and evaluate a research protocol	Work with and within communities

#### The Method

Identify and articulate the range of actual and potential biological, chemical, physical, social and psychosocial stressors that may act upon and within the physical, social and human worlds	Identify, communicate and engage with partner organisations, agencies, fellow professionals and others with whom appropriate intervention strategies might need to be formulated
Identify and articulate the points of possible impact of the stressors on and within the worlds	Identify and articulate the most appropriate intervention to exercise, having regard to the factors, be they political, financial and technological that are likely to influence the decision making process
Identify and articulate the mechanism of impact of the stressors on and within the worlds	Design and implement appropriate intervention strategies in collaboration with others
Identify and articulate the potential and actual public health implications that (may) arise from the impact of stressors on and within the worlds	Monitor and review the effectiveness of the intervention strategy; altering or adapting it, where necessary, according to the actual or predicted outcome
Identify and articulate the points at which EHPs may intervene to prevent, control or mitigate the impact of stressors on and within the worlds	

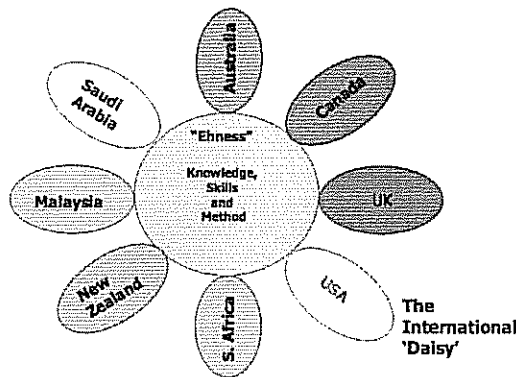
#### 5.0 ‘EHness’ as the international core curriculum

5.1 Having identified ‘EHness’ as the baseline knowledge skills and method that enables EHPs to identify, assess and manage risks to (public) health that arise from the impact of a range of stressors on our world means, IFF accepted that the concept of EHness would

ensure that those who studied the associated curriculum would develop into problem solvers or facilitators for problem solving and would be capable of meeting the requirements of the WHO definition of environmental health; namely, practitioners who could be involved in:

“.....the assessment and control of those environmental factors that can potentially affect health.”

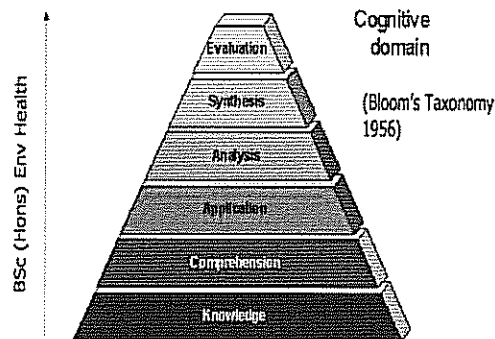
5.2 IFF in Brisbane also went on to consider how the concept and curriculum of ‘EHness’ could conjoin with the additional knowledge, skills and competencies that each country requires of its EHPs in order to deliver a national, ‘fit for purpose’ environmental health service that addresses the specific needs of each nation or region. The answer came in the form of a curriculum model that was termed “The International Daisy”:



5.3 The Daisy model sees all IFEH countries educating their student EHPs by the delivery of the common ‘EHness’ curriculum. The model then allows each state to also develop their own practitioner’s additional knowledge, skills and competencies (contained within the daisy petals) deemed necessary for practice within each member’s state. This model, therefore, ensures that, irrespective of the location within the world, all EHPs will be educated to the same ‘core’ curriculum (‘EHness’); but with divergence taking place via the daisy petals and thus allowing nation states to produce EHPs who are

not only fit for purpose in their own country but are capable of emigration and acceptance within other states on the basis of their ‘core’ learning. This model permits a country or set of countries to ensure that their practitioners are not only recognisable at the international level but also reflect the environmental health realities within their jurisdictions. For example, under Vector Control and Zoonotic Diseases, Africa or China might want to emphasize capability in malaria and avian flu.

5.4 IFF also determined that the level of attainment of EHness should be fixed firmly at a level that envisages cognitive development across all of the key domains within Bloom’s taxonomy <sup>7</sup> i.e. a level internationally accepted as being equivalent to a Bachelors degree in Environmental Health. In other words, graduates from environmental health education courses will be expected to not only hold the prescribed knowledge, skills and method, but will be able to demonstrate that they are capable of fully ‘thinking through’ the concepts, issues and actions that are encapsulated within the ‘core’ curriculum.



## 6.0 The Proposal

6.1 Given the outcomes from the IFF meeting in Brisbane in May 2008 that are outlined above, the IFF community believes that it has now met the brief given to it by IFEH Council in Sweden in 1998 and had developed an realistic and achievable international curriculum for environmental health. That curriculum is embodied within ► [ continued on page 32 ]

the concept of 'EHness' which is to be delivered at the level of BSc or equivalent and which may be added to at the national level by further knowledge, skills and competencies that may be delivered within 'petals' on the International Daisy model. The IFEH Council is recommended to adopt this curriculum, the concept of EHness and the Daisy model for consideration and consensus building by all member states.

6.2 In addition to the above, IFEH Council is recommended to further consider developing a formal system of qualification 'passporting' within environmental health at the international level. The concept of a "passporting" system for an international qualification is attractive in its simplicity. However, it will not be acceptable unless there is a recognised and robust validation process that is accepted worldwide and IFEH Council is recommended to consider how it might develop such validation and assurance principles and processes.

6.3 Once adopted, the curriculum will need to be disseminated to national professional bodies, who will need to undertake an evaluation of their own accredited courses to determine whether they meet this standard or, if not, to determine the extent of any gap.

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#### Glossary

**Competence-** A cluster of related knowledge, skills, and attitudes that affect a major part on one's job (role or responsibility), that can be measured against some accepted standards, and can be improved via training and development

**Capability** - Describes an individual's potential to develop future competence

**Competencies** - A range of abilities and skills that support the capability to develop competence

**Skills** - A skill is the learned capacity or talent to carry out a task or activity to pre-determined results in the most efficient manner

**Reflective Practice** - a continuous reflective process which involves the learner considering critical incidents in his / her life's experiences with a view to improving future actions and outcomes

**"EHness"**- The accepted combination of professional knowledge, skills, behaviours and competencies which define the Environmental Health Practitioner