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Workshop on
ECOLOGICAL ENGINEERING EDUCATION

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REPORT

The Figures 1, 2 and 3 describe the attitudes, knowledge and skills which we believe are necessary in the IDEAL ecological engineer. No one person will acquire these attributes in the course of a university degree course or even in a lifetime of professional practice, but that is not necessary because the ecological engineer will work in a multi-disciplinary team environment. What is more achievable is that the ecological engineering team will collectively have these attributes and that the members will be able to communicate effectively and work together to apply their skills and knowledge to the problems they face.

Many of the attributes we list are common to many engineering disciplines or indeed other professions. What we believe is unique and fundamental to the practice of ecological engineering is the ATTITUDE of care of the engineers towards the environment and the KNOWLEDGE and SKILLS to effect the necessary changes. Attitude is something that many students will possess as they begin ecological engineering training because it is concern for people and the environment which will attract them to this engineering discipline. Attitude cannot be taught it can only be "caught" or absorbed from people around or from the environment in which we live and work. So an ecological engineering degree must be structured to impart and foster an attitude of care from both academic example (not normally teaching) and appropriate field experience.

The degree course should impart the necessary knowledge and skills to work with the natural resources of soil, water, atmosphere, energy and bio-materials. Because of the multi-disciplinary nature of ecological engineering, the education must be broader in scope than most other engineering degrees. There must however be a "spine" of academic discipline from which the "flesh" of other subjects will be supported. It is suggested that this "spine" should be a thorough grounding in systems engineering, integrative thinking, design and self-design. Each student would add flesh to this with a selection of subjects from the "hard" and "soft" sciences according to their individual interests.

The strands of engineering and ecology must be closely integrated throughout the degree course. It is not ideal to append an engineering degree to an ecology programme or vice versa.

Urgent problems requiring an ecological engineering approach confront humanity. On the whole, appropriately trained ecological engineers do not exist so engineers with traditional training endeavour to provide solutions. There is therefore an urgent need to provide extra ecological education to such people who could then be regarded as “ecological” engineers. The need for such life-long learning will always exist.

Graduates from the ideal programme we describe would be more completely educated in the discipline and would thus be called “ecological engineers”. In time both groups would permeate the profession at all levels.

This workshop deliberately avoided a prescriptive approach to ecological engineering training. Environments, cultures, resources and traditions vary widely around the world and each setting will need its own solutions to educating ecological engineers.

The vital thing is to make a start!

Henryk Skolimowski, the Polish theologian (“A Sacred Place to Dwell”), spoke the following aphorism.

“KNOWLEDGE IS STRUCTURED INFORMATION.
WISDOM IS STRUCTURED KNOWLEDGE”

The role of an ecological engineering education is to provide the information and assist the student to begin structuring it into a personal knowledge base. Experiential learning will assist with skills development. Committed teaching will encourage respectful (humble?) attitudes to environmental issues and problems. The foundation of knowledge, skills and humility is the beginning of ecological engineering wisdom.

Figure 1

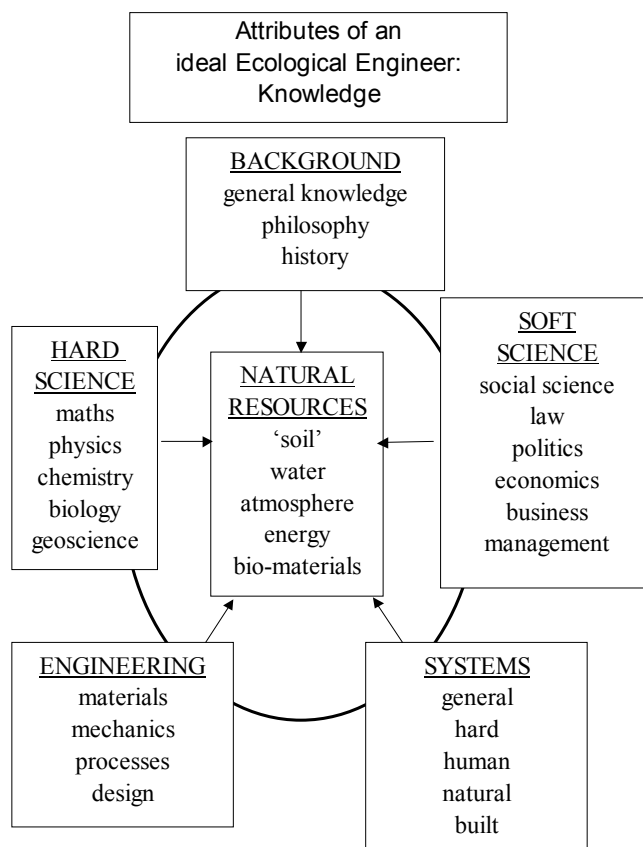


Figure 2

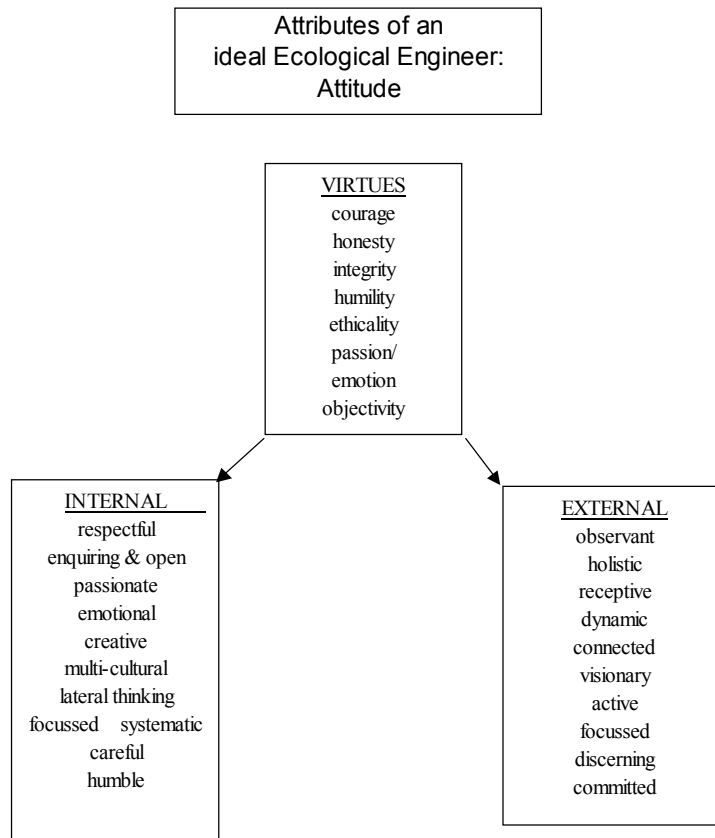


Figure 3

