Knowledge Integration, Environmental Informatics and Environmental Education

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"Knowledge and human power are synonymous" (Francis Bacon), and as we are entering era of Knowledge and Knowledge Management, it is appropriate to ask, whether we are entering era of Power automatically too? According to the World Bank, the number of Higher Education students will more than double from 70 million to 160 million by 2025. Nevertheless, not only quantity of students, but also quality of future education is very important for the global environmental crisis prevention. As we are entering environmental crisis age, a substantial part of those students will obtain some environmental education, and hundreds of millions of future specialists would deal with environmental knowledge and environmental information globally in order to have enough power to overcome this crisis. But ecosystems, populations and organisms are enormously complex systems, and their management demands an integration of many previously separate sciences and "the unassisted hand and the understanding left to itself, possess but little power" (Francis Bacon). Never before has so much environmental information been available to mankind but never before has mankind been so unable to integrate such diverse information as use of energy, resource consumption, pollution, environmental health, environmental management, environmental policy including information about the current situation as well as aims for the future and how those are to be met etc. etc. The knowledge required to understand this information is complicated and subject to change. The ability to structure complex information, to integrate environmental knowledge and environmental information becomes critical. But how can we assist people to analyze and synthesize so much and so disintegrated environmental information and environmental knowledge?

It should be stressed that Medical Sciences have enormous experience in the management of very complex systems, and the creation of Medical Ecology gives a new methodology on how to use this huge experience of Medical Doctors in optimizing Integral Health. The INTEGRATED HEALTH CONCEPT aims to organize a more effective interdisciplinary transfer and integration of knowledge and is intended to encourage students to achieve a more holistic understanding of the relationships between environment, health and sustainable development. This concept aims to design integrated environmental knowledge bases incrementally: discrete fragments of environmental information are identified, their relations to the Integrated Health are assessed and then they are added to the growing knowledge base. An important part of environmental information management in Medical Ecology is the holistic TAO Concept of environmental information circulation (Testing, Analysis, Optimization). According to this concept, the first stage of processing of environmental information should be Medical-Ecological Testing using the Concept of Medical-Ecological Symptoms. Second stage, Medical-Ecological Analysis, is very important for evaluating and structuring environmental information, in turning it into environmental knowledge and using the Concept of Medical-Ecological Syndromes - groups of Medical-Ecological Symptoms that occur together on the ecosystem, population and individual levels and that characterize particular disturbances in Integral Health. Third stage - Medical-Ecological Optimization - uses Medical-Ecological Syndromes for

decision-making to optimize Integral Health. All three stages should be introduced into environmental education to guide educators from the traditional mode of transferring environmental information and knowledge to a mode of teaching that fosters both critical and creative thinking.

The meaning of complex environmental information, its integration with environmental knowledge and implementation of the holistic TAO concept could become much clearer when organized in Knowledge or Mind Map form where segments of new environmental information could be added separately to a growing tree of environmental knowledge. We have studied the entire educational software development process and conclude that most suitable for this purpose is MindJET's MindManager™ software which is a sophisticated but easy-to-use visual thinking software tool that enhance creativity and productivity in business and education. To meet the expanding needs in knowledge integration MindManager™ offers powerful functionality and complete reliability and uses top quality method for knowledge and information integration, helping managers or officials, teachers or students to connect easily any new information units to an existing Knowledge or Mind Map branch. Therefore every user can see the integrated knowledge/information picture not just bits and pieces of scattered environmental information and to acquire environmental knowledge or process environmental information for testing, analysis and optimization more effectively. Mind Mapping visual technique can demonstrate very clearly how new environmental information interacts synergistically with existing knowledge, how existing knowledge explains the new information and how new information aims to correct existing environmental knowledge. Integration of holistic TAO Concept of environmental information circulation and powerful functionality of MindManager™ offers a possibility to improve structural and theoretical analysis of complicated environmental situations and could be able to add a totally new dimension to educational software development process for environmental education – dynamic process of environmental knowledge integration with regard to the Integrated Health could be made visible. If both teachers and students would have sound understanding of TAO approach and skills in creating Mind Maps through understanding the complex and fundamental relationships between pieces of environmental information and knowledge, they could solve some of the present apparently insurmountable educational problems.

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