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EDITORIAL

Concept interfaces as bridges between clean technology and policy research disciplines

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Clean Technologies and Environmental Policy (CTEP) has grown as an influential multidisciplinary journal, overcoming various hurdles, becoming stronger and wiser. One of the key elements of its fundamental philosophy is its orientation towards the issues to be solved, rather than towards any specific methods. This inevitably defines a wide span of disciplines or fields of research—ranging from pure chemical engineering to mechanical engineering, environmental science, economics, etc.

The issue-centred philosophy and the resulting inherent multidisciplinarity of the selected articles are both the source of the current success and a reason to look cautiously to the future. Bringing multiple disciplines together and gearing them to the goal of improving the sustainability of various society parts and sectors allows cross-fertilisation and amplification of the research impact. This provides enormous benefits to all involved stakeholders—mainly in cognition and creativity improvement.

However, as the body of the developed multidisciplinary knowledge in one discipline accumulates and deepens, much of it becomes less comprehensible and accessible to researchers from other disciplines. An example, even within the relatively narrow area of process integration, is the development of the temperature–enthalpy diagram, initially known as the "Grand Composite Curve" (GCC). This is a well-known tool, representing the thermodynamic properties of a collection of process streams for a heat exchanger network (HEN)—usually at the stage of targeting before design. Recently, researchers from the University of Maribor developed a sophisticated mathematical optimisation model, which constructs similarly looking diagrams within the temperature–enthalpy space, representing current state of existing HENs. Following the high popularity of GCC as a heat recovery analysis tool, they named their curves also as GCC, despite the different underlying status or context. This introduces a certain confusion, which resulted in a serious delay in debates until it has been clarified that the GCC and the new diagrams are variations of the energy-transfer diagram for energy systems and represent the thermodynamic bounds on performance (GCC) and current performance (the new diagrams) of a HEN, and the differences can be used for targeting retrofit actions for reduction in primary energy use as well as the associated costs and emissions.

Extrapolating from the above example, bringing together articles and research teams from different disciplines threatens to also introduce a certain and growing incoherence. If the works are just collected and published, or if the teams just assembled and their members left to work alone, thus can slow down the work or cause it to stop altogether.What can be done, then, to improve the coherence of the diverse mixture of researchers and their fields of expertise? What can act as the glue to the varicoloured mixture of ideas typical for the multidisciplinary CTEP?

The answer to this may lie in the principle of information hiding and interfacing, typical for programming and information technology. This practice separates the internal workings of software objects from what is necessary to exchange with others, allowing to vastly simplify the need for interchange of data. Interfaces do not need to be confined to programming constructs only.

The mentioned Grand Composite Curve is a typical interface created by process engineers to communicate with site managers limited information about the underlying energy

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systems: minimum utility heating, minimum utility cooling and eventually minimum heat transfer area. This is exactly the sufficient information for explaining to site managers how well do their processes perform in terms of energy. Any further detail is unnecessary to them, and they would not even listen to the reports.

Another very popular tool recently has become the spider diagram, picturing a number of environmental footprints simultaneously. Depending on the context of its application, it changes the meaning of the results slightly. However, its essence is clear to most researchers in the field of sustainability, as well as to most company managers, who are used to gauging the company performance with similar charts. Seen from the perspective of knowledge and information flow management, the spider diagram is clearly a conceptual as well as a visual interface among the stakeholders in a project.

The main conclusion from the provided reasoning is that the concept interfaces and their visualisation parts have an important role to play in the future development of the research for the cause of sustainable development. They have a high probability to be that glue which binds diverse domains and research ideas together, into a coherent force for innovation. As a result of this conviction, the current authors, in their roles as editors and reviewers, have always encouraged the use of well-defined concepts and illustrative examples in the publications. Further steps would be necessary, however, to bring about a unified practice of providing concept interfaces and visualisations. This should improve the understanding and the communication among the involved stakeholders, raising the quality of the articles and the contribution of the journal to the cause of sustainability knowledge.