

## ***Interactive comment on “T-shaped competency profile for water professionals of the future” by S. Uhlenbrook and E. de Jong***

**Anonymous Referee #2**

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This contribution is of high interest as it characterizes general principles for academic education of water professionals. The definition of four different fields of occupational competence and the demand to mix them accordingly to the professional status is well reasoned. The authors develop a T-shaped competence profile consisting of a solid knowledge in one discipline, knowledge and cognitive competence outside the own discipline and functional, personal and ethical competencies as third part. Of course there is no doubt to expect that a water professional needs a strong background in one discipline. This is nowadays the basic of our academic education. More difficult is that he should be able to build bridges to other disciplines. This can be a difficult problem, depending on the degree of his involvement in the interdisciplinary cooperation, e.g. in a joint project. The leader of an interdisciplinary team e.g. has to be a generalist,

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as he should be able to specify the tasks and to evaluate the results, provided by specialists from different fields in his group. An expert which contributes to a solution of a complex problem has to understand the requirements of others to provide useable results. Such a specialist has to understand the interdependencies of his discipline with others. For him it would be not necessary to become a generalist. The second end of the horizontal leg of the T-shaped competence profile is much more complicated. Here the authors demand personal competence: “the ability to adapt appropriate behaviors in work-related situations”. As Figure 1 shows, the demand for this personal competence depends strongly on the position of the water-professionals. But also the socio-cultural background of each professional has a strong influence. In summary the T-shaped profile is some type of a general orientation for education. How to implement this idea? Here the authors suggest following ways: 1. Flexible learning paths and group works. The problem of this approach consists in the demand for intensive mentoring of students. At many universities (at least in Europe) the number of teachers is small in relation to the number of students. The most of the staff members are experts in one discipline but have little experience in teaching personal competence for practical work. From my point of view this competence is not an automatic result of group works. It is formed “learning by doing” during a process starting with a critical evaluation of the own results of working, a dialogue with users of these results, an adaption to the requirements of others and so on. Among my PhD-students I found the best skills in this field if they worked at least two, better five years in practice. Such skills cannot be provided by lectures or academic exercises within the tight time-table of our curricula. Flexible learning paths and group works are often not a realistic option.

2. An “open attribute for learning” If you start studying you have this attitude. But if you become a specialist this openness for a holistic water-related knowledge will be reduced step by step as you see that the demand for learning in your own discipline is growing very fast. To become a specialist is the most important task for most of our students. They collect credit points and try to learn straight on: Here is a problem, where is the solution? As teacher you can give impulses to have a look also for other

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issues. To give an example: teaching e.g. about flood hydrology means to discuss uncertainties, vulnerabilities, social issues and engineering ethics of flood protection as well. Recently I had a discussion with a professor who gives courses for ethics in medicine. Such courses are useless for beginners. Only if students feel the need to consider such problems in their daily work they will be more and more interested in this subject.

3. Stimulating learning environment The most lecturers have no choice how to teach a subject. Besides teaching they are organizers and researchers. They are evaluated by others, often not by the quality of teaching but by the ranking of their publications or the number of graduates.

To make a summary: In general I agree with the attempt to consider the complexity of the competency profile for water professionals. However the suggestions of the authors are in many cases not a realistic option for many universities. I hope the suggested approach could be realized at the IHE. We should keep this general orientation and try to realize it in our daily work. This will be a long-term task which cannot be implemented by programs or modifications of the course systems. Every university and every lecturer is challenged to find his own way in this direction. This way can be blocked by limited teaching capacities or high work-loads for students which reduce their ability to develop personal competences. However: The idea of a T-shaped instead of an I-shaped one should be a guideline of our teaching. Thank you for raising this question!

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