

Interactive comment on “On teaching styles of water educators and the impact of didactic training” by A. Pathirana et al.

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Received and published: 25 June 2012

1 Referee #3: Todd Walter

We thank Dr. Todd Walter for reviewing this article. Two questions are raised by the reviewer:

1. If the researchers considered a more global survey of water educators, would they find that there is a sort of a natural trend towards active or problem-solving teaching styles, and
2. Is there a way to assess effectiveness of these teaching styles for the students?

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While being somewhat out of the scope of the present study, both these questions are extremely relevant to the bigger picture of this article. Therefore, we will include in a revised paper the following two sub-sections within the discussion.

1.0.1 A global trend in teachers to be student-centered?

The broad field of hydrology naturally demands problem-oriented skills. Many innovations in hydrology are fundamentally based on empirical findings. Systems hydrologists deal with are complex, and problems they pose are largely unique and original. This context should 'naturally' induce a framework apprenticeship that values active or problem-solving teaching styles. However, there are diametrically opposing forces as well. First there are the habits: Many seasoned water educators today are products of very much teacher-centered education systems and old habits die hard! Also creative teaching does not sustain well with the institutional pressures driving towards efficiency in numbers. Therefore, it is unlikely that there is or will be a natural change (triggered by their experience in handling real-world hydrological problems?) towards active or problem-solving teaching styles.

However, most of the water educators understand and appreciate the value of providing an environment for active learning. To keep their desire to be innovative in education alive and to provide opportunities to apply that enthusiasm, it is necessary to provide a structured set of activities that work as a counterbalance for the above-mentioned habits and institutional pressures. Training programs like UTQ, opportunities to attend seminars and talks on education, encouraging faculty to engage in didactic research, etc. are steps that can be taken towards this. It is also important to give a non-superficial importance in faculty assessment process.

In our opinion it probably is a mistake to rely on a 'natural tendency' of educators to become more active educators in order to implement student-centered instruction. Even within the somewhat limited sample of UNESCO-IHE water educators who participated

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in this study, we believe that the long-term success of implementing student-centered education depends heavily on the presence of series of activities within a sustainable framework.

1.0.2 How to assess the effectiveness on the students?

In any educational program, ultimately what matters is the quality and effectiveness of learning. Therefore, the ultimate objective of altering teaching styles, or for that matter, any kind of innovation in education, is to what degree it improves the learning processes. However, measuring effectiveness in education (the degree to which the learning objective have been achieved) is not simple. First, it is not necessarily reflected by the student grades: Naturally, changing the way of teaching must lead to change in the nature of the assessments. Once the assessment is changed the basis of comparison is lost! Student evaluations, while being very useful to judge the satisfaction, comfort and sense of achievement of students, are not useful tools to evaluate the effectiveness of innovative teaching. Innovative teaching is no synonymous with providing the students a comfort-zone in education. Indeed, students may feel somewhat uncomfortable, at least in the beginning, of the novel and unfamiliar approaches to education. Student evaluations provide useful signals about such situations and can be invaluable mechanisms of feedback on how students feel. But, they do not necessarily provide good indications on how effective the education is.

We do not suggest that any steps taken towards 'innovation in education' in general and specifically, much more delegatory teaching styles should be assumed to be superior without hard evidence. Our intention is to indicate that gathering evidence for real effectiveness of education is a hard task, but it should not be substituted by proximate indicators such as student grades and feedback. Robust evaluation of effectiveness of education needs careful contemplation.

The ultimate indicator of an effective education is how successful the graduate is in the

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real-world situations. But measuring this is a long-term endeavor that is not practical for the purpose of evaluating the outcome of a single action, for example, altering teaching style. Arguably the alternative is to create assessment opportunities that resemble the reality 'out-there'.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 2959, 2012.