6 Case Study - Workshop on Teaching Problem Solving

Audience for this Guidance

Staff presenting to, facilitating or leading any workshop, conference session or event.

Function

Through a (hypothetical, but hopefully realistic) example, this case study suggests how a workshop on approaches to teaching problem-solving can be both effective and evaluable.

The case study

The case study assumes a half day or one-day workshop on teaching problem solving.

The example is accompanied and followed by *commentary* which suggests how the approach illustrated here for problem solving can be applied to other topics.

The workshop leader suggests that the main stages in problem solving in the discipline are:

- Analysing initial problem statements
- Where appropriate refining these statements
- Undertaking research
- Developing and describing alternative solution approaches
- Establishing criteria for judging solution approaches and solutions
- Selecting one or more particular solution approaches
- Implementing a chosen solution approach
- Evaluating the solution
- Communicating the solutions

The stages should be undertaken as an integrated whole, with feedback to previous stages as appropriate.

At each stage the student should also be able to justify decisions made and steps taken, with reference to theory and established practice.

The intended learning outcomes for the workshop, then, is that participants will be able to adapt, and plan to use in their own practice, ideas on teaching problem solving presented in the workshop

> *(Perhaps surprisingly, it does not matter, for the purposes of evaluation, what approach to teaching problem solving the workshop is advocating. We simply need to note that students should be capable in each of the above stages; should be able to apply them in an integrated way to a particular problem; and should be able to justify their decisions and actions at each stage.)*

During the workshop, under the guidance of the event leader or facilitator, a lecturer participating in the event plans and discusses with others how they can apply this approach to their own teaching of problem solving in their discipline.

Later, the lecturer teaches problem-solving broadly in the way suggested in the event, with some necessary changes to reflect disciplinary, programme and institutional circumstances.

How to evaluate the effects on student learning of this new approach?

Through the normal processes of assessing student work, the lecturer identifies how good students are; at each stage of problem-solving, at undertaking the stages in an integrated and coherent way, and in justifying their decisions and actions at each stage.

Very often, evaluation of efforts to improve student learning can use data on student performance, data gained through normal processes of assessment. What we might call 'evaluation through assessment' has one huge advantage – assessment is done anyway, and so the need for a whole layer of additional evaluation is removed. The only additional requirement for evaluation based on student work is some analysis of that student work. This is not a trivial requirement, but it is much less demanding than a full research or evaluation study.

If the lecturer has taught problem-solving previously, to similar students, it may be possible to compare the work of students taught in the old and the new way.

Such an evaluation does not prove the effectiveness of the new teaching approach, certainly not to the standard of proof with which, for example, a scientist is comfortable in their discipline. However, education is a social rather than a natural science. A lower and different standard of proof is necessary, mainly because of the sheer complexity of people acting in social settings and the huge number of variables and interactions involved.

If the evaluation suggested here shows that students exposed to the new teaching method have developed and demonstrated the specified capabilities, it would feel like a success for the new method – crudely, the method seems to work. Further, if the students were seen to do better than those taught by previous methods, then it would be legitimate; with whatever cautions were felt to be necessary; to claim that the new method works better than the old.

Research into learning and teaching in higher education in general reports that better learning results from a higher level of active student engagement in the learning process. The lecturer could use this argument to claim to have improved their teaching. Better student performance at problem-solving supports the lecturer's case both for having improved their teaching and for having improved students' learning.

This would have been a productive, and not particularly onerous, evaluation to undertake.

A more sophisticated evaluation could identify the particular ways in which the changed teaching methods were effective; identify students' reactions to the new teaching and learning approach; and relate these changes to more sophisticated theories of learning, or indeed generate new theory which can be used to develop new practice. Evaluation thus feeds both pedagogic research and pedagogic development.

Meta data

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Author (s)	David Baume
Owner (s)	David Baume
Title	Case study – Workshop on teaching problem solving
Keywords	Academic practice, development, evaluation, event, problem solving, Higher Education Academy
Description	One of a series of guides on the evaluation of academic practice, academic development units, resources, events, activities and services. This guide, like the others in this series, is modified from an evaluation framework produced for the six Higher Education Academy Science, Technology, Engineering and Maths (STEM) Subject Centres in 2009. These Subject Centres consist of Biosciences, Engineering, Information and Computer Science, Materials Science, Maths Stats and OR and Physical Sciences. The author, Dr David Baume, adbaume@aol.com, is happy to be contacted for advice and support on using this evaluation tool and others in the series.
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