Writing learning outcomes

Advice on defining courses using an outcomes-based approach

UK Physical Sciences Centre

Quality assurance developments in higher education have encouraged a move to an outcomes based approach to teaching, learning and assessment. Programme Specifications, benchmark statements and the National Qualifications Framework define the student in terms of what they can do at the end of a programme or a particular level of study. This is a change from the more traditional approach where academics tended to define courses in terms of what is taught, rather than what the student can do at the end of the module or programme.

There is much debate in the educational literature about the value of defining learning outcomes to the learning process and the effect that they may have on student learning. There is also much discussion of whether all articulated learning outcomes should be assessed, or whether it is acceptable that some outcomes **must** be achieved whilst others **should** be achieved. It is not the purpose of this paper to enter into such a debate. Although many academics have serious misgivings about the outcomes-based approach, many of us are now required to define our courses in these terms. This paper simply aims to give some advice on how to do this as painlessly as possible.

Moving to this approach requires academics to think about what they ask their students to **do** during various formative and summative assessment activities. What students can do at the end of a learning opportunity defines the learning outcome. Stated outcomes must be realistically achievable by the students and should constitute a tutor's 'wish list'.

Our aims in teaching a particular module may be to engender 'understanding' or 'appreciation' of a particular topic. Learning outcomes should not use terms such as 'understand' or 'appreciate' as it is not immediately obvious to a student what they have to do in order to demonstrate that they 'understand' or 'appreciate' something. Understanding cannot be directly assessed, only inferred from the outcomes of other activities. Tutors should think about how they ask their students to demonstrate their understanding. They may ask students, during an examination, to describe a process, to discuss a concept, to evaluate some data or to derive an equation. These are the tasks that the student actually does in order to demonstrate understanding, so these terms can be used to express the leaning outcomes.

Learning outcomes should:
- be written in the future tense
- identify important learning requirements
- be achievable and assessable
- use clear language easily understandable to students

When writing outcomes, it may be useful to use the following expression
At the end of this module/course you should be able to…….

Then follow with an active verb. Useful ones include:
> *analyse appraise apply calculate choose compare contrast create criticise*
> *demonstrate derive describe design develop differentiate discuss explain*
> *evaluate extrapolate formulate identify list measure name plan plot*
> *postulate predict present propose recall recognise use utilise*

By articulating outcomes in this way it then becomes clearer to students what they should expect to be able to do. Learning outcomes may also help staff to decide whether they are assessing what they think they are assessing and whether their assessment methods are appropriate. If a learning outcome is defined, be prepared to say how it is developed and assessed.

There are no rules on how many outcomes are appropriate per lecture course or credit point and any attempt to standardise would be completely artificial. Some modules may have many outcomes that are fairly easily achieved and assessed. Other, perhaps higher level, modules may have fewer, more complex outcomes which are more demanding to acquire and demonstrate.

Here is an example of some learning outcomes for an introductory course on atomic structure. The aims of the course may be to give students an appreciation of how models of the atom have developed and help them to recognise the importance of quantum mechanics in describing the modern view of the atom.

At the end of this course you should be able to:
- define the terms *wavelength*, *frequency*, *amplitude* and *node*.
- recall the relative frequencies or wavelengths of the various regions in the electromagnetic spectrum
- describe the Bohr model of the atom and use it to account for the emission line spectra of the H atom
- discuss the limitation of the Bohr model
- use the Rydberg equation to predict the wavelengths of electronic transitions
- describe the concept of particle wave duality
- state the Heisenberg Uncertainly Principle and discuss the ramifications of it
- describe what you understand by the term *orbital*
- name and state the relationships between the quantum numbers n, l and m_l

Further information

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Original Author: Tina Overton
Edited: June 2010