CME - guide No 1

Designing a course for meaningful learning

A step by step guide

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Introduction

This guide aims at providing support in course planning. It facilitates the development of a completely new course, however, the guide can also be used for analysing existing courses. If for example the course evaluation shows that there is room for improvement, this guide can used to systematically analyse the course design and identify areas that need to be improved.

The guide starts with a brief description of the theoretical underpinnings. A number of strategically chosen points and questions follow; a resource list and links to relevant websites plus a reference list conclude the guide.

Theoretical underpinnings

The guide builds on more than 30 years of collective knowledge and research regarding factors contributing to meaningful learning (1, 2). The term "meaningful learning" is defined as learning where the student is not only learning to remember facts but also to understand how this facts link together to provide new knowledge. Further the notion of "meaningful learning" encompasses the circumstances the knowledge should be used in as well as how well the student is able to use the information in new situations. Meaningful learning takes place when the individual who is going to learn is active and engaged in the course material. During this process, it may be important for the student to get feedback from teachers as well as from other students (3). Course design has an important function here; where you can plan activities, where the students get to apply, analyse, explain, test ideas, identify and solve problems that help them to work through the learning material.

The guide is also based on the principle of alignment between learning outcomes[1], teaching-and-learning activities[2] and the formal examination of a particular course (Constructive Alignment, see Biggs (4) for a thorough description of the term). A part of the Bologna process is that all courses and –programmes shall have clearly stipulated learning outcomes. These learning outcomes are supposed to outline what students are supposed to know in terms of knowledge and understanding, be able to do in the form of acquired skills and stipulates also their ability to make ethical and professional decisions by the end of each predesigned course/programme. In a European context the Dublin Descriptors (8) stipulate the type of knowledge higher education provides, consequently each country defines the types of knowledge to suit the local context. This explains why each country may emphasis different types of knowledge for its own local context. The course is supposed to be planned in such a way that the teaching-and-learning activities provided help the students to reach the outcomes, e.g. to be able to understand, be able to do, and how to relate to what is defined by the outcomes. In order to judge if the students have reached their learning outcomes, the examination must be designed in a way that reveals exactly that. Learning outcomes, teaching-and-learning activities and examinations must interact harmoniously and be coherent. Furthermore, they ought to be shaped in a way that supports meaningful learning. This is the principle of constructive alignment. Another description of course design is the model by Fink in integrated course design (5). The similarities between Biggs' constructive alignment and Fink's integrated course design are evident. For more information regarding course design, you can read either Biggs (2) or Ramsden's book (1), or a paper by Fink (5) in order to understand how course design affects students' learning.

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[1] Learning outcomes describe what the students are supposed to understand, be able to do and be able to relate to at the end of the course

[2] Teaching-and-learning activities are the different activities taking place during the course, e.g. lectures, seminars, lab work and projects. Also activities that student do outside of contact hours, e.g. essays, preparations for seminars, homework and noting down reflections after lectures etc.

The Bologna process

As mentioned previously, all courses and programmes are now supposed to formulate learning outcomes which describe what students are supposed to know, understand, relate to and be capable of performing by the end of the course/programme. This is, however, not enough for formulating learning outcomes! These outcomes are supposed to act as the hub around which the whole course design is moving. That is why this guide is about the whole course and not just the learning outcomes. A final note on learning outcomes; the bologna process highlights the value of generic skills such as the ability to think critically, to be able to communicate ones' knowledge, to be able to be a life long learning, to be able to work in a group, etc, outcomes that are broader in scope and address skills that are not strictly subject specific, it is important to bear this in mind during the process of formulating learning outcomes. CME Guide No 2 (6) provides you with information about how to formulate learning outcomes and the two guides complement each other and should preferably be read together. CME guides No 3 and 4 address progression and examination respectively.

How to use the guide

This guide does not have to followed from start to finish, you can just as well start in the middle and work forwards or backwards. The process of designing a course is seldom done in a stringent linear fashion from intended learning outcomes through activities and examination. Oftentimes there is a need to re-think and revise the course design re-thinking activities, outcomes and examination several times. The main thing is that the points raised below are discussed at some stage during the process. When it comes to the generic competencies that all higher education is supposed to develop in the students, e.g. a scientific approach and an ability to communicate conclusions and ideas to others, it is important that these competencies are reflected during several courses (course modules) of a programme. A common planning and co-ordination of course modules within a programme is therefore important.

The Guide; step by step

1. **Setting the scene**
   a. Who are the students (number, knowledge and experience, motivation, cultural background etc).
   b. In which context is the course given (when during a programme, elective or mandatory course, prerequisites, connection to other courses etc).
   c. Which generic competencies should this course provide an opportunity to develop? (Is the course coming early in the training programme – should this course introduce some topic that other courses will build on?)
   d. Which resources are available for the learning process? (Lecture rooms, labs, group rooms, teachers, computers etc).
   e. Which teachers are involved? How will I communicate to them the learning outcomes for this particular module? (experience in education and course planning, ethos regarding learning and education etc).

2. **Limit the course content**
   a. Consider what is absolutely necessary for the students to learn during the course. Which are the central ideas, skills, principles or connections that the students must bring forward? It is around this central pillar that the course content should be built.
   b. What can you take out to avoid "curriculum overload"?

c. Next time the course is given – ask the students what they consider is the most important part of the course and what they think could be taken out. Is the response consistent with the teachers' experience?

3. Identify learning outcomes[3]
a. What do you want the students to be able to do/perform after the course (skills)?
b. What do the students have to understand in order to perform the skills that you have listed under 2a?
c. Should the students have developed a way to relate to the issues discussed during the course?
d. Review the learning outcomes and analyse them using for example the SOLO taxonomy[4] (7). Where in the taxonomy can you place your outcomes? Can the outcomes be formulated in order to place them higher in the taxonomy?
e. Are our learning outcomes focused on key definitions and central skills? If not, revise. Learning outcomes should not include too specific facts.

4. Assessment of learning outcomes – examination
a. How can you know that your students have fulfilled the learning outcomes? (In which manner can you judge if whether they can perform and understand what you have listed under point 2?).
b. Go through each learning outcome above and discuss which information you as teachers need to be able to define if each individual student has reached the outcomes.
c. How can you substantiate differences in quality, e.g. how well they have performed in for example the answering of a complex question in a written test.
d. How can you introduce formative[5] assessment during the course? Which types of examination are suitable? (Self-and peer-assessment, log book, short tests, teacher and peer feedback etc. There is a large number of different varieties of formative assessment. See resource list in the end of the guide.).
e. Which forms of summative[6] examination should you use during the course? (Written examination, oral examination, practical tests, portfolios, projects, etc).
f. Are the students performing tasks that are assessed, but are not a part of learning outcomes? If yes, should you revise the learning outcomes?

5. Consider teaching-and-learning activities
a. What teaching and learning activities do you normally include during the course? (Listening to lectures, performing practical tasks, group work, project

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[3] See also CUL Guide No 2: Formulating learning outcomes: Practical guidelines

[4] SOLO taxonomy (Biggs 2007) provides good assistance when you are writing learning outcomes. In order to design a course for meaningful learning it is important not to get stuck on too fact focused outcomes and activities. Fact focus gears the students towards a short-sighted fact studying, instead of moving on trying to understand how things are related.

[5] Formative assessment is performed during the course in order to find out how the students are doing, but also as a support for learning. Short tests can be a form of formative examination. Remember that also these have to fit with the learning outcomes and teaching-and-learning activities!

[6] Summative examination is given by the end of a course. The summative examination can be performed in many different manners but should provide a basis for the teachers in judging whether the student has reached the learning outcomes. Summative examination has a learning function as well as a control function.

work, problem solving individually or in group etc). How active are the students? (Listening, reading, discussing, preparing, performing).

b. Why are these activities included? In what way do you think that the students will reach the learning outcomes through these activities? Which proof do you have for this?

c. Which alternative activities could you possibly introduce in order to help the students achieve the learning outcomes (See resource list in the back of the guide for inspiration).

d. If the teaching-and-learning activities are not aligned with the learning outcomes – should you change the outcomes or the activities? Remember that it is meaningful learning that should be stimulated, which means that if the activities are too focused on facts – while the outcomes describe that the students should be able to use their knowledge by analysing something – you need to change the activities. If it is the other way around, the outcomes should be changed.

6. Choose suitable teaching methods
   a. How can you as teachers help the students reach the learning outcomes? Which teaching methods and pedagogical tools should be used? Why?
   b. How is the working climate of the department/class room perceived by students and teachers? Can this be altered? Should it be altered?

7. Prepare the course schedule
   a. Which activities should come first? Which activities should come at the end of the course? It is more favourable to have limited tasks in the beginning of a course and more complex at the end. You can also consider aligning the content in the previous course to your own course somehow. This helps students to "study for life and not for the exam", since their knowledge will be used outside of the course.
   b. Will the design of the course encourage the students' own activity? If not – revise teaching-and-learning activities in order to promote students' own activity.

8. Assessment criteria
   a. Read what you wrote under point 3 about assessment of learning outcomes. Formulate practical criteria. What can you as a teacher observe in a student who does not fulfil the criteria, e.g. what is a *fail*?
   b. If the outcomes are impossible or very difficult to use in formulating assessment criteria – reformulate. Ask yourself if they express transparency to the students? Test your criteria on the students.
   c. How many assessment steps are there in your course? Formulate criteria for all assessment steps. One way to do that can be to write a rubric (see resource list in the end of the guide).
   d. If the criteria are not working when you are supposed to use them in your assessment, they have to be revised. Normally it takes a couple of revisions until you have been successful in formulating really good and useful assessment criteria. Remember that criteria for grades of pass with distinction, pass, fail and anything in between needs to be communicated to the students, to let them know what is required.

9. **Evaluation**
   a. How is the course as a whole going to be evaluated? Which information do you need to develop the course?
   b. Which information will you need during the course? (How do the students perceive the course, are the outcomes clear, have they learnt what they are supposed to, do the teachers support the students etc)
   c. How will you get that information? (Interviews, class room techniques, feedback from colleague, questionnaires etc).

A few final thoughts

Designing a course for meaningful learning is not always easy. It requires a lot of thinking to get all parts aligned with each other. It may not be even possible to perform a course in the way you would wish to. Reality with all its shortcomings can be difficult to change and in many cases you have to settle with solutions that are less than perfect. However, you always have a certain room for improvement and it is important to be able to see which changes you can do that have the largest impact on the student learning. Possible changes are often those that are related to changing forms of examination and introducing more teaching-and-learning activities where the students have a possibility to practically work on the information material. It is important also to have a holistic view of the course and an awareness of how things are interconnected and as a teacher try to understand how course design can support or obstruct student learning.

References

1.   Ramsden P. Learning to teach in higher education. 2nd ed. London: Routledge Falmer; 2003.
2.   Biggs J, Tang, C. Teaching for Quality Learning at University. 3rd ed. England: McGraw-Hill; 2007.
3.   Race P. Using feedback to help students learn2005: Available from: http://www.heaacademy.ac.uk/resources.asp?process=full_record&section=generic&id=353
4.   Biggs J. Aligning teaching for constructing learning2003: Available from: http://www.heacademy.ac.uk/resources.asp?process=full_record&section=generic&id=477
5.   Fink LD. Integrated course design. Idea Paper [serial on the Internet]. 2005; (42): Available from: http://www.idea.ksu.edu/papers/Idea_Paper_42.pdf.
6.   Thorsson I, Weurlander M. Formulating learning outcomes. CME Guide [serial on the Internet]. 2007; (2).
7.   J. B. Biggs' structure of the observed learning outcome (SOLO) taxonomy2007: Available from: http://www.tedi.uq.edu.au/downloads/Biggs_Solo.pdf
8. Dublin Descriptors: http://www.jointquality.nl/ge_descriptors.html

Resources
Below you can find web pages and papers which describe active learning and tips on how to get students to be more active during a course. You will also find texts on formative examination and about the Bologna process.

About teaching-and-learning activities, active learning and course design
Andrade H, Understanding

The Bologna Process, Towards the European Higher Education Area. The European Commission, Education and training; [cited 2008 June 15th]; Available from: http://ec.europa.eu/education/policies/educ/bologna/bologna_en.html .