Designing Courses

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Schedule

- **Part 1: What should our courses achieve for students?**
  - Focus on student learning: deep vs. surface learning
  - Focus on the issue of employability
  - Focus on student motivation

- **Part 2: The curricular context**
  - Focus on learning aims and outcomes; practice writing learning outcomes
  - SCQF Levels: National expectations with regards to student progression
Part 3: What teaching and assessment options do we have?
- “Traditional” teaching in the sciences
- The “Flipped Classroom”
- The “Quecture” approach
- Advantages and disadvantages for your course
- Passive vs. active learning
- Traditional vs. peer learning

Part 4: Course design models:
- Biggs’s Theory of Constructive Alignment (Biggs 2003)
- Dennis’s course design and review model (Dennis 1990)
- Practice deciding on teaching and learning activities and assessment
Part 1: What should our courses achieve for students?
What should our courses achieve?

- Individually pick a course which you need to design or which you would like to teach in the future. Think of the effects that you would like this course to have on students. Present your course and ideas to 1-2 colleagues.
What should our courses achieve? Some possible answers

- Good results in exams
- Deep learning to also help with skill development
- Employable students
- Increasing student numbers
- High participation
- Lifelong learning
- Disability equality
- Internationalisation of the curriculum
- Research-informed teaching
- Quality assurance
- Presentation of new advances in technology and research

Adapted from Butcher et al. (2006) page 47
Surface vs. Deep Student Learning

Could anyone explain these notions?
Surface vs. Deep Student Learning

- **Surface learning** is:
  - Focused on meeting the demands of the course
  - Strategy: remembering and reproducing information
  - May not involve understanding
  - Most students just want to pass, although some aim for high marks through the development of good time management.

- **Deep learning** is:
  - Focused on understanding
  - Strategies: reading in depth, discussing with others, relating new to old knowledge
  - Students may not be interested in high marks, unless achieving approach used.

From Toohey (1999) pp.9-10
The issue of employable students

- Employers looking more and more for “T-shaped” people (i.e. people with both depth and breadth in their skills)
One of our university’s aims is to ‘produce graduates fully equipped to achieve the highest personal and professional standards’.

The Strategic Plan 2012-16 describes some of the important steps:

- ‘embed[ding] graduate attributes and employability in all our curricula, and equip[ping] our students to compete in the global marketplace’
- ‘producing graduates with socially and economically valuable attributes and expertise’
- ‘increas[ing] student satisfaction with the opportunities and support for developing their graduate attributes and employability’
- ‘equip[ping] our graduates with the expertise and graduate attributes they need to achieve their full potential within the global community’
- ‘brokering strategic partnerships between academics, industry, specialists and other institutions to enhance the development of graduate attributes in all students’

From http://www.ed.ac.uk/employability/staff-information/strategic/strategic-plan
Employability and the Graduate Attributes of the University of Edinburgh

- Define what it means to be a graduate of our university, including skills, abilities, attitudes, approaches that were developed through learning and reflection.

- Must be considered in the design of programmes and courses

- Are governed by the HEA “Student employability profiles”

- Spend a few minutes to browse through the “Graduate attributes” website and the “Graduate attributes summary” document
The issue of motivation

In small groups, discuss the following questions:

- Why are students not motivated to attend course or adopt a deep learning approach?
- What could you do in general?
Some ideas for motivating students

- Motivation may have different reasons: desire for high grades, qualifications, sense of achievement, real interest and love of learning.

- Watch students to understand how engaged they are and what motivates them by:
  - Checking attendance rates, results in assessment
  - Observing how active they are in class (e.g. how animated, whether they come prepared, whether they ask questions, etc.)
  - Observing how much effort they put into their written work

- In general, students are more motivated by courses which are realistic, practical and related to job prospects
Part 2: The curricular context
The curriculum

- Learning and teaching is driven in many countries by a curricula based on aims and learning outcomes.
- **Aims** = broad statements defining the purpose of a course, module or learning activity; written from the perspective of the teacher (enable, support, facilitate, etc.).
- **Learning outcomes** = specific statements about the observable effects of the course, module or learning activity on students, i.e. what the students should know or be able to do; written from the perspective of the students (discuss, describe, calculate, etc.).
- Learning outcomes should be SMART: specific, measurable, achievable, realistic & relevant, time limited.

Adapted from Morris and Murray (2005), pp. 21-22
Focus on learning outcomes

- Using Bloom’s taxonomy (Bloom et al. 1956, from Butcher et al. (2006) p. 47) and working individually onto the ‘Course design plan’ handout, built a list of at least 5 learning outcomes for your course
Focus on learning outcomes

- What kind of learning outcomes (you could think of verbs) would ensure your students passing from a surface to a deep learning approach?
Relationship learning objectives-learning

From Biggs (2003) p. 27
The Scottish Credit and Qualifications Framework (SCQF) of the Quality Code for Higher Education defines Scottish qualifications and expected outcomes for students.

In the University of Edinburgh:

- 1st and 2nd year UG courses are normally level 8
- 3rd and 4th year courses are levels 9 or 10
- Masters level courses are level 11

In groups, have a quick look at the “SCQF Level Descriptors” document. How are expectations for UG 1st-2nd year, 3rd-4th year and Masters different?
Part 3: What teaching and assessment options do we have?
“Traditional” teaching in the sciences

- Lectures, tutorials, labs
- Lectures present theory; students listen passively
- Tutorials give the opportunity to put theory in practice, exercise and collaborate with peers
- Labs involve more individual work, and are usually an opportunity to try out technology
- Tutors and lab demonstrators must step up and explain concepts which are not clear to students.
The “Flipped Classroom” approach

- The students engage with lectures and resources at home before the class, normally online, to learn the theory.
- In class, they are given the chance to practice the theory, often in groups, by tackling a series of tasks.
- Other activities can also be part of the flipped class: debates, Q & A, demonstrations, role playing, etc.
- Explaining purposes and expectations, being careful in the choice of media, presentation and duration of activities and motivating preparation and participation are key for the success of this approach.

University of Waterloo “Planning a flipped class”
The “Quecture” approach

- Developed by Dr. Heather McQueen from the School of Biological Sciences
- Trialled 2nd year Genetics course with very positive results: more of her students preferred quectures to other approaches to teaching
- Combines traditional lectures and the ‘flipped classroom’ in that it:
  - Requires on-line preparation before class
  - Involves peer instruction style activities during the class (quete) itself
  - The theory is delivered both before and, for difficult notions, during the quecture
- The quecture is divided in blocks governed by learning objectives
- Students and encouraged to formulate and discuss their own questions during the quecture, then continue discussion online in between quectures
- Interesting or difficult questions are discussed in following quecture

Teaching matters blog (2016): “Quectures: Teaching through questions”
Teaching matters (2016): “Experimental interactive learning “Quectures”"
Advantages and disadvantages

- In small groups, and in relation to your course, use poster paper to write down advantages and disadvantages for:
  - Traditional lecturing
  - The “Flipped Classroom” approach
  - The “Quecture” approach
Passive vs. active learning

- Traditional lectures involve passive learning
- Current trend towards more active learning approaches, involving learning through practice and mistakes
- There was proof that active learning increases student performance in examinations, and reduces the chance for failure in science, engineering and mathematics subjects

Freeman et al. (2014)
Traditional vs. peer learning

- Traditional learning puts more emphasis on the central figure of the teacher
- Peer learning is more centred on the sharing of knowledge, ideas and experience between students of the same or different levels

- Some advantages:
  - Learning a lot by explaining things to one another
  - Developing transferrable skills (communication, planning, time management, facilitation) which foster lifelong learning and contribute to their employability
  - Developing a sense of community and relieve anxiety about university life
  - The onus is more on the students who become more in charge of their own learning
  - Easier to manage more students by fewer members of staff
  - Works well with on-line learning

Boud et al. (2014), pp. 3-6
Assessment approaches - revision

- From students:
  - Questionnaires (off-the shelf/school directed/own, one minute/extended)
  - Dropping in to see how they are doing
  - Structured group discussion at end of tutorial
  - Quizzes to check understanding (tutorials)
  - Post-its
  - Paper and pens to write on wall poster
  - Observations of student attendance, preparation, motivation, attitude, etc.
Assessment approaches - revision

- From peers:
  - Sitting in (observation)
  - Advice before (previewing) or after (debriefing)
  - Scrutinising material/processes
  - Making plan on tutorial together
  - Mentoring

- From self:
  - Checklists or pro formas
  - Regular teaching diary or loose reflexion notes
  - Post-it notes on preparation notes

- From course outcomes: attendance rates, results
Part 4: Course Design Models
The Theory of Constructive Allignment (Biggs 2003)

- Is a widely adopted curricular framework; main ideas:
  - The learner should be seen at the centre of learning and teaching; what he/she does is important!
  - Aims and learning outcomes, learning & teaching activities and assessment should be aligned to provide transparency.
The Theory of Constructive Allignment (Biggs 2003)

- **INTENDED LEARNING OUTCOMES**: What students will know and be able to do as a result of the course.
- **TEACHING AND LEARNING ACTIVITIES**: The activities and experiences that support students in succeeding in the assessment.
- **ASSESSMENT**: How students demonstrate that they have acquired the desired Learning Outcomes.

Adapted from Biggs 2003
A course design and review model (Dennis 1990)

Dennis (1990), taken from Butcher et al. (2006) p. 22
A course design and review model (Dennis 1990)

- Places aims and learning outcomes in the centre
- Content is chosen based on them, and its availability feeds back into them
- Teaching and learning methods, how they are sequenced and timed and how students are organised are then chosen based on and influence content
- There must clear links between aims and learning outcomes and assessment, and between teaching and learning methods and assessment
- Assessment informs the evaluation of the course, but also the review of its appropriateness, relevance, quality of material, etc.
- The rationale (i.e. the why?) informs the aims and learning outcomes, but must also be revisited from time to time (i.e. is this still valid?)

From Butcher et al. (2006) pp. 21-23
Deciding on teaching and learning activities and assessment

- Using the “Course design plan” handout, start from each of your 5 learning outcomes to individually decide on teaching and learning activities (including those to be performed by students on their own!) and assessment. Share your ideas within your small group.
Resources/references

- Slides and other resources on Informatics homepage - Staff Intranet - Student Services - Teaching Support - Training
- “Designing courses” material on the “IAD Resources on Tutoring and Demonstrating” channel in Learn
- General texts on course design:
Resources/references

On Employability:

- University of Edinburgh Employability Information for Staff, with sublinks “Graduate Attributes”, “Strategic Implementation” (including “Strategic Plan 2012-16”) and “Employability in the Curriculum”).
- University of Edinburgh “Graduate Attributes” website

On national expectations with regards to student progression: “SCQF Level Descriptors” document

On teaching and assessment options:

- On the “Flipped Classroom approach”: The University of Waterloo, “Course design: planning a flipped class”
Resources/references

- On “Quectures”:
  - Teaching matters blog (2016): “Quectures: Teaching through questions”
  - Teaching matters (2016): “Experimental interactive learning “Quectures”
