

***What the student does***  
***(Reflections on 25 years***  
***teaching actuarial students)***

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# ***Presentation outline***

- ***What is teaching?***
- ***What is the curriculum?***
  - ***1 Learning objectives/outcomes***
  - ***2 Assessment tasks***
  - ***3 Teaching/learning activities***
  - ***Digression: Actuarial capabilities***
- ***A key ingredient: feedback***
- ***University/profession relationship***
- ***Conclusions***

# ***Presenter's perspective***

- ***Over 25 years teaching thousands of actuarial (and other) students at Macquarie University in Sydney***
- ***Teaching actuarial students face-to-face in Canada, USA, Kazakhstan, PRC, HK, Singapore, Malaysia (as well as Australia)***
- ***Teaching Actuarial Control Cycle students in many countries via Internet***
- ***SoA Course 7 Seminars 2001-2006***
- ***UK Profession's CA2 seminars 2006-2009***
- ***Grad Dip Ed; Masters in Higher Ed***
- ***Research focus: student learning***

# ***What is teaching?***

- ***On reflection ... three main stages in my development as “teacher”***
- ***Different focus at each stage:***
  - ***1 Mastering the content***
  - ***2 Achieving better communication of the content***
  - ***3 Getting learners doing the sorts of things that will result in them learning what we want them to learn***

# ***Characteristics: Stage 1***

- ***Teacher must know the content thoroughly, and be able to answer any question that students might ask***
- ***Different learning outcomes – some students learn well and others not so well – are due to differences between students***
- ***There are ‘good’ and ‘poor’ students***
- ***Student’s role is to attend classes, listen carefully, take notes, read the textbook, do the exercises and ...***
- ***... regurgitate it accurately in the exam!***

# ***Characteristics: Stage 2***

- ***Now more comfortable with the content***
- ***Emphasis on transmitting that content more effectively***
- ***Focus on developing teaching capabilities – better lectures, better lecture notes, more and better exercises for students, clearer explanations, from OHP to PowerPoint, computer-based learning***
- ***Central focus on teacher's activities***

# ***Characteristics: Stage 3***

- ***Teaching expertise has no value if no learning takes place***
- ***No longer possible to say:***
- ***“I taught these students about Markov chains last term but they didn’t learn a thing!”***
- ***What does it mean to “learn” or “understand”? How best to support, and test for, the achievement of “understanding”?***
- ***Role of teaching is to stimulate and facilitate learning***
- ***Analogy between teaching and coaching a sporting team – coach can help by guiding but students/athletes must perform***

# ***What is the curriculum?***

- ***Much discussion of actuarial education focuses on knowledge content***
- ***Knowledge content is just one component of the curriculum***
- ***Three main components:***
  - ***1 Desired learning outcomes***
  - ***2 Assessment tasks (how we evaluate how well the desired outcomes have been achieved)***
  - ***3 Teaching/learning activities***



# ***1 Desired learning outcomes***

- ***What do we want our students to know and be able to do?***
- ***Not just knowledge content***
- ***What do we want our students to do with that knowledge?***
- ***What capabilities do our students need to be developing?***
- ***What capabilities are needed to practise as an actuary?***

## ***2 Assessment tasks***

- ***Assessment is in some respects the most important of the three components***
- ***To many of our students, assessment IS the curriculum!***
- ***Assessment speaks louder than words***
- ***Conventional examinations are not well suited to assessing many of the capabilities our students need to be developing***
- ***“It’s not about the numbers!”***
- ***What do the numbers mean?***
- ***Words! (Why?)***

# ***3 Teaching/learning activities***

- ***Gradual move away from conventional lectures to workshops (even for up to 500 students)***
- ***Students are actively involved***
- ***If there are too many students for all to interact with the teacher then have students interact with each other (“teach” each other)***
  - ***Problem based approach (“Here’s a problem ...”)***
  - ***Students think about and tackle the problem individually, then discuss in groups of 2 or 3***
  - ***Teacher ‘models’ solving the problem (start with blank OHP transparency and talk it through)***
- ***Means letting go of “need to cover the syllabus”***

# ***What are actuarial capabilities?***

- ***Consider this list, based on “Bridging the Gap Between Theory and Practice” (Enrique de Alba, GC/IAA Education Seminar, 2009):***
  - ***Up to date technical knowledge***
  - ***Able to do complex modelling (process)***
  - ***Collaborate with other experts (eg insurers, geophysicists, reinsurers)***
  - ***Communicate results to a range of audiences***
  - ***Appreciate the broad context of the problem (regulation, insurance, reinsurance, local, global)***
  - ***Research skills (active, diligent, systematic, careful, reflective)***
  - ***Ready to try different approaches (flexible, creative)***
  - ***Professional (standards of practice, code of conduct – integrity, care, skill, responsibility)***

# ***What are actuarial capabilities?***

- ***Consider this list of “personal abilities” needed by engineers in the early part of their career:***

*(Compiled by Moulton & Lowe, 2005)*

- ***Being willing to face and learn from errors and listen openly to feedback***
- ***Understanding personal strengths and limitations***
- ***Being confident to take calculated risks and take on new projects***
- ***Being able to remain calm under pressure or when things go wrong***

*..... continued*

# ***What are actuarial capabilities?***

- ***Having the ability to defer judgement and not to jump in too quickly to resolve a problem***
- ***A willingness to persevere when things are not working out as anticipated***
- ***Wanting to produce as good a job as possible***
- ***Being willing to take responsibility for projects, including how they turn out***
- ***An ability to make a hard decision***
- ***A willingness to pitch in and undertake menial tasks when needed***
- ***Having a sense of humour and being able to keep work in perspective***

# ***A student's perspective***

- ***A 2009 Macquarie Uni Control Cycle student, commenting on an excerpt from Trevor Thompson's IAAust Presidential Address:***
- ***“Trevor Thompson expresses surprise that there are so few actuaries who are also entrepreneurs.”***
- ***“I'm not at all surprised, at least for the ones who make it through the UK Part I exams – it seems to me that the exam process selects people with the ability to memorise detail, use calculators fast and accurately and take meticulous care in complicated calculations. These may well be good skills for actuaries to have (at least in the pre-computer days), but I would guess that they rarely come together with the skills of the entrepreneur.”***

# ***A key ingredient: Feedback***

- ***Students receiving timely and relevant feedback on their learning so far and acting on that feedback***
- ***Feedback from whom?***
- ***Possible sources of feedback: teachers, teaching assistants (usually more senior students), fellow students (peers), self***
- ***Learning to give, and to receive, peer feedback is valuable preparation for the workplace and for professional responsibilities***
- ***Old adage: “The best way to learn something is to teach it!”***
- ***A tip: Use green (or any colour but red!) for annotating students’ work***



# ***University/profession relationship***

- ***Some thoughts on the relationship between the profession and university programs:***
  - ***Learn from our mistakes!***
  - ***Recognising a whole degree program***
  - ***A principles-based approach to accreditation***
  - ***Quality learning materials through collaboration***

# ***Recognising a whole degree***

- ***Currently: IAAust awards exemptions from professional subjects individually***
- ***For example, a grade of a minimum level (say, B) in a specified university subject earns an exemption from Subject CT5***
- ***Problem: Creates actuarial degree programs with two classes of subject – exemption and non-exemption subjects***
- ***Implicit message: Learning in non-exemption subjects is not important to becoming an actuary and is not valued by the profession***
- ***Solution: Recognise a whole degree***

# ***Accrediting university programs***

- ***Adopt a principles-based approach:***
- ***“<Actuarial organisation>’s approach to accreditation of university actuarial education is principles-based rather than relying on prescriptive rules. A principles-based approach is one that emphasises learning outcomes in setting educational requirements and expectations, but does not seek to specify or prescribe the exact manner in which those outcomes must be achieved.”***
- ***Adapted from APRA’s approach to regulation***

# ***Accrediting university programs***

- ***Current approach: Universities seeking accreditation are asked to demonstrate that their programs “cover” a minimum proportion of the knowledge-based syllabus***
- ***Recommended approach: Universities seeking accreditation are asked to demonstrate how their programs support development of the specified learning outcomes (capabilities) and how the achievement of those outcomes is assessed***

# ***Quality learning materials***

- ***Imagine ...***
- ***... all the experience, energy and time currently spent by volunteer actuaries on writing course notes, exercises, model solutions, M/C items, exams and model answers, reading and grading exam answers, setting pass/fail cut-offs, and in committees ...***
- ***... is invested instead in writing case studies, real world problems, role plays and research assignments, building or adapting data sets to support them, and writing model solutions ...***
- ***... so that students can practise applying their technical knowledge***
- ***SoA analogy: Course 7 (Applied Modeling)***

## ***What the student does ...***

***“It is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does.”***

***Thomas J Shuell (1986)***

***John Dewey said:***

***“... learning is based on discovery, guided by mentoring, rather than on the transmission of information ...”***

# ***Conclusions***

- ***Anyone who teaches actuarial students operates at the intersection of two academic disciplines – actuarial science and education***
- ***Is expertise in one of those areas good enough?***
- ***“What the student does is actually more important ...”***
- ***Good actuaries have more capabilities than just technical expertise***
- ***Assessment speaks louder than words***
- ***When evaluating university actuarial programs, professional bodies should focus less on “syllabus coverage” and more on learning outcomes***



***What do you think?***

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