Innovative
ENGINEERING CURRICULUM

Assessment in an Integrated Curriculum

Bringing Life to Engineering Education: Workshop 3

Facilitated by Dr Zach Simpson and Dr Teresa Hattingh

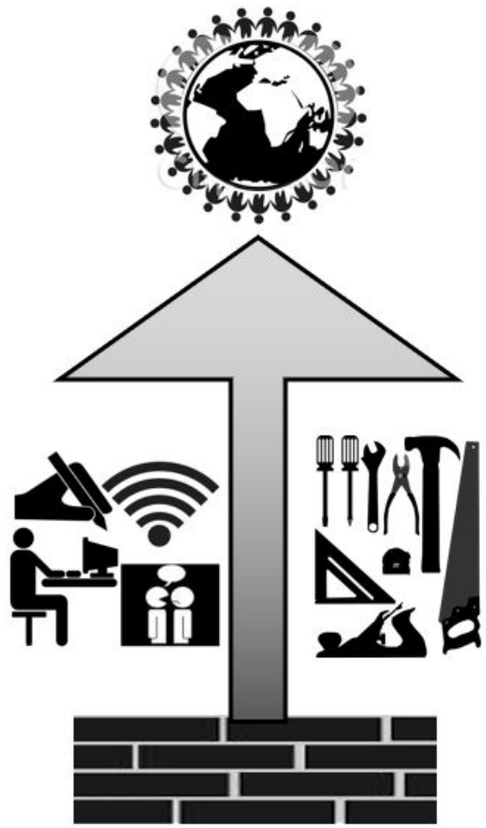
24 February 2022

What is integrated curriculum?

Lelanie Smith

Definition of integrated curriculum:

A curriculum that facilitates a learning experience that connects professional development to technical knowledge and critical thinking.



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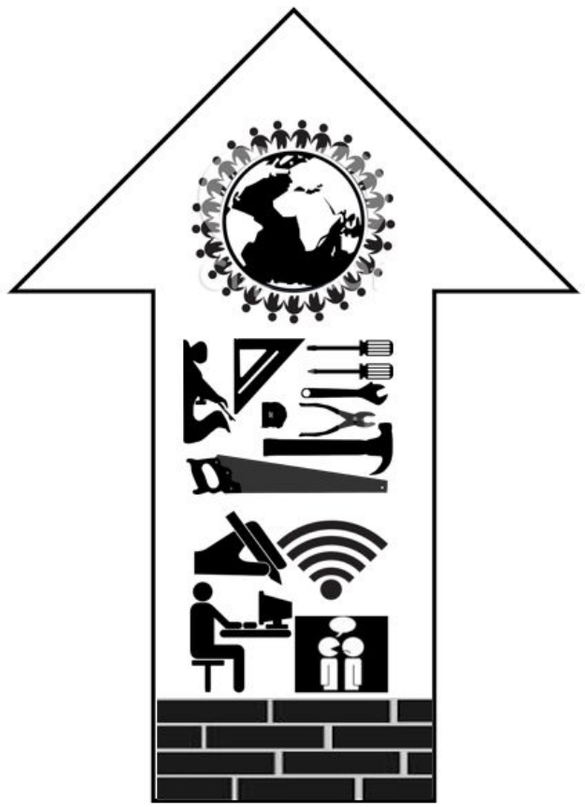

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Bringing Life to our Engineering Curricula

Lelanie Smith

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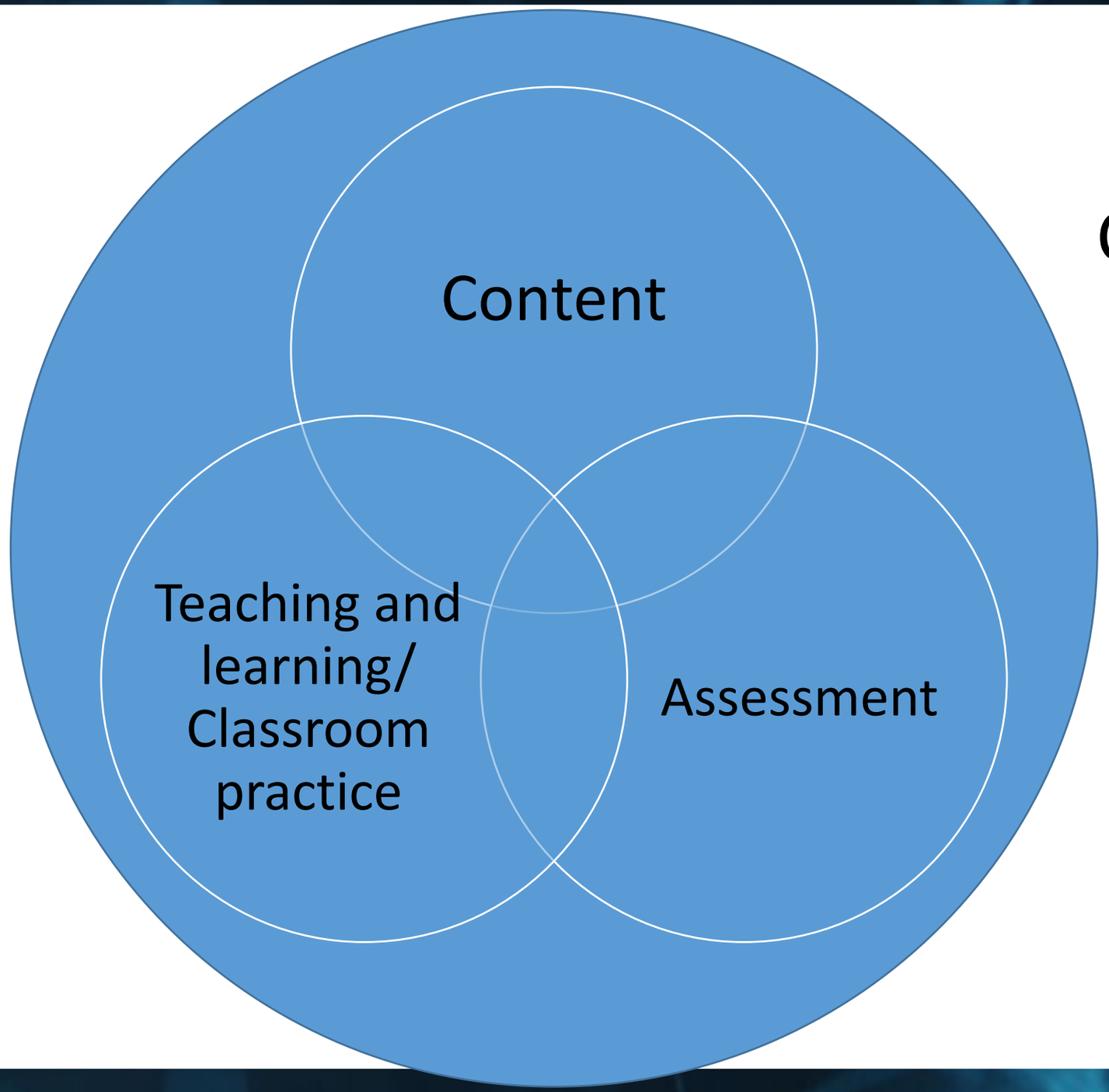
ROYAL ACADEMY OF ENGINEERING

Overview of today's session

- An introduction to sustainable assessment and key assessment principles relevant to an integrated curriculum
- Breakaway activity
- Feedback and discussion
- Close out

First… a caveat



Curriculum

What is the purpose of assessment?

Assessment of learning

Assessment for learning

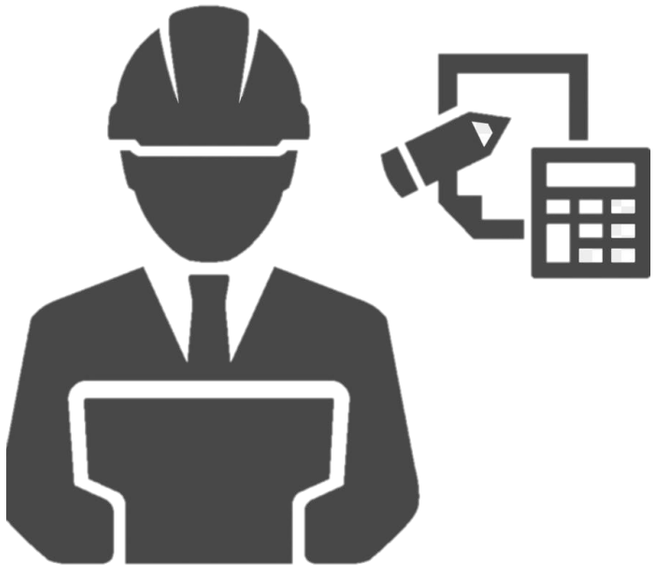
The power of assessment…

Students will do whatever we ask….

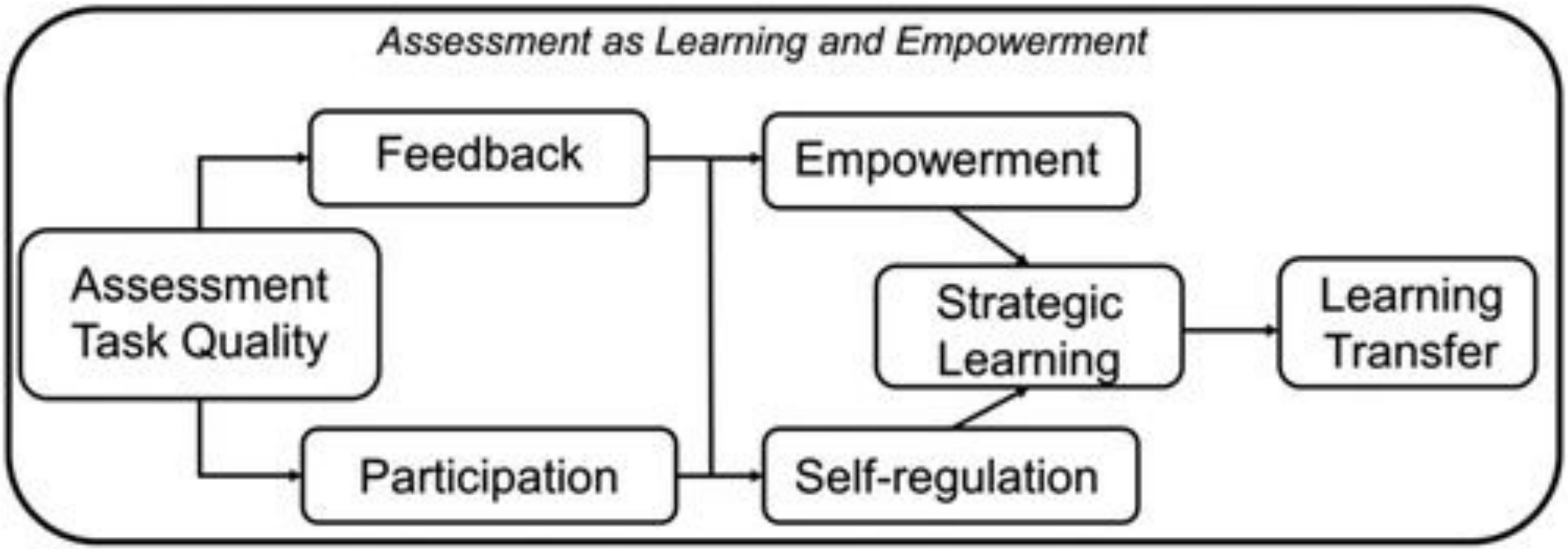
We need to be careful about what we are asking students to do….

Value

"Assessment … is always about more than judging the achievement of learning outcomes for a given module or course. **It is an act of communication about what we value**. It … is an act of **cultural communication transmitting what the collective 'we' intends**…"
(Boud, 2000)



Assessment should empower learners…



(Ibarra-Sáiz, Rodríguez-Gómez & Boud, 2021)

This relies on a varied assessment approach…

- If student are not developing criteria for judging work, they will not be able to effectively establish criteria for work when they don’t have a lecturer around to do it for them.

- If they only write essays, they won’t be able to communicate in other modes.

- If they only do theory, they won’t know how to do practice.

- If they only write exams, they won’t be able to function in a normal workplace, where exams aren’t a ‘thing’

And what is this ‘normal’ workplace?

“The only things we can be sure about are change and connectedness with others in a complex society… We will need to prepare students not just for [course outcomes], but to operate in a society whose form we can but glimpse.”

(Boud, 2000)

What is sustainable assessment?

"Assessment that meets the needs of the present without compromising the ability of students to meet their own future learning needs."

(Boud, 2000)

How can sustainable assessment support an integrated curriculum?

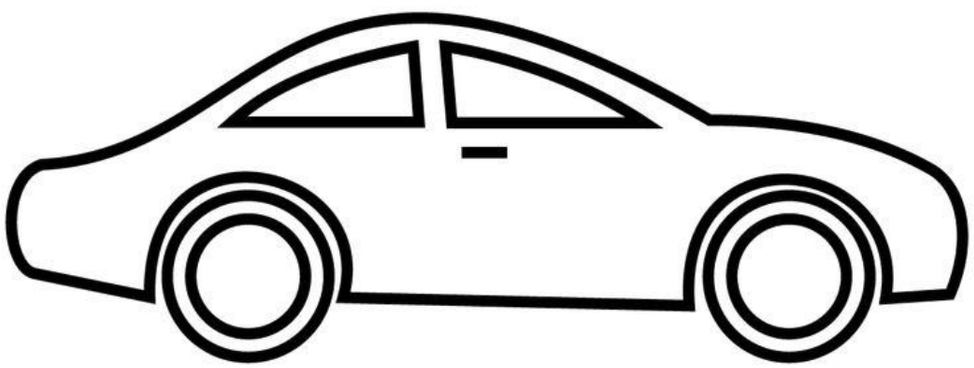
Assessment tasks should be

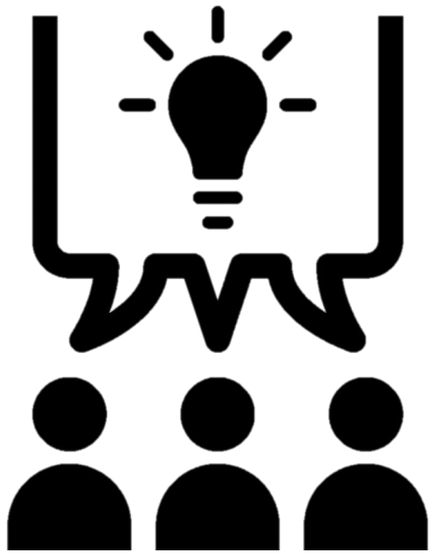
- open,
- ‘naked’ (ie non-technical), and
- novel to students

“students need… to draw upon both disciplinary and professional knowledge… [to develop] their capacity to handle situations in the future that they have not previously dealt with.”

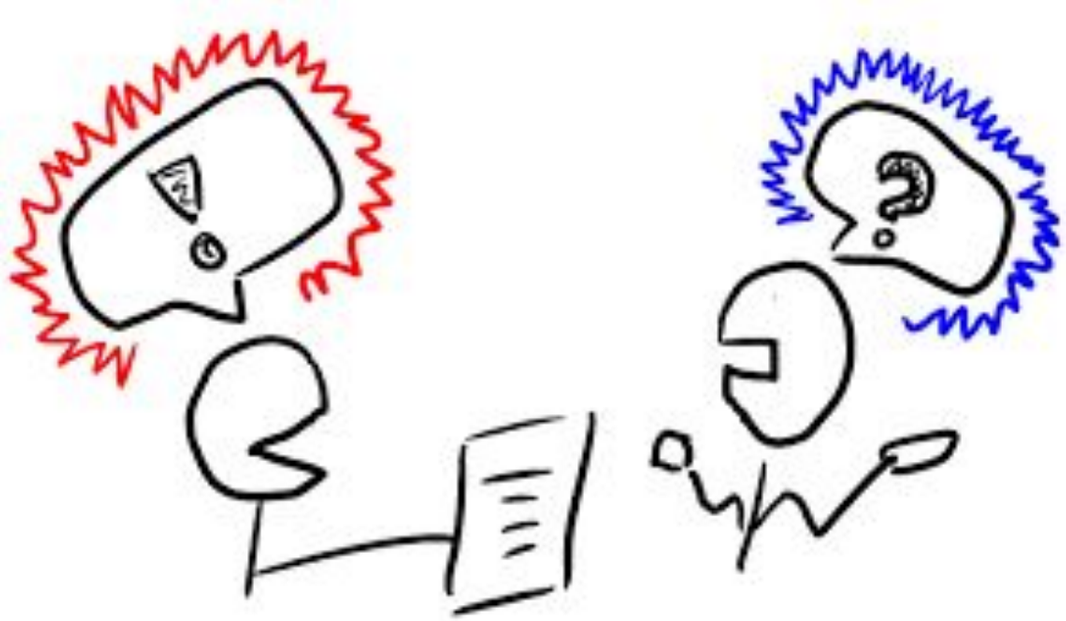
(Boud, 2000)

Product vs process-centred



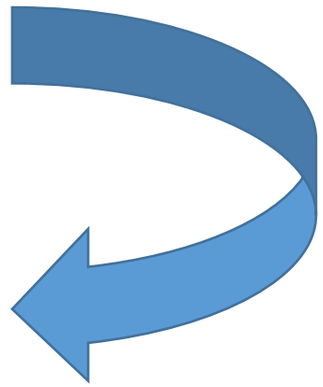


Self-reflection… and peer evaluation



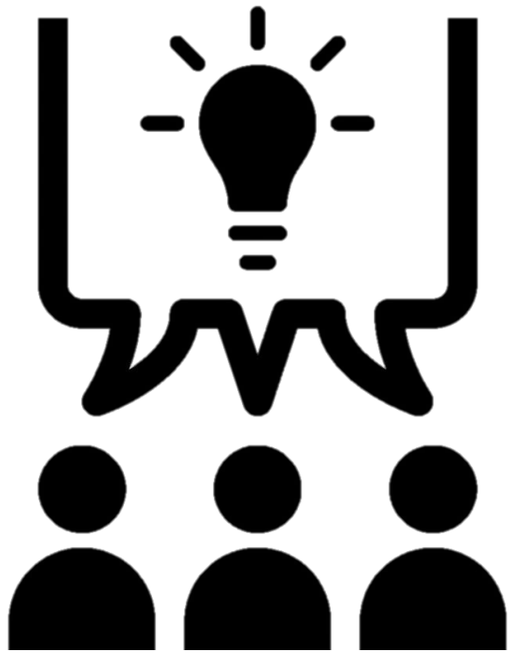
"The creation of a climate in a course in which the giving and receiving of feedback is a normal part of the teaching and learning processes leads to worthwhile peer learning." (Boud, 2000)

Feedback



Rubrics….

Student, lecturer & learning centred-ness



So, what does this mean for the lecturer?

1) Attitude towards learners
2) Making learning explicit
3) Avoiding compartmentalizing knowledge (ie. INTEGRATION)
4) A whole new ~~world~~ approach to teaching and learning

Some questions to ask (Boud, 2000)

Does this form of assessment tend to encourage students to take a surface or deep approach to learning? And secondly, to examine the effects of the assessment on students' approaches to self-assessment.

Does it encourage students to meaningfully engage with criteria for good work in this area?

Does it add to students' repertoire of self-assessment strategies?

Does it prompt students to devise their own assessment strategies to better respond to the assessment tasks we have set?"

ECSA

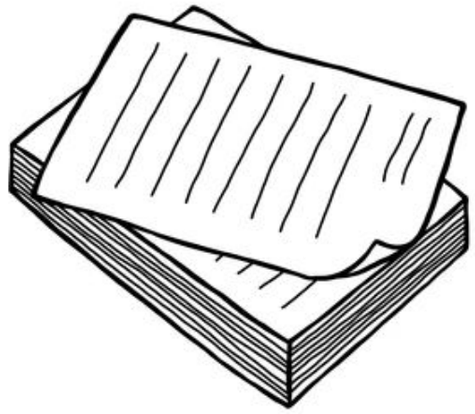
“Providers of programmes shall in the quality assurance process demonstrate that an effective integrated assessment strategy is used. Clearly identified components of assessment must address summative assessment of the exit level outcomes. Evidence should be derived from major work or multiple instances of limited scale work.” (ECSA)

“Overlap exists between performances specified for different outcomes. The same evidence may be used toward assessing competence under different outcomes.” (ECSA)

Professional registration process

ECSA

Engineering Council of South Africa



This is great, but, what does it mean in practice?

How can an integrated curriculum lens address some of our assessment challenges?

In your groups, give yourself permission to be creative and innovative…

Group 1 - Chris

Let’s question who (else) can assess?

(How can self-, peer- and other-assessment be incorporated into your module/programme, or not?)

Group Members: Chris von Klemperer (UCT), Sandile ? (UJ), Leroo ? (UKZN), Ferdie Gerber (WSU).

Peer assessment of fellow students in project work. Submitted project group work contains a Peer work component outcome.	**More effective self directed learning. Reflective practitioners. Self assessment helps here. The presentation is as important or more important than the technical “answer”**	**Get the students to help set up the rubric. Self identification of what is important in the assessment activity. Then get them to assess against the agreed rubric.**
Attention to detail and recognition of what is important in the activity	**Danger in using Industry partners as they often have an incorrect view of what is valuable.**	**Self reflective portfolio of student experience both on classroom and assessment activities. Helps the big picture understanding**
Assessment examples need to be “realistic”, include budgets and other non-technical. Real world simulations	**Peer and self feedback can be facilitated. We put in lots of effort to prepare students and setting assessments. Need to put the same time and effort into feedback - After the assessment.**	
Make everything for marks to avoid the “not for marks” work avoidance by students. Lots of small assessments rather than a big single assignment. Can use Peer evaluation- easier to do on multiple small	**We want students to have an Attention to detail and recognition of what is important in the activity**	**Understanding strategic behaviour in students**

Group 2 - Zach

Let’s question who (else) can assess?

(How can self-, peer- and other-assessment be incorporated into your module/programme, or not?)

360 degree peer assessment	**Critical review of 2-3 other students work, and write a reflection**	**Self-assessment: self-generated portfolios of evidence (BUT need to ‘teach’ students about criteria/outcomes)**
Self-assessment: get students to reflect on progress made by looking at previous assessment tasks (helps to build confidence in their abilities)	**Final-year project already externally assessed - but presentations could also be assessed by industry guests**	**Posters - scaled-up version of industry guests assessing presentations**
Work-integrated learning a good module for self-reflection as well as industry assessment	**ENTER A FANTASTIC IDEA HERE**	**ENTER A FANTASTIC IDEA HERE**
ENTER A FANTASTIC IDEA HERE	**ENTER A FANTASTIC IDEA HERE**	**ENTER A FANTASTIC IDEA HERE**

Group 3 - Eudes

Eudes K Tshitshonu (VUT) - Jamie Cripwell (Stellenbosch) - Liezle Boshoff (CPUT)-- Stephen Adeyemi (VUT)

Let's question who (else) can give feedback?

(How can self-reflection, peer feedback, and other mechanisms be built into your module/programme?)

Feedback from industry partners?	**Context is important - criteria need to be explicit in "assessment <u>of</u> learning approach"**	**ENTER A FANTASTIC IDEA HERE**
Qualitative "better or worse than" rather than rigorous marks	**Peer assessment of low- or zero-stakes assessments (from self and one other student) prepares students for expectations**	**ENTER A FANTASTIC IDEA HERE**
Examples of student variations in approach (learn from one anothers' approach)	**ENTER A FANTASTIC IDEA HERE**	**ENTER A FANTASTIC IDEA HERE**
"Self" feedback - questionnaires pre-, post- and post solution for assessments (incentivise?)	**ENTER A FANTASTIC IDEA HERE**	**ENTER A FANTASTIC IDEA HERE**

Group 4 - John

Let’s question who (else) can give feedback?

(How can self-reflection, peer feedback, and other mechanisms be built into your module/programme?)

Liora Ginsberg, Johan Mayer, Cuthbert Musingwini

Post work and asked students to comment.	**Use senior students to conduct assessment of formative work**	**Use of competitions (Shell Eco) with assessment against specification by externals.**
Need to provide support for students to assess, they don’t know how to assess.	**Projects with EWB - they provide feedback - but typically in product not process.**	**Industry examiners for projects.**
Peer Assessment has problems. Moderation needed.	**Students can get very confused by rubrics. Are they written in language students can understand.**	**balance both the teamwork and the product (as orthogonal axis). Anonymous tools very useful**
Assess the assessment - ask students to evaluate other and assess the evaluation	**Challenges of classes sizes on feedback.**	**We should train academic and students in how to give constructive and valuable feedback**

Group 5 - Lelanie

Let’s question who (else) can be responsible for designing assessment?

(How can students or others be involved in the design of assessment?)

Bonga Khuzwayo (DUT), Tata (US), Craig Law (Wits), Marne de Vries (UP)

Need experience, so can’t hand over completely - could be a collaboration	**Lecturing assistants come up with questions - then lecture moderates and adds complexity**	
Little value in having the students design assessment - but might give us insight in their disconnectedness to the process and what is important.	**lecturing team (i.e. module coordinator, lecturers, internal and external moderator)**	**Gap of interpretation of what the rubric criteria means - so including students could help they really understand the expectations.**
Can draw on Industry to develop practical tasks that students can use to demonstrate competence		

Group 6 - Teresa, Patricia, Trevor, Cheryl, Danny

Let's question who (else) can be responsible for designing assessment? (How can students or others be involved in the design of assessment?)

Get identify something in their own community - tapping into knowledge and passion	Relate assignments to a societal problem	ENTER A FANTASTIC IDEA HERE
Make the students find the context for their assessment - incorporating their voice in the task so that it is kept exciting and real	Use previous students who have done the module to provide feedback that can be used to improve assessments which also asks them to reflect on their learning	Can we introduce students to the integrated space from 1st year??
Get students to work across disciplines		
Working with colleagues when developing assessments	Involve industry - in moderation - to define the projects and to assist with the definition of learning outcomes	Co-design - when they are involved it is easier to get a better result
Giving a second opportunity - prepares for industry	Integrated project - with detailed peer 360 degree feedback)	To prevent working in silos: use a "case" which is used in multiple

Group 7 - Karin

Thabo Maluka VUT (Instrumentation/Process Control 1st Yrs) [Feedback]; Elizbe Du Toit UP (Thermodynamics, Reactor Design) [Scribe] Pontsho Mokautu VUT (Power Electronics)

Let's question who (else) can be responsible for designing assessment?

(How can students or others be involved in the design of assessment?)

Industry partners involved in assessment process. Make it easier to make the link between GA's required by industry	**Published EngEd academics [Flow diagram eg]; also example of strategies for formative assessment.**	**Students in In-service/vac work designing assessments for earlier years [what would I have needed to have a better grasp of XYZ]**
Collaboration between different subject lecturers to design a integrated assessment to allow for more holistic experience.	**Conversations between matric exam assessors (Umalusi) and first year STEM lecturers to exchange perspectives on assessments and feedback strategies.**	**Students in a module given an assessment to DESIGN an assessment with a feedback strategy (rubric/memo) on sections of their course material**
ENTER A FANTASTIC IDEA HERE	**ENTER A FANTASTIC IDEA HERE**	**ENTER A FANTASTIC IDEA HERE**

Group 8 - Reuben

Let’s question who (else) can give feedback?

(How can self-reflection, peer feedback, and other mechanisms be built into your module/programme?)

Group members: Francis Moletsane, Anusha Singh, Wyhan Jooste, Ntshangase Motsweni , Reuben Govender

Feedback ? Anusha

Breaking into small groups - encourages participation, sharing ideas	Within groups - buddy rating / peer review - helps ensure all members contribute	Buddy rating needs to be anonymous - evaluating participation / contribution rather than product
Swopping work for peer assessment - in class for short activities	Helps student see past their own blindspot	Student A finds a reference on a topic, Student B decides if that reference is helpful
Students required to present AND ask questions of presenter	Facilitates thinking critically about communication, and	ENTER A FANTASTIC IDEA HERE
Allocation of tasks within group	Automated feedback (computers?)	Student / peer feedback

FEEDBACK FORM

https://forms.gle/UDmpkfb5vCnCRrZs7

REFERENCES

David Boud (2000) Sustainable Assessment: Rethinking assessment for the learning society, *Studies in Continuing Education*, 22:2, 151-167.

María Soledad Ibarra-Sáiz, Gregorio Rodríguez-Gómez & David Boud (2021) The quality of assessment tasks as a determinant of learning, *Assessment & Evaluation in Higher Education*, 46:6, 943955.