Challenges for HE science teaching

Keith Trigwell

University of Sydney

CoESP launch, Guelph University, 2016
Approaches to learning

Deep approach (understanding)
Students focus their attention on the overall meaning or message in a class session, text or situation. They attempt to relate ideas together and construct their own meaning, possibly in relation to their own experience.

Surface approach (memorising)
Students focus their attention on the details and information in a class session or text. They are trying to memorise these individual details in the form they appear in the class or text or to list the features of the situation in order to pass the examinations.
Approaches to learning and outcomes

Mean Surface Approach score

Scale 1-5

Class III /Pass

n=740

Academic achievement (Honours)
Approaches to learning and outcomes

Mean Deep Approach score

Scale 1-5

Academic achievement (Honours)

Class III /Pass

Class II Div 2

Class II Div 1

Class I

n=740

Mean Deep Approach score

Scale 1-5

Class III /Pass

Class II Div 2

Class II Div 1

Class I

n=740
The Challenge

Ways of thinking and practicing in teaching

Effects on student approaches to learning

Factors affecting teaching

Getting engagement by all faculty

Using evidence on teaching (today)

Gathering evidence on teaching (next Monday)
Structure

Relational model of teaching/learning system

Approaches to learning

Approaches to teaching

Relations between teaching and learning

Factors affecting quality teaching

Implications

Scholarship of teaching and learning
Model of teaching-learning

- Teachers’ conceptions of teaching
- Teachers’ perceptions of context
- Teachers’ approaches to teaching
- Students’ approaches to learning
- Outcomes
Model of teaching-learning

- Teachers’ conceptions of teaching
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- Outcomes
- Students’ approaches to learning
Students adopt qualitatively different approaches to learning that are related to outcomes of learning.
Structure

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Approaches to teaching

A: Teacher-focused strategy with the intention to transmit information
B: Teacher-focused strategy with the intention that students acquire the concepts
C: Teacher-student interaction strategy with the intention that students acquire the concepts
D: Student-focused strategy with the intention to develop conceptions
E: Student-focused strategy with the intention to change conceptions
Approaches to teaching

A: Teacher-focused strategy with the intention to transmit information
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Approaches to teaching

A: Teacher-focused strategy with the intention to transmit information

E: Student-focused strategy with the intention to change conceptions

ITTF
CCSF
Faculty focus their attention on what they do (forward planning, good management skills, an armoury of teaching competencies, use of the literature, ability to use IT …).

They attempt to transmit the information about the curriculum on the assumption that students will learn from that process. That information is often complex and requires organisation and presentation skill.
Approaches to teaching

Conceptual Change/Student-focused (CCSF)

Faculty focus their attention on the students and monitor their perceptions, activity and understanding. Transmission is seen to be not enough.

They assume students construct their own knowledge, and the task of the teacher is to involve the student, and challenge current ideas through questions, discussion and presentation.

Includes mastery of techniques, including those associated with transmission, but this is an empty display without learning.
A CCSF approach includes elements of an ITTF approach, but not *vice versa*
Using buzz groups in a lecture theatre

Do you know what buzz groups are?

What do others think they are?
Turn to the people near you and ask them.

Please finish your conversations when I raise my arm.
Using buzz groups in a lecture theatre

A teacher-focused approach
“Buzz groups give me and the students a break. Research shows students lose concentration if there are no breaks in a one-hour lecture.”

A student-focused approach
“Buzz groups are a means by which students can try out their understanding, and in so doing also give me an awareness of that understanding.”
Approaches to Teaching Inventory

Two scales: CCSF, ITTF, 11 items in each scale
Scale reliability = 0.83 and 0.86 respectively

Scale scores range from 1 (low) to 5 (high)

ITTF sample item:
It is important to present a lot of facts to students so that they know what they have to learn for this subject

CCSF sample item:
A lot of teaching time in this subject should be used to question students’ ideas
# Approaches to teaching & satisfaction

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable</th>
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</thead>
<tbody>
<tr>
<td>Information Transmitter/Teacher-focus (ITTF)</td>
<td>Satisfaction with teaching R</td>
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<tr>
<td>Conceptual Change/Student-focus (CCSF)</td>
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</table>

* p < .001; N = 497; Trigwell and Lindblom-Ylänn, 2004
Model of teaching-learning

- Teachers’ conceptions of teaching
- Teachers’ perceptions of context

Teachers’ approaches to teaching

Students’ approaches to learning

Outcomes
### Approaches to teaching & learning

<table>
<thead>
<tr>
<th>Learning Variable</th>
<th>Teaching Variable</th>
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<tbody>
<tr>
<td></td>
<td>Inform. Transm.</td>
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<tr>
<td></td>
<td>Teacher-focus</td>
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<tr>
<td></td>
<td>Concept. Change</td>
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<tr>
<td></td>
<td>Student-focus</td>
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<tr>
<td>Surface Approach (SA)</td>
<td>0.37**</td>
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<tr>
<td>Deep Approach (DA)</td>
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N = 55 Trigwell, Ramsden, Prosser, Martin (1998)
Variation in approaches to teaching is related to variation in student learning.
Structure

Relational model of teaching/learning system

Approaches to learning

Approaches to teaching

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Teachers’ conceptions of teaching

Teachers’ perceptions of context

Teachers’ approaches to teaching

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Outcomes
Conceptions of teaching

Level 1 Focus: What the student is

Level 2 Focus: What the teacher does

Level 3 Focus: What the student does
Different conceptions of teaching lie behind the variation in teaching approach.
Model of teaching-learning

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# Approaches to teaching & context

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N = 439, Ramsden, Prosser, Trigwell, Martin (2007)
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Teaching approach & discipline

Means of approaches to teaching by discipline (N=497).

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(Lindblom-Ylanne, et al., 2006)
## Teaching approach & discipline

Means of approaches to teaching by discipline (N=497)

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<td>3.74</td>
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Scale is 1 (low) to 5 (high)

(Lindblom-Ylanne, et al., 2006)
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Teaching online

Questions from an ITTF perspective:
Is this strategy likely to be the most efficient method of dissemination?
What amount of coverage is likely to be achieved using this approach?

Questions from an CCSF perspective:
Is this strategy likely to achieve the student learning aims?
What type of learning is likely to be encouraged by using this strategy?
Ways of thinking about teaching

Curriculum design

From an ITTF perspective:
I am the knowledge expert in this field and I should be able to teach the content as I see fit and in a way that makes sense to me.

From an CCSF perspective:
It is important that students are able to experience coherence within a subject and between subjects, so curriculum is a collaborative academic pursuit.
A model for judging teaching

Teaching competence

Done poorly

Done well
A model for judging teaching

Teaching competence

Done well

Quantitative

Done poorly
A model for judging teaching

Teaching competence

CCSF

Qualitative

ITTF

Quantitative

Done well

Done poorly
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Scholarship of teaching and learning
Boyer’s overlapping scholarships

Teaching

Integration

Discovery

Application
Scholarship

To be scholarly is to be engaged in personal, but rigorous intellectual inquiry and development involving values such as honesty, integrity, openness, scepticism and intellectual humility.

To be engaged in scholarship is to take that process, for scrutiny, into the public arena.

It is to make transparent the processes and outcomes of scholarly activities.
Scholarship of teaching

If teaching is about making learning possible …

… then the scholarship of teaching is about making transparent how learning is being made possible.

If teaching is about collaborative meaning-making

…

… then the scholarship of teaching is about making transparent how collaborative meaning-making is happening.
## Levels of pedagogic investigation

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Conclusions

- CCSF approaches are more likely to lead to adoption of deep approaches to learning.

- They involve encouraging self-directed learning, taking time to discuss problems, assessing to encourage conceptual change, encouraging debate … .

- …but most crucially, ‘quality teaching’ involves a way of thinking in which there is more of a focus on what the student is perceiving and doing, than on the teacher, …

- … and the scholarship of teaching is about inquiry that has, as the main focus, the facilitation and improvement of student learning.