Teaching Practice Standards for science & mathematics

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The standards landscape

• Why do standards matter?
• What is out there?
• What and who do they apply to?
Why do standards matter?

...because we spend public money

...because governments may use this as a criteria for allocating funding

...because good practice creates better learning outcomes for our students

...and because the world needs scientifically literate citizens
Standards for learning ... and teaching

**Learning standards**

What are the outcomes of a degree?
What is in a degree?

- *Disciplinary standards*
- *Competency standards*

**Teaching Practice standards**

How is a degree delivered?
How does teaching support learning?
What support is provided?

- *Online teaching standards*
- *Peer review of teaching*

**Governance standards**

How is quality defined?
How is quality measured?
How is quality maintained and improved?

- *Uni policy and procedures*

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**National regulations:**
TEQSA Act, Threshold Standards for HE Providers, Australian Qualifications Framework
Higher Education Standards Framework 2015

Domain 1: Student participation and attainment
Domain 2: Learning environment
Domain 3: Teaching
Domain 4: Research and research training
Domain 5: Institutional quality assurance
Domain 6: Governance and accountability
Domain 7: Representation, information and information management
Higher Education Standards Framework
Teaching Practice standards

Domain 1: Student participation and attainment
1.4. **Learning outcomes and assessment**: benchmarking, AQF, constructive alignment, assurance of learning

Domain 3: Teaching
3.1 **Course design**: course specification, ‘Teaching and learning activities are arranged to foster... achievement’
3.2 **Staffing**: ‘skills in contemporary teaching, learning and assessment principles’
3.3 **Learning Resources and Educational Support**: contemporary, relevant, access

Domain 5: Institutional Quality Assurance
5.1 **Course approval and accreditation**: institutional processes apply the HESF standards effectively
5.3 **Monitoring, Review and Improvement**: external referencing/benchmarks (progression, attrition, assessment), emerging developments in ...education, student feedback, guide and evaluate improvements

Domain 6: Governance and accountability
6.3 **Academic Governance**: ‘action to improve performance against institutional benchmarks for academic quality and outcomes’, ‘critically evaluating the quality and effectiveness of educational innovations’
Other dimensions to consider

Where do the standards apply?

Individual:
HEA fellowship promotion and review

Discipline:
Science TLOs Accreditation

Institution:
HESF/TEQSA ACODE/BLASST

What is measured?

Inputs:
Learning resource quality
Teaching and learning time/volume
Expertise of teachers

...and/or...

Outputs:
Student/staff perceptions
Student/staff behaviours
Student success, progress, attrition
Quality measures: what is the local response?

<table>
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<tr>
<th>Outputs</th>
<th>Measured by?</th>
<th>Response?</th>
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| Student perceptions                  | Student teaching evaluations  
National surveys                                 |                                    |
| Student behaviours                   | Engagement measures:  
participation, LMS                              |                                    |
| Student success, progression, attrition | Assessment over time                            |                                    |
Standards for learning ... and teaching

**Learning standards**
What are the outcomes of a degree?
What is in a degree?

**Disciplinary standards**
**Competency standards**

Science TLOs
RACI accreditation standards
PULSE Biology rubrics

**Teaching Practice standards**
How is a degree delivered?
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**Peer review of teaching**

AUTC
UK-PSF
ACODE Benchmarks

**Governance standards**
How is quality defined?
How is quality measured?
How is quality maintained and improved?

**Uni policy and procedures**

HESF (TEQSA)
QILT
Focus on teaching practice does make a difference

Professor Carl Wieman at THE Teaching Excellence Summit, Glasgow, July 2018

Making teaching expertise the norm--

Science Education Initiative– experiment in changing how science departments teach at 2 large public research universities. UBC & U. Colorado

1. Is possible. Transformed the teaching of ~200 science faculty and ~ 150,000 credit hours/year UBC. >90% in best dept’s

2. Factors that help and hinder.
   Help: 1) Science ed. specialists embedded in depts.;
   2) Once they learn, faculty greatly prefer this way of teaching

Hinder: 1) Formal incentive system punishes (only research counts).
Takes ~ 50 hours to learn.
Don’t recognize teaching expertise. No meaningful evaluation of teaching.
2) Dept organizational structures poor for innovating. ...

https://www.youtube.com/watch?v=HioLgQ2KxsQ&feature=youtu.be
How can we use standards to improve learning and teaching?

Standards for Faculties/Schools/Divisions for teaching practice in science and mathematics could be:

• consensus reference point for ACDS members
• basis for local policy and procedure
• basis for benchmarking

Quality measures combine:
Science TLOs (what is learnt?)
Teaching Practice Standards (how is it taught?)
Quality measures (what was the outcome?)
Discussion: What is the utility of and what should be included in teaching practice standards for science and mathematics?

In small groups consider:

In setting teaching practice standards for Faculties/Schools/Departments:
  • What is the primary use for teaching practice standards?
  • What are the key domains/criteria that should be included?
  • Which domains/standards have special application to science and mathematics?

Each table will consider teaching practice standards under one of the four general themes (one theme per table)
A. Teaching and assessment design
B. Teaching and assessment delivery
C. Infrastructure for learning: spaces, online, student support
D. Governance (including QA) and leadership