Enhancing the Scholarship of Teaching through Action Research

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Short summary

- The Bologna Process
  - The case of the University of Aveiro, Portugal

- The Scholarship of Teaching

- Strengthen the Scholarship of Teaching through Action Research
  - The ‘Questions in Chemistry’ Project
  - The ‘Questions in Geology’ Project
The Bologna Process

- Implementation ‘in form’ rather than ‘in substance’
- Intended changes of the curricula of study programmes (teaching methodologies, contact hours, assessment)
- Some incongruence found, e.g., size of classes
University of Aveiro and the Bologna Process

- One of the institution’s strengths
  - Structure and organization of learning programmes

- Some weaknesses
  - Too much contact hours
  - Little tutoring
  - Unpreparedness of students for the challenges of higher education
  - Insufficient concern on the part of the teachers for student success

(Self-Evaluation Report of the University of Aveiro, 2007)
To develop **training** and **advisory services** to teachers who want **to improve their teaching skills**

These services should be available on a **voluntary** rather then compulsory basis (European University Association Evaluation Report, 2007)

Portuguese university and department leadership expect teachers to get involved in services to **improve** their **pedagogical skills** (Veiga & Amaral, 2009)
The Scholarship of Teaching

- Content knowledge
- Pedagogical knowledge

Research ↔ Teaching

Pedagogical content knowledge
The Scholarship of Teaching

- Teaching as **community property** (Shulman, 1993)
- **Critical review** and evaluation of teaching practices (Shulman, 1999)
- **Student-focused** teaching (Boyer, 1990; Trigwell & Shale, 2004)

“Great teachers stimulate active, not passive, learning and encourage student to be critical, creative thinkers, with the capacity to go on learning after their college days are over”

(Boyer, 1990, p.23-24)
The Scholarship of Teaching

- Practice of, reflection on, and codification of teaching (Kreber & Cranton, 1997)
- Faculty evaluation and development (Paulsen, 1999)
- Conduction of research on teaching and learning (Paulsen, 2001)

Classroom research is the most relevant way to integrate content and pedagogical knowledge to create pedagogical content knowledge, and to engage in the scholarship of teaching (Paulsen, 2001; Kreber, 2001)
The Scholarship of Teaching

- Collaborative action research programs: professors + education researchers (Kreber, 2001)

- “If teaching is to be seen as a form of scholarship, then the practice of teaching must be seen as giving rise to new knowledge” (Schon, 1995, p.31)

- “analysing the world but also trying to change it” (Gray, 2004, p.373)

- “designed to bridge the gap between research and practice” (Somekh, 1995, p.340)
“No other event better portends learning than a question arising to the mind” (Dillon, 1988)

“questioning lies at the heart of scientific inquiry and meaningful learning” (Chin, Brown & Bruce, 2002)
Student-generated questions play a significant role in motivating meaningful learning and can serve different function:

- confirmation of expectations, answers to unexpected puzzles, and filling a recognized knowledge gap (Biddulph & Osborne, 1982);
- drive classroom learning and are highly effective in increasing students’ interest, enthusiasm and engagement (Almeida et al., 2008);
- an essential aspect of problem solving (Chin & Chia, 2004);
Students’ Questions

- Student questioning can also guide teachers in their work:
  - influencing the curriculum (Crawford, Kelly & Brown, 2000);
  - revealing the quality of students’ thinking and conceptual understanding (Watts, Gould & Alsop, 1997);
  - revealing students’ alternative frameworks (Maskill & Pedrosa de Jesus, 1997);
  - revealing students’ reasoning (Donaldson, 1978).
“questions are asked when individuals are confronted with obstacles to goals, anomalous events, contradictions, discrepancies, salient contrasts, obvious gaps in knowledge, expectation violations, and decisions that require discrimination among equally attractive alternatives”. (Graesser & Olde, 2003, p.525)
The ‘Questions in Chemistry’ Project

- Action research project
- Collaboration between a research team from the Didactics Department and a professor from the Chemistry Department
- 1st year Chemistry students
- Promotion of student-centred approaches (through the development of students’ questioning competence)
- Enhancement of the scholarship of teaching
The ‘Questions in Chemistry’ Project

- to investigate ways to stimulate students to formulate questions
- to examine the use of students’ questions in the learning and teaching of undergraduate chemistry
- to categorise conceptual questions asked by students during the course of all classes
- to describe students in terms of their disposition to ask different kinds of questions
- to identify and characterise learning styles
- to relate questioning styles to learning styles
Instruments to collect written questions:

- Software
- Question boxes
The ‘Questions in Chemistry’ Project

- **Lectures** (not compulsory), mainly expositive, with small pauses for students’ questioning

- **Seminar-tutorial sessions** (compulsory, n=30), centred on the resolution of case studies in chemistry

- **Practical laboratory sessions** (compulsory, n=15), reformulated in order to enable questioning and to promote student autonomy
The ‘Questions in Chemistry’ Project

- ‘Questions in Chemistry’ lectures (not compulsory), based on students’ questions on a specific topic, e.g., acid rain, fuel cells, ozone layer

- Conference lectures (not compulsory), based on selected Chemistry topics of wide scientific, technological and social interest, e.g., batteries and fuel cells, origin of chemical elements

- Mini-projects (voluntary based), developed only during 2nd semester (February to June), small group work to stimulate investigations on themes chosen by the students
Daily distribution of student-generated questions

2nd semester

Seminar tutorial
Mini-project
Mini-project
Mini-project
QQ lecture
Seminar tutorial

Lecture
The ‘Questions in Chemistry’ Project

- It is clearly possible to create a questioning **environment** where asking questions becomes an integral part of everyday transactions between teachers and students (Almeida et al, 2008)

- Learners will ask questions when and where their **questions are seen to be valued** (Teixeira-Dias et al, 2005)

- To nurture the **spirit of inquiry** and **cultivate questioning** as a habit of mind, teachers should foster a classroom environment where it is intellectually, socially and academically rewarding for students to pose questions (Pedrosa de Jesus et al, 2005)
The ‘Questions in Chemistry’ Project

The ‘Questions in Geology’ Project

- Facing the challenges of the Bologna process
- Enhancing a student-centred approach

- Improving the quality of students’ learning
- Improving the quality of teaching

- Promoting the advancement of the Scholarship of Teaching
Teaching must be seen not only as a setting for the transmission and application of knowledge, but also for its generation, leading to the implementation of action research projects.

Designing and implementing action research projects aiming to develop students’ questioning competence involving faculty members with diversified backgrounds is a way of creating and enhancing dialogue and cooperation between university teachers and education researchers.

Potentialy useful and meaningful way to strengthen teaching-research links, to promote a scholarly teaching, to enhance the scholarship of teaching and