TO CITE THIS ARTICLE (in APA) : Verpoorten, D. (2014). Navigating the uncertain seas of controversies – A pedagogical wind rose. In F. Mélard & P. Stassart (Eds.), *Proceedings of the International Interdisciplinary Working Conference (May, 20-21) "Teaching complexity and uncertainty on Environmental Issues - Practices, Theories and Products"* (pp. 147-157). Arlon, Belgium: Dept. of Environmental Sciences and Management – University of Liège.

Navigating the uncertain seas of controversies – A pedagogical wind rose

A controversy-based pedagogy

The Arlon conference brought together lecturers willing to share and discuss aspects of their practice of "controversies", seen as a teaching/learning method suited to the contextual needs and demands of higher education environmental studies.

The present note contributes to this joint reflective effort by providing conceptual tools helping to interpret the practice, to question what it puts at stake and to detect, from a pedagogical viewpoint, key issues and upcoming questions.

This note falls within the Seminar's aim n°2: "share theories or conceptual propositions that make it possible to equip the teaching approaches and to give them theoretical and methodological foundations" (Program Arlon Conference 2014, p. 2).

The note takes a traditional stance, looking at the contributions to the conference through "constructive alignment"(Biggs, 1996), a basic principle meant to secure the pedagogical validity of any given learning situation by establishing a triple consistency (Kovertaite & Leclercq, 2006; Leclercq, 1995; Petit, Castaigne, & Verpoorten, 2007; Tyler, 1949) between objectives, methods and evaluation. A high-end layer is also examined: the general paradigm. These four dimensions compose the "wind rose" (Fig. 1) used here to nurture the conversation about a bunch of innovative instructional experiences aimed at "recognizing and taking account of the controversial, complex, and uncertain nature of environmental issues and their management" (*ibid*. p.2).

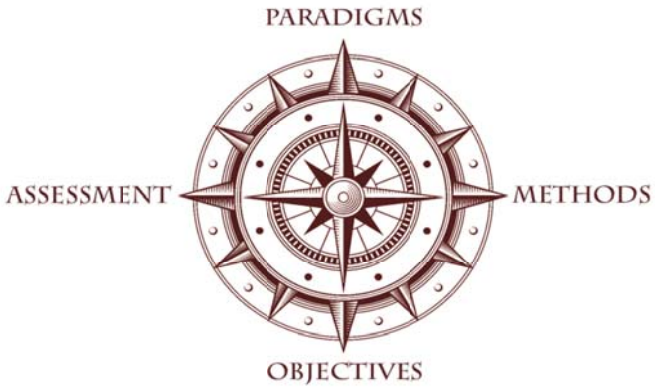

Figure 1 – A four-pronged interpretation grid of the teaching/learning experiences shared during the conference.

Paradigm

Huba and Freed (2000) provide one possible overarching descriptor (Fig. 2) of what is deployed in methods taking controversies as a resource for learning: a shift from transfer knowledge from faculty to students to a production of learning through student discovery and construction of knowledge. Indeed, the adoption of a student's centered approach leaves many options open. Working on controversies is one of them. The hallmarks given in the right column of Fig.2 can easily be recognized in the empirical foundations laid and presented by the participants to the conference. The paradigm centered on learning encompasses influent trends in education like Active learning, Experiential learning, Action learning / Research learning, Problem-based learning, Practice-based learning, Inquiry-based learning, Learning by doing. Huba and Freed's categories can also be seen as a sophisticated presentation of the popular catchphrase "Sage on the stage versus guide on the side". (One missing feature in the table might be that controversies-based pedagogy work with situations which are producers of insecurities for tutors and students).

Teacher-Centered Paradigm	Learner-Centered Paradigm
Knowledge is transmitted from professor to students.	Students construct knowledge through gathering and synthesizing information and integrating it with the general skills of inquiry communication, critical thinking, problem solving, and so on.
Students passively receive information.	Students are actively involved.
Emphasis is on acquisition of knowledge outside the context in which it will be used.	Emphasis is on using and communicating knowledge effectively to address enduring and emerging issues and problems in real-life contexts.
Instructor's role is to be the primary information giver.	Instructor's role is to coach and facilitate.
Teaching and Assessing are separate.	Teaching and assessing are intertwined.
Assessment is used to monitor learning.	Assessment is used to promote and diagnose learning.
Emphasis is on right answers.	Emphasis is on generating better questions and learning from errors.
Desired learning is assessed indirectly through use of objectively scored tests.	Desired learning is assessed directly through papers, projects, performances, portfolios, and the like.
Focus is on a single discipline.	Approach is compatible with interdisciplinary investigation.
Culture is competitive and individualistic.	Culture is cooperative, collaborative, and supportive.
Only students are viewed as learners.	Instructors and students learn together.

Figure 2 – The traits of controversy-based pedagogy to be found mainly in the Learner-Centered Paradigm as delineated by Huba and Freed (2000).

Methods

The 8 Learning Events Model (8LEM) is designed to help teachers describe complex scenarios by facilitating the identification of their components[1]. In contrast to the paradigm level (see section above), the application of the 8LEM is relevant at the finer-grained level of learning activities (Leclercq & Poumay, 2005; D. Verpoorten, Poumay, & Leclercq, 2007). The 8LEM is a

[1] The need for such a rigorous pedagogical approach is rightly emphasized by DuPuis and Ball (2013, p. 66), especially in an unsettled domain like environmental studies: "This approach recognizes sustainability as an intrinsically unstable concept, a dynamic idea that can never be pinned down to a particular technology, set of behaviors, or even worldview and set of values. Under this scenario, the challenge becomes to design a curriculum around an unfixed concept and engage students with multiple modes of knowing without creating an unfocused strategy, agenda, and pedagogy".

learning/teaching model. It means that each event is documented in terms of actions of the learner and corresponding actions of the teacher. Both actions are complementary and interdependent[2]. Three learning events (receives-impregnates-exercises) come under tutor's initiative while the others are on student initiative's side. Quite logically, these latter events are more often represented in the instructional design of learning sequences based upon controversies[3].

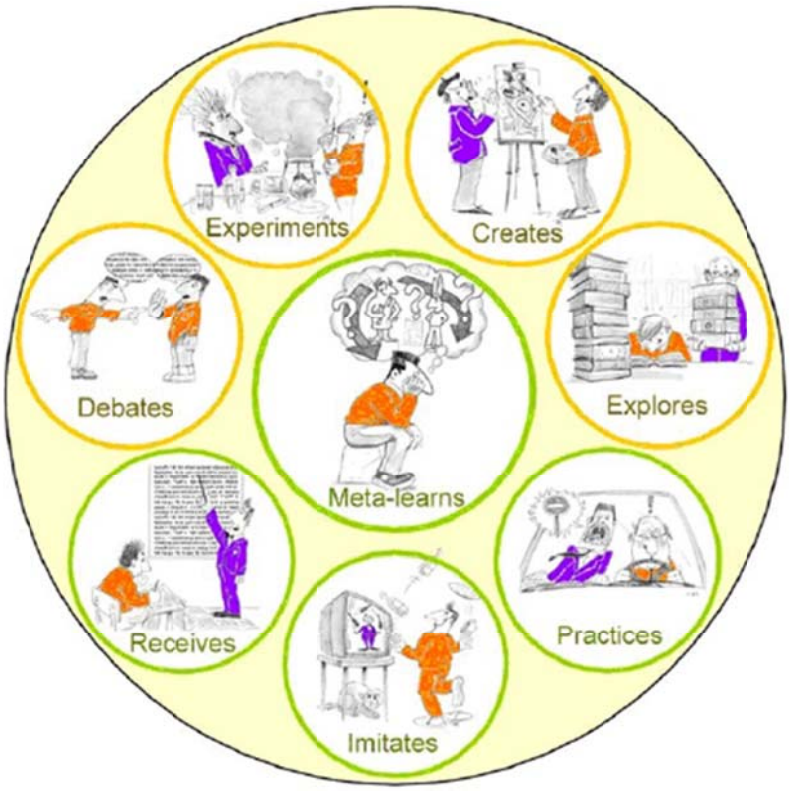

Figure 2 – In controversy-based pedagogy, the student mainly explores, debates, experiments, creates and reflects.

Objectives

[2] The variations on these pairs could be described with many details, but this wouldn't be very efficient since the 8LEM wants to provide educational practice with a model "you can think along with". If the model greatly exceeds human working memory capacity, it will lose one of its essential qualities: that of remaining in educators' mind at all times. The 8 events model remains within the limits of human capabilities and helps providing a rough but complete vision of the learning experiences traversed by the students.

[3] Nevertheless, the tutor-led events never vanish, even in the most "constructivist" sequences. This is the reason why opposition systems like those in Huba and Freed's categories or in the 8LEM, albeit insightful, must always be used with caution. In spite of its seduction, the learner-centered education cannot do without some dosage of instructivism. Transmission remains an unescapable dimension of the learning process, even where its intensity is reduced (Blais, Gauchet, & Ottavi, 2008, 2014). A good example is given by DuPuis and Ball (2013, p. 66) whom wisely observe that an efficient pedagogy is achieved through an interlace of instructivist ("didactic") and constructivist ("post-normal") learning events ("modes of knowing"): "We ultimately categorized our pedagogy into four separate modes, including the didactic strategy of teaching normal science as "facts"—knowledge that is delivered from experts to non-experts—and three collaborative, post-normal modes of knowing".

A competence can be described as: "a complex know-how drawing on the effective mobilization and combination of a range of internal and external resources within a class of situations" (Tardif, 2006, p. 20)[4]. At first sight, a competency-approach is suited to a controversy-based pedagogy because both call for integrative, complex, combinatorial, contextualized, evolving learning. Several contributions to the conference explicitly mention objectives/skills/competences/key learning outcomes:

- Lieblein, Breland, Francis, and Østergaard (2012, p. 37): "to improve student skills in dealing with complex situations, and on visionary thinking". "During this activity, the students have the opportunity to develop what we see as agroecological key competencies: deep reflection, rich observation, creative visioning, responsible participation and dialogue-based communication".
- Denayer (2014, p. 12) identifies[5] 4 areas of competence (generating knowledge, caring for, living with, reporting) and one meta-competence "cross-cutting" (negotiating): "If there is one and only one cross-cutting competence to single out to reflect these conservation practitioners' work, it should belong to the realm of connecting, adjusting, compromising, or negotiating. However, this last term must not be taken simply as refereeing among groups of players whose interests remain different. Negotiating means adjusting the four areas of skills that we have identified to each other and trying to solve, always in a situated and temporary manner, the challenges and tensions that run through them".
- DuPuis and Ball (2013) underline 4 competencies (tied to modes of knowing): Reflexivity, Deliberation, Research, Innovation.
- Aebi (2014) defines course objectives as follows : « apprendre à percevoir et analyser les « problèmes environnementaux » par une approche interdisciplinaire, en respectant toute leur complexité et dynamisme ». Competencies to be acquired are: « identifier les acteurs principaux, comprendre les cadres biologiques, juridiques, administratifs et sociaux de leurs actions, mener des observations et des entretiens avec eux, ainsi que effectuer des analyses en laboratoire ou des revues de la littérature scientifique et des médias où cela s'avère pertinent »
- Mélard, Semal, and Denayer (2014, pp. 7, 13) coins a « public-based learning » approach that develops several transversal and specific competencies: « La démarche contribue à mettre les étudiants en situation de développer un esprit critique, un certain savoir-être et des compétences qui seront mobilisables pour affronter avec succès de nouvelles situations et épreuves, et qui continueront à être développées au cours de l'exercice professionnel ». « La capacité à gérer la tension entre complexification et résolution de problème du processus de gestion de la situation est une compétence-clé. Elle s'accompagne de nombreux corollaires : la posture exploratoire non-essentialiste, le savoir-être d'un praticien réflexif, le renoncement à la disqualification et à la hiérarchisation des points de vue, la capacité à capitaliser les expériences situées, la capacité à « faire avec l'incertitude et l'insécurité», la faculté de s'adapter, le courage de faire place de plein droit à la délibération, à la confrontation et à l'apprentissage collectif, la compétence à négocier les limites de

[4] « Un savoir agir complexe prenant appui sur la mobilisation et la combinaison efficaces d'une variété de ressources internes et externes à l'intérieur d'une famille de situation ».

[5] To document these competencies, Denayer (2014) apply, through interviews of professionals, an approach called "profils de sortie". It is intended to ground the curriculum design in the skills observed onto workers (Roegiers, 2011).

son intervention avec les acteurs ». Very interestingly, slowing down[6] and hesitating are also considered as skills to train and develop.

While salient during the conference, the ability to deal with uncertainty is not really elaborated as a full-fledged competency. This trail could find inspiration in the work of Tauritz (2012, p. 299): "Nine competences are distinguished that help a person to tolerate and to reduce knowledge (un)certainty: being able to accept not knowing what will happen; reflect on one's own or other's beliefs and being able to change personal beliefs; find and evaluate information; judge the credibility and cognitive authority of information sources; reason; respond in accordance with the underlying probabilities; assess one's own ability to achieve a desired outcome; engage a supportive network; formulate a plan of action to deal with uncertainty".

All reviewed contributions (including Fallon, 2014) also put emphasis on developing students as researchers. This effect of controversy-based learning might be further investigated and benefit from the "research-based teaching" literature (Healey & Jenkins, 2009). As can be seen in Fig. 3, one junction point could be the different role granted to students (audience versus partipants) both in controversy-based pedagogy and in research-based teaching.

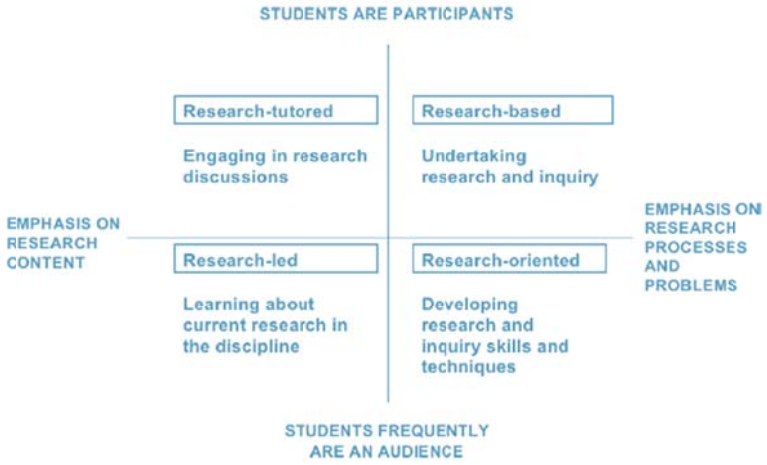

Figure 3 – Healey (2005) defines 4 flavours of research-based teaching, an orientation that might share concerns with controversy-based pedagogy.

Evaluation

Competencies have always a two-fold aspect. As learning objectives (see section "objectives"), they help piloting the instructional design of a learning sequence. As evaluation criteria, they inform the assessment procedures. Some contributors to the conference mention difficulties tied to assessment

[6] Davies (2012, p. 294) also examine the importance of slowing down, in relationship with the practice of reflection : "Evidence suggests that reflective practice can enhance sustainability education by enabling students to slow down and think more carefully, deepen their relationships with nature, communities and people, encourage them to think more systemically, and face their feelings of being overwhelmed, sad or fearful about the scale and severity of sustainability problems". Likewise, DuPuis and Ball (2013, p. 73) underline the need to decelerate but sometimes also to… accelerate: "Overall, we learned that reflexive learning requires substantial class time, although with less lecture time. When students are struggling to find effective ways to collaborate, the professor needs to have some way not to rush the process, to let things go. At other times, the instructor needs to know when to intervene to move things along so that students see the value of the class-time work".

(dilemmas individual/collective marks, scoring rubrics, weighting of content-related skills and soft skills[7], dilemmas between assessment of processes and products, troubles in assessing "reflection"[8], accounts for progression, scoring of intermediary productions, ipsative assessment that incorporates a reflection on individual differences…). A need for new assessment methods pervades also through some contributions. On this topic, Bloom's taxonomy of cognitive objectives (Bloom, 1956) can still be helpful. The taxonomy was created for categorizing different levels of thinking processes that form part of the learning skills. They remain useful to determine and ensure that students are assessed beyond factual recall and comprehension. Other models of assessment studying evolutions of mental representations or attitudinal outputs of learning would be worth investigating to counterbalance purely cognitive effects.

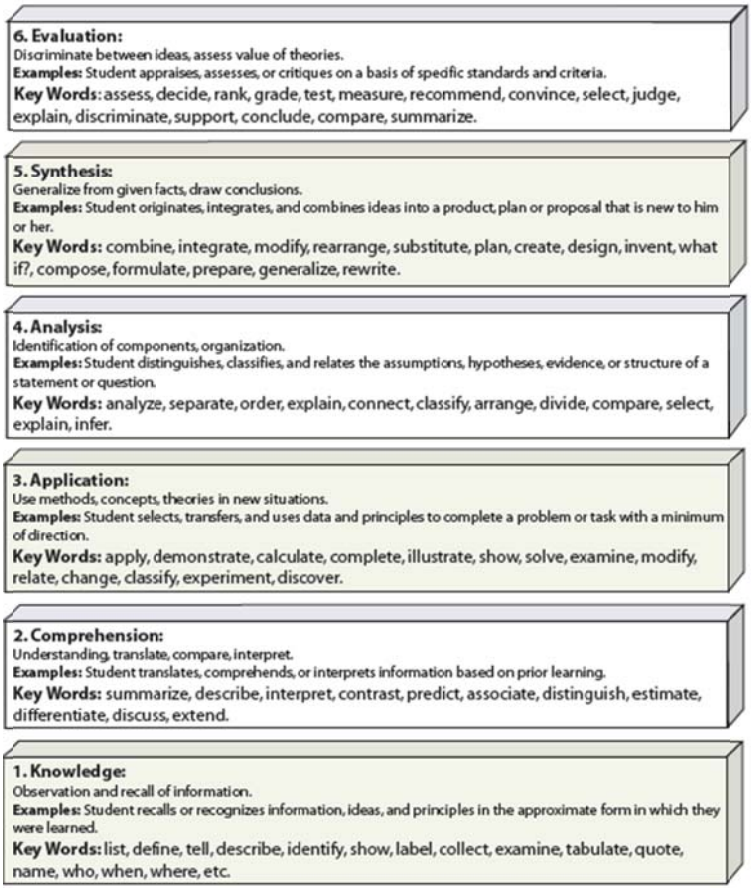

Figure 4 – For Bloom, the ultimate goal is that students reach high order levels of thinking, which enable to them to become adaptable and creative individuals in society as a whole.

Regarding the progressive aspect of evaluation, it is relevant to proceed with intermediary assessments of specific and narrow resources[9] (of all types), followed by mobilization of these resources in "simplified" situations, followed by the assessment of "real-world" situations.

[7] "This article describes a curriculum design that attempts to maintain both canonical disciplinary learning about the techniques of sustainability and training in the reflexive skills necessary to explore sustainable change through post- normal learning processes" (DuPuis & Ball, 2013, p. 64)

[8] Boud, Keoogh, and Walker (1985) assign 4 measurable outcomes of reflection: new perspectives on experience, change in behavior, readiness for application, commitment to action.

[9] "It is important that they first practice key skills in a controlled setting and then are supported through the process of translating these skills into the applied context" (DuPuis & Ball, 2013, p. 69)

Challenges

This section pinpoints some aspects of controversy-based pedagogy that deserve further study.

Definition of the approach

The variety of practices that this note puts under the label of "controversy-based pedagogy" makes it difficult to assess what falls within or without the definition and whether an observed setting is a "real instance" of such a pedagogy. Are there features that must be present or absent in order for an instructional activity to be considered CBP? Are there enough similarities to allow the construction of generalizations, if not a hand-out for colleagues willing to explore this educational orientation?

Authentic situations

Contributors to the conference strive to confront their students to "authentic situations", that is situations wherein student experience a kind of general rehearsal of the professional tasks they will have to perform once graduated[10]. This respectable wish postulates the existence of "family of situations". Students well-trained to situations owing to a family would be able to transfer knowledge and competencies to similar situations of the same family. This axiom is part of the definition of a competency-approach and has received criticism (Chenu, January 2004). At the same time, different articles highlight the uniqueness of each situation "out there" [11] or see each situation "out in the field" as fresh material[12]. There is probably here a paradox to be explored[13]. Are not all learning situations both artificial and authentic? For what reasons should a traditional course or theory teaching (less "situated" methods) be considered as unauthentic? Isn't there any "practice of theory"? What does the effort to align teaching on authentic situations convey in terms of relevance and limitations? Related to pedagogical purposes, isn't it a risk tied to "too much" authenticity?

Contributors to the conference also demonstrate, thanks to the variety of their instructional settings, that instilling authenticity can be done in different temporalities and with different intensities, from the student who works at a farm (Lieblein et al., 2012) to activities bringing the world in the classroom (the "packaging lab", DuPuis & Ball, 2013, or listening to invited experts, Mélard et al., 2014).

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[10] "Le cas singulier étudié est supposé représentatif des problématiques environnementales et de leurs modes de gestion en général ». « Les étudiants développent aussi des compétences transversales comme le travail en groupe et l'argumentation, dont on sait qu'elles sont recherchées sur le marché de l'emploi » (Mélard et al., 2014, pp. 12, 14).

[11] "As professionals, our students will later face unique and complex situations out there, and we see it as our main task to prepare them for dealing with such situations" (Lieblein et al., 2012, p. 37)

[12] "However, out in the field we can pick out situations that prove to be new starting points rather than illustrations of what was previously learned. The practitioners are forced to learn in real time, in unique, changing contexts, and to strike compromises between what they previously learned and ongoing processes" (Denayer, 2014, p. 12)

[13] Other hesitations seem discernible in some contributions. They touch upon difficulties a) to affirm expertise in settings that tend to reduce the teacher/student, the specialist/amateur asymmetry, b) to accept a closure in settings valuing open-endedness, c) to give a definite interpretation of situations in settings willing precisely to respect all the complexity and dynamics of situations. Risks of knowing and not knowing, of certainty and uncertainty…

Lastly, nuances to this "authenticity" of situations are rightly brought up by different contributors who stress that such situations are, on instructors' side, the result of sharp pedagogical constructions: "Les EI ne reproduisent pas la situation réelle. C'est une situation artificielle, minutieusement organisée. Car le principe des EI, c'est l'émergence : il s'agit de susciter quelque chose d'inédit, donc non totalement prévisible mais néanmoins cadré, entre les « acteurs » des EI" (Mélard et al., 2014, p. 4).

Practice of reflection

Learning includes changes in knowledge, understanding and skills brought about by experience, and reflection upon that experience. Reflective practice encourages learning from one's own experience, rather than from a teacher or a text. Most contributions to the conference stress on the importance of reflection as an input and an output of the work on controversies. This reflection is conducted in dialogue with actual situations. An interesting point concerns the reflection about what has been learnt[14]. In complex instructional settings wherein gains in learning are sometimes hard to measure, planning time slots (Meirieu, 2014; Verpoorten, Westera, & Specht, 2012) wherein students themselves let emerge what they have matured deserves consideration.

Documenting problems and benefits

On the whole, the papers gathered for the conference do not describe many problems in depth. For a workshop on controversies, there is eventually a great deal of agreement. It comes probably from the fact that all cases are success stories, and indeed they are in an educational context of still devoted to rather traditional approaches. However, documenting difficulties would be a path to extra improvement. This would also make salient the pedagogical complexities that are affronted in controversy settings. Examining problems in details should go along with examining more closely the benefits of this type of pedagogy. Most contributors make excellent and probably true suggestions about different types of learning gains flowing from controversy-based pedagogy. However, DuPuis and Ball (2013) excepted, systematic attempts to gather evidence about fundamental questions – do they learn and what ? – remain a modicum. This might be a next step. It implies to establish a gist of assessable competencies / skills and to describe the various components (including scaffolding and feedback) of effective learning environments using controversies as resources. So doing, participants will make one step further on the two parallel research tracks indicated by Lieblein et al. (2012, p. 38): "As teachers, we are doing two types of action research, to be able to support the students in their learning process: we participate and reflect jointly with the students as part of their project work, and in parallel we explore and reflect on our own practice as educators with the aim of improving the overall learning process".

[14] "During the first weeks of our course many students, as a result, have the impression that they 'learn nothing'" (Lieblein et al., 2012, p. 37). "When students do productive classroom work, it is also important to devote class time to recognize what has been learned". (DuPuis & Ball, 2013, p. 73). "However, fewer students saw the connection between their learning and their service-learning activities" (*ibid*.)

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