Reflection on Teaching in Higher Education: Critically reflective processes of Greek academics in Hard, Soft, Pure and Applied disciplines

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Abstract

In this study, we build upon Biglan-Becher's typology of academic disciplines (Soft/Applied, Hard/Applied, Soft/Pure and Hard/Pure), on the Teaching Perspectives Inventory, and on Kreber and Cranton's SofT model of reflection on university teaching, and we explore whether the extent to which academics from different disciplines engage in critical reflective processes is linked to (a) the epistemological structure of their discipline and (b) the teaching perspectives that dominate their discipline.

Introduction

Improved teaching practice, as a result of critical reflection on it, may mean a lot within a system of mass Higher Education that is becoming increasingly more international, diverse and market-driven (Kreber and Castleden, 2009, p.528). Several studies have examined how reflection might play a role in academic's pedagogical growth (Brookfield, 1995; Cranton, 1998). Mc Alpine's research, contributed to the understanding of teacher thinking in Higher Education and further elaborated on the role of reflection in the construction of teaching knowledge (Mc Alpine et al., 1999; Mc Alpine and Weston, 2000). Their focus on reflection on university teaching lead to an empirically and inductively derived metacognitive model that operationalizes the process of reflection.

To this direction, the extensive work of Kreber and Cranton (2000), and Kreber (2005) lead to the construction of a model of reflection, the Scholarship of Teaching (SofT) model, deducted directly from Mezirow's work. It suggests that academics might engage in content, process and premise reflection in their day to day teaching. Furthermore, it contends that there are two different sources of knowledge construction in teaching: personal teaching experience and educational research theory. The model also distinguishes three different but interrelated domains of knowledge in teaching within which each of the three kinds of reflection might occur: Instructional (instructional design), Pedagogical (knowledge of how students learn and of how to facilitate learning) and Curricular (knowledge of the goals, purposes and rationales for their classes/courses). The three types of reflection within each of the three domains yield a three by three matrix, resulting in nine different forms of reflection. Additionally, a list of conceptually derived and empirically tested indicators involving concrete actions, (Kreber and Cranton, 2000; Kreber, 2004, 2005) from which the instructors' engagement in specific forms of reflection could be inferred, is also suggested by the model. These indicators work as a "test of validity" of an instructor's assumptions and beliefs within the three domains of learning: instrumental, communicative and emancipatory.

As university teaching is firmly located within academic disciplines, broadly categorized in terms of their epistemological structure (cognitive and social dimensions), Kreber and Castleden (2009), based on the SofT model, explored whether academics from different fields engage in reflective practice differently.

This study builds upon Kreber's research and focuses on the reflective processes that academics from different disciplines engage in as they approach their day to day teaching. More specifically, it explores whether the extent to which academics from different disciplines engage in critical reflective processes is linked to the epistemological structure of their discipline, and/or the teaching perspectives that dominate their discipline. We opted to (a) work with an existing model of reflection (SofT model) on university teaching that emphasizes reflective processes, and (b) use the Biglan-Becher typology for distinguishing the disciplines in four clusters, each manifesting its own epistemological characteristics: Hard/Pure (H/P), Hard/Applied (H/A), Soft/Pure (S/P) and Soft/Applied (S/A) (see also: Neumann et al., 2002; Biglan, 1973).

Methodology

This study is part of a larger investigation employing both a qualitative and a quantitative methodology, with the qualitative methodology being here the dominant one.

Sample

Data were collected from 26 academic teaching staff. Participants were purposefully sampled for field of study and dominant teaching perspective. Participants came from S/A, H/A, S/P and H/P disciplines, from 15 Departments of 4 Greek Universities, namely: National and Capodistrian University of Athens, Aristotle University of Thessaloniki, University of Patras and University of Thessaly (see Table 1 below).

Instrumentation

Two different sources of data were used: (1) Pratt and Collin's (Pratt & associates, 2005; www.teachingperspective.com) Teaching Perspective Inventory (TPI) and (2) semi-structured interviews. Data were collected from the fall term of 2011 until the winter term of 2012.

Teaching Perspectives Inventory

The 26 academics (N=114 in the larger study) completed the TPI. The TPI measures all five of an instructor's perspectives and identifies their one (or two) dominant ones. Teaching perspectives are defined as interrelated systems of beliefs and intentions which give meaning and justification for the actions of the instructor, and which constitute the lens through which he or she sees the world of teaching and learning (Pratt and associates, 2005, p. 33).

Table 1: Distribution of the Sample of 26 Respondents

Discipline	Departments	n	Dominant Teaching Perspective/s
SOFT APPLIED (S/A)	Educational Sciences and Early Childhood Education	1	Nurturing
	Special Education	2	1.Nurturing & Developmental 1. Nurturing
	Primary Education	1	Nurturing & Social Reform
	Law	2	1.Nurturing 1. Nurturing &Transmission
HARD APPLIED (H/A)	Electrical and Computer Engineering of the Technical University	3	2.Transmission & Apprenticeship 1.Transmission
	Computer Engineering and Informatics of the Technical University	1	Transmission
	Dentistry	2	1.Transmission & Apprenticeship 1.Apprenticeship
SOFT PURE (S/P)	Sociology	2	1.Developmental & Nurturing 1. Developmental
	Linguistics	2	1.Developmental & Social Reform 1. Developmental
	Philosophy	2	1.Developmental 1. Developmental & Nurturing
	Economics	2	1.Developmental & Transmission 1. Developmental
HRRD PURE (H/P)	Physics	2	1Transmission & Apprenticeship. 1 Transmission
	Chemistry	2	Transmission
	Mathematics	2	1Transmission 1 Transmission & Nurturing

These perspectives are:

1. "Transmission": Effective teaching requires a substantial commitment to the content or subject matter.
2. "Apprenticeship": Effective teaching is a process of socializing students into new behavioural norms and ways of working.
3. "Developmental": Effective teaching must be planned and conducted "from the learner's point of view".
4. "Nurturing": Effective teaching assumes that long-term, hard, persistent effort to succeed comes from the heart, not the head and must respect the learner's self-concept and self-efficacy.
5. "Social Reform": Effective teaching seeks to change society in substantive ways.

(see Pratt and associates, 2005 for a more detailed description of the 5 perspectives)

The TPI consists of 45 items clustered into three groups of 15 items (15 Beliefs, 15 Intentions and 15 Educational Actions). For each of the five perspectives, 3 of the 15 items of each group describe the Beliefs of the instructors in relation to learning, teaching, and knowledge, their Intentions, and their Educational Actions respectively. The items relevant to the Actions and the Intentions are rated along a 5-point scale ranging from "Never" to "Always", while those relevant to their Beliefs are rated on a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree.

Interviews

All 26 academics participated in semi-structured face to face interviews. They were informed to focus on their experience teaching a particular course (undergraduate and/or graduate). Interviews lasted between 60 and 130 min. Interview questions were based on the SofT model (see Kreber, 2005, pp.354-355). All 26 interviews were audio taped and transcribed verbatim. They were analyzed by conducting a first-level content analysis whereby participants' responses were compared to the processes suggested by the SofT model. Specifically, it was explored whether: (1) academic staff engaged in reflection in the domains of instructional, pedagogical, and curricular knowledge, (2) they engaged in content, process, and premise reflection, within each knowledge domain, (3) there are differences in the extent to which academics from the 4 clusters of disciplines engage in reflection in the three domains. We, then, counted the number of concrete indicators of reflection (recording the same indicator every time it was found with different individuals in the same sample - see Table 3). This was done separately for the instructors from each of the 4 clusters of disciplines. Finally, based on the analysis, we developed a list of additional indicators of reflection.

Findings

The first main findings of this study are briefly presented in this section. All but 7 of Kreber's indicators of critical reflection were also identified in this study. These 7 indicators not identified in this study are the following: "Reflecting on meaningfulness of appropriateness of goals in a journal" (Kreber and Castleden, 2009, p.523), "Using the rep grid method to understand what goes on in students' minds as they are reading" (p.522), "Having students talk to each other and then compose half a

page on what they liked or what they'd like to see differently about the activity" "Sharing why certain approaches work at teaching-related conferences" (p.521), "Comparing insights gained from teaching-related workshops and seminars to one's one teaching", "Presenting findings from classroom teaching experiments at teaching-related sessions at conferences" (Kreber, 2005, p.340) and "Writing articles in discipline-specific journals on how to teach a certain subject that challenges traditional pedagogies" (Kreber and Castleden, 2009, p.521). In addition, many of the indicators identified in Kreber and Castleden's study with an S/P sample were also identified in this study but with participants from other disciplines: indicators 2, 3, 4, 5 -Curricular Knowledge/Premise R.- (p.523), indicators 3, 5, 7-Instructional Kn./Process R.- (p.521) and 5,6,8 -Instructional Kn./Premise R.- (pp.521-522).

All academics provided evidence of engagement in content reflection. Nine (9) of the 26 academics (34.6%) were not able to recall incidents indicating premise reflection on the following domains: Curricular knowledge (4-15.4%- 2 from H/P and 2 from S/P fields), Pedagogical knowledge (3 -11.5%- 1 from H/A, 1 from H/P and 1from S/P disciplines) and Instructional knowledge (2-7.8%- both derived from H/A disciplines). Only 1 instructor (3.8%) did not engage in process reflection (domain of Instructional knowledge, from H/A fields). Interestingly, 15 academics (57.7%) from all the 4 clusters of disciplines provided evidence of premise reflection on the 3 domains of knowledge (7 on Curricular, 5 on Instructional and 3 on Pedagogical knowledge), based exclusively on additional indicators identified in this study.

Examples of these additional indicators of process and premise reflection on the 3 domains of knowledge are given in Table 2 below. One the one hand, these additional indicators test empirically Kreber's conceptual SofT model. On the other hand, they confirm Kreber's (2006, p.103) notion that other indicators than the ones suggested by her are clearly possible.

Table 2: Additional Indicators		
Knowledge Domain	**Indicators/ Level of Reflection**	
	Process Reflection	**Premise Reflection**
CURRICULAR **KNOWLEDGE**	Comparing teaching goals with the experiences I have gained from my personal professional engagement in fields relative to my teaching subject area. Comparing my goals with current trends in the international scientific community relevant to my discipline (current scientific/research advances, curricula in equivalent foreign schools, guidelines from international scientific organizations, cooperation with foreign universities). Comparing my goals with anything that research on my subject area or more generally the study of other disciplines (philosophy, sociology, psychology, etc) conveys.	Receiving feedback from graduates on the impact of my goals on their current professional practice. Re-negotiating goals following the feedback I receive from the tutors of the students. Using the literature (scientific journals) on my discipline in order to redefine my goals.
PEDAGOGICAL **KNOWLEDGE**	Employing colleagues or other students as "informants", so that they can elicit the opinion of the students on my course (how well they learned). Following advice and attending the teaching of experienced educators of other levels. Studying the literature on learning and connecting	Entering a process of internal dialogue or dialogue with a colleague, when I receive negative feedback from my students, which leads to a revision of perceptions and teaching practices. Being in a continuous process of self-examination, self-assessment, self-criticism and painful reflection

	my conceptions and practices with what I learned. Confirming the way of learning of my students from the application of knowledge in authentic contexts of professional practice (from practice to knowledge and not vice-versa).	which leads to a revision of conceptions/beliefs and practices or the search for more effective teaching practices. Questioning the sufficiency of the final tests as the only assessment indicator for learning and experimenting with alternative methods of assessment. Revising at regular intervals the teaching content and the teaching approach by taking advantage of my personal experience concerning teaching and learning. Self-awareness, self-assessment or even assessment from the students, understanding of my deficits as a teacher, lead me to an attempt for self-improvement.
INSTRUCTIONAL **KNOWLEDGE**	Drawing knowledge and validation concerning the effectiveness of my practices from authentic frameworks of application of my teaching subject, and methods for the transmission of my professional knowledge applied in that context (mentorship). Comparing my teaching practices with the way peers make their presentations in conferences.	Rejecting, after critical evaluation, certain teaching techniques or teaching paradigms (e.g. teacher-centered, use of power-point presentations, etc). Discussing about the teaching practices with the students as an important factor of optimization or change of my practices. Reflecting on the knowledge conveyed by my personal studies and

	Developing a network of formal or informal communication with colleagues and exchanging experiences, concerns on teaching practice issues.	the attendance of conferences, and re-adjusting accordingly my teaching practices. Following current trends concerning the teaching practices applied in other education levels, I re-adjust accordingly my teaching practices. By observing the teaching of my colleagues during their assessment process or the way they make their presentations in conferences, I readjust my teaching practice.

For providing examples of responses received when exploring process and premise reflection in the 3 domains of knowledge, excerpts of interviews are further included.

Negative example of premise reflection on Curricular knowledge:

Interviewer: Have you ever critically reflected on whether the goals/purposes and rational that you identified for your course make a difference to student learning?

Instructor from S/P discipline (Sociology): "…Yes of course…but my personal view is that I cannot check this (my students' learning) because my students are receiving many stimuli from different instructors and each one of them adopts a personal teaching approach.."

Table 3: Distribution of Total Indicators (Kreber's and Additional)

Domains of Knowledge/Levels of Reflection	**Soft/Applied**	**Hard/Applied**	**Soft/Pure**	**Hard/Pure**
Curricular/Pro.R	60	24	44	29
Pedagogical/Pro.R	125	51	81	51
Instructional/Pro.R	39	20	22	20
Total/ Pro. R.	**224**	**95**	**157**	**100**
Curricular/Prem.R	36	18	14	8
Pedagogical/Prem.R	43	14	21	9
Instructional/Prem.R	39	11	19	14
Total/Prem. R	**118**	**43**	**54**	**31**
Total/Pro &Prem.R	***342***	***138***	***211***	***131***

Positive example of premise reflection on Curricular knowledge:

Instructor from H/P discipline (Chemistry) "…Of course… what I have to teach and they have to learn is aligned with the needs of the labor market…what I teach must be associated with the qualifications required from employers nowadays…"
Note that in the first example the respondent although declares that he is critically reflecting, he cannot provide evidence. Furthermore, he is not in the position to distinguish between teaching goals/purposes and approaches. The case is quite the opposite in the second example where the evidence provided is clear and directly connected to the purposes and rationale of his course.
Positive example for premise reflection on Instructional Knowledge:

Interviewer: If someone told you *'I don't think it makes any difference whether or not you use these methods that you already mentioned?'* What would your reaction be?

Instructor from H/A discipline (Computer engineering):"…on the last course of each semester, I discuss with my students about their experience from my lessons and the methods used…what they did or didn't like...this is an important feedback for me… and the following year I modify my methods based on this feedback…."

Positive example for process reflection on Pedagogical knowledge:
Interviewer: Considering the course you are currently teaching, how do you know that you are successfully helping your students learn?
Instructor from S/A discipline (Education):"… mostly it is the feedback that I take from my students' tutors…pages and pages of comments regarding the students' learning, knowledge and skills development etc…"
Furthermore across all the levels of reflection, reflection was oriented primarily towards personal experience rather than formal knowledge about teaching (participation in workshops, research, readings etc.).
Finally, correlation between instructors' dominant teaching perspective and their scores on the distribution of total indicators of process and premise reflection can be inferred. Indeed, S/A disciplines are dominated by the Nurturing perspective and S/P by the Developmental. Instructors from these fields gave much more evidence of the 2 levels of reflection on the 3 domains of Knowledge than their colleagues from H/A and H/P fields. H/P and H/A instructors mainly oriented towards the Transmission perspective gave much less, and almost equivalent, evidence of the 2 levels of reflection on the 3 domains of Knowledge instead. Furthermore, concerning the S/A academics, it is important to notice that 4 out to 6 were trained in pedagogy. These 4 academics provided much more evidence of process reflection on Pedagogical knowledge and of premise reflection on Instructional knowledge.

Discussion
An intriguing finding is that 7 indicators identified in Kreber's studies were not confirmed in this study. Among these 7 indicators, there were indicators such as "reflecting in a journal" or "using the rep grid method" or "having students discuss with each other". This exclusion could probably be attributed to Greek academics' professional traditions or to cultural factors. More specifically, on one hand, the majority of Greek instructors are not trained how to teach in order to familiarize with such practices. This lack of pedagogical training (such as teaching-related workshops, seminars etc.) is further highlighted by the majority of the instructors in their interviews. Also, it should be noted that the majority of the Greek academics stated that they do not attend teaching-related conferences or teaching-related sessions at

conferences. On the other hand, such practices seem to be incompatible with the culture of the Greek educational community. Pratt's (1999) view that "while individuals espouse their own conceptions of teaching, those beliefs and admonitions are apparently informed by, and are a reflection of larger social, cultural, historical, and/or disciplinary contexts within which people live and work" may also constitute a possible interpretative framework for the exclusion of these7 indicators.

The finding that many of the indicators identified in Kreber and Castleden's (2009) study with S/P sample were also identified in this study but in other disciplines is also noteworthy. Kreber and Castleden's (2009, p.526) notion that "discipline-specific traditions and boundaries might be less pronounced at the level of day to day reflections on teaching even though certain differences can be observed", offers a possible interpretation.

Another intriguing finding of this study is the additional indicators for the three domains of knowledge and the two levels of reflection. This finding is possibly attributed to the fact that in this study there were four clusters of disciplines instead of two (H/S and H/P) explored by Kreber and Castleden (2009). It also brings forth issues of the historic, social, and cultural influences on instructors and raises issues of personal philosophy and individual approach of the discipline, the subject matter, and the students (Prosser et al., 2005; Kreber, 2009, pp.26-27; Pratt, 1999). All these issues constitute equally important factors contributing to the interpretation of similarities and differences relevant to the additional indicators found across different disciplines in culturally differed departments (concerning the Greek respondents) and instructors (Greek sample and Kreber's sample). Furthermore, these additional indicators were identified mostly in S/A and S/P disciplines and to a lesser extent in H/A and H/P fields. This was also the case in Kreber's indicators. It is probably the epistemological structure of Soft and Hard disciplines that leads to these differences. Indeed, instructors in Soft fields approach teaching and learning in a different way than their colleagues in Hard fields. Academics in Soft disciplines are more oriented towards teaching, active learning methods, deep learning, and student-focused approaches. Instructors in Hard fields, on the contrary, are oriented more towards the teaching content and less towards the processes of active and reflective information processing by the student, they engage the student less in the teaching-learning process, while they are more focused on the subject matter of the discipline (Braxton et al.,1998; Nelson et al. 2006; Norton et al.,2005, pp.554-555).These approaches of the instructors are attributed to the different features of Hard disciplines (e.g. well-defined content and teaching methods applied), compared to the features of Soft disciplines (e.g. more loosely organized knowledge structure, deviations in the teaching content and the mainly active teaching practices employed) (Singer,1996, pp.665-675).

Interestingly, Greek instructors from the 4 clusters of disciplines gave more indicators of process reflection for the domains of Pedagogical and Curricular than in Instructional knowledge. With regards to the domain of Pedagogical knowledge, this finding is intriguing, considering that the majority of the instructors (except 4 of them, from the fields of Education and Special Education -S/A fields-) have not received any formal training on teaching. Concerning the domain of Curricular knowledge, it is clear that the goals instructors identify as a result of reflection within this domain influence the reflective processes in the other two domains (Kreber, 2006, p.96; Pratt and associates, 2005, p.21), a fact that possibly explains the aforementioned finding. It is noteworthy that the majority of Greek instructors (19/26) provided a statement of the reasonable and causal connection between their teaching goals, their beliefs about

teaching and learning and their subsequent teaching actions. However, it still remains an intriguing finding that Greek instructors from the 4 clusters of disciplines, unlike the H/P (Kreber, 2004, 2005) and like the S/P (Kreber and Castleden, 2009) ones consisting Kreber's sample, provided more evidence on process reflection for the domain of Curricular knowledge.

Premise reflection, the questioning of presuppositions, or "critical reflection" (Mezirow, 1991), was not common in any of the three knowledge domains (see also Kreber, 2004, 2005; Kreber and Castleden, 2009). Greek instructors mostly from S/A and S/P fields provided evidence of premise reflection, more frequently observed within the domains of Pedagogical and Instructional Knowledge. As this was not the case primarily for the instructors in H/A disciplines and in a lesser extent for the instructors in H/P fields one might attribute this finding to the epistemological structure of the Hard disciplines. Kreber and Castleden (2009, p.527), citing Huber and Morreal (2002), argue that "the kinds of questions faculty have learned to ask about the knowledge of the discipline are, to an extent, a mirror image of the questions they ask about their teaching". This notion seems to converge with the characteristics of the epistemological structure of these fields as opposed to the characteristics of the Soft fields, as already commented. It seems that premises remain unquestioned, or taken for granted, more so in Hard disciplines than in Soft ones.

Indeed, Greek instructors from S/A and S/P disciplines provided more evidence on process and premise reflection for the three domains of knowledge than their H/A and H/P counterparts and this is probably also attributed to the teaching perspectives dominating their disciplines (Nurturing and Developmental respectively). Nurturing perspective is based on a belief in the critical relationship between learner's self-concept and learning. Instructor's primary role, according to this perspective, is to foster a climate of trust and respect, to engage empathetically with individual needs, to enhance learner's self-esteem, to encourage expressions of feeling, and to challenge people, while also caring about them (Pratt and associates, 2005, pp. 239-240). With regards to the Developmental perspective, the belief in the potential emergence of increasingly complex and sophisticated forms of thought, related to one's content, discipline or practice is fundamental. Teachers that espouse this perspective challenge student understanding of content, provide more questions than answers in order to change student's cognitive structures and foster deep approaches to learning (Pratt and associates, 2005, pp.234-235). Developmental and Nurturing perspectives are considered mainly student-centred. Most studies examining the relation between the conceptions of teaching and the disciplines, highlight the prevalence of student-centred perspectives in the Soft fields compared to the Hard fields (see for example Norton et al. 2005; Singer 1996). It is possible therefore that teaching perspectives have an impact on the extent to which academics engage in reflection, and that there is a relationship between student-centred conceptions of teaching, the epistemological structure of the Soft disciplines and the process and premise reflection across the three domains of knowledge (see also Kreber and Castleden, 2009, p.526; Kreber, 2005, p.353).

Finally, and as this study is in progress, further analysis of the interviews' data may also reveal relationships between the level of internal and across perspectives consistency of respondents' dominant perspectives and the level of reflection across the three domains of knowledge. Also, commonalities and differences in the range of different indicators (Kreber's and additional) and the nature of learning (Instrumental, Communicative and Emancipatory) across the three domains of knowledge with the four clusters of disciplines (and subsequently the teaching perspectives that dominate

them), constitute the following step of the analysis.

Conclusions

Two main conclusions can be inferred from the previous discussion of the results:

First, the extent to which academics from different disciplines engage in critical reflective processes is linked to the epistemological structure of their discipline. This was true for the distinction between the Soft and the Hard fields, since in the former instructors provided more evidence of process and premise reflection for the three domains of knowledge than in the latter.

Second, that teaching perspectives have an impact on the extent to which academics engage in reflection. This study confirmed the relationship between student-centred conceptions of teaching (Nurturing and Developmental) in the Soft fields and the higher levels of process and premise reflection across the three domains of knowledge attributed to these perspectives.

Furthermore, with regards to the additional indicators of process and premise reflection for the three domains of knowledge found in this study, it is important to highlight the impact of different discipline-specific traditions and cultures on concrete activities reported by instructors from different departmental and disciplinary contexts when engaged in critical reflection. It is also important the notion that these indicators may reflect different social, historical and cultural larger contexts within which academics live and work.

In any case, instructors' personal philosophy or teaching perspective, their individual approach of the discipline, of the teaching and learning process, of their students and their teaching subject, play a significant role in the way that they engage in process and premise reflection on their goals, their knowledge of how students learn and of how to facilitate learning, and of their subsequent instructional design.

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