The research-teaching nexus in the humanities : variations among academics

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Chapter 4

The role of the discipline in the debate about the research-teaching nexus

4. The role of the discipline in the debate about the research-teaching nexus[3]

In higher education the nature of the link between research and teaching is a major subject of discussion, with an ongoing debate on the role of the discipline in this relationship. Some researchers emphasise that research and teaching are conceived differently in different disciplines and therefore result in different ideas on the ways in which research and teaching can be linked. Others argue that the disciplinary influence is strongly overestimated. This study, conducted in a Faculty of Humanities, reports findings about relationships between academics' disciplinary backgrounds, the types of research-teaching nexus they prefer, and their conceptions of knowledge, research, and teaching. Academics' disciplinary backgrounds were found to be related to their knowledge and research conception rather than their teaching conception. However, it is the teaching conception that is related to the preferred research-teaching nexus. So, this study stresses the importance of academics' teaching conceptions above academics' disciplinary backgrounds when it comes to linking research and teaching.

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4.1 Introduction

A prominent theme in the literature concerning the research-teaching nexus is whether academics' particular disciplines affect the way they link and would like to link research and teaching, in other words, whether the way the link between research and teaching is made or can be made differs between disciplines. In this chapter, we will highlight both positions in the debate; i.e., 'discipline is essential to the research-teaching nexus', and 'discipline is not that important'.

4.1.1 Disciplinary differences

Many researchers (Barnett, 2003; Colbeck, 2004; Neumann, 1993; Robertson & Bond, 2005; Smeby, 1998) have noticed distinctions between the disciplines in the way research and teaching are related. Barnett (2003, p. 154-155), for instance, states that research and teaching are both complexes of activities that take different forms across disciplines, for example empirical research involving large teams versus the work of an individual scholar, or laboratory-based teaching as opposed to text-based teaching. So, when trying to establish the link between research and teaching it seems meaningful to distinguish between disciplines. The distinction is found in academics' conceptions of research as well as in conceptions of teaching. Robertson (2007) reports differences in conceptions of the research-teaching nexus itself. Academics from the hard disciplines were overrepresented among those conceptions of the nexus she characterises as 'weak' and 'transmission', indicating a view in which research and teaching have only a tenuous link, while academics from the soft disciplines could be found in the area of conceptions characterised as 'symbiotic' and 'integrated', meaning a view in which teaching and research are strongly related or even integrated. Before looking at the differences identified in these particular aspects, we will discuss the phenomenon of discipline, or academic area, in general.

The most cited work on disciplines is Becher's study (1989) on academic tribes and territories. He focuses on the relationship between the distinctive cultures within academic communities and academic ideas in these communities. Cultures are formed by taken-for-granted values, attitudes, and ways of behaving, articulated and reinforced within a group of people in a certain context. Disciplines are formed by the ideas they explore. Donald (1986) also mentions the different ways in which ideas are explored, and points towards disciplinary differences in four elements: the nature of the concepts, logical structure, truth criteria, and methods employed. However, even within one discipline there can be different epistemological beliefs. A true entity, therefore, is formed at the level

of specialism or even sub-specialism. However, this is considered not a useful level of analysis because of the instability of the specialisms (Becher, 1989, 1994). Regarding the relationship between epistemology and culture Becher and Trowler (2001, p. 23-24) explain:

> In practice, academic cultures and disciplinary epistemology are inseparably intertwined. The flow of causation is not one way; rather the relationship is mutually infused: disciplinary knowledge forms are to a large extent constituted and instantiated socially. Meanwhile their constitution has a reciprocal effect on the cultures from which they spring (…) In attempting to explore the characteristic features of their relationship it is nevertheless necessary to separate culture analytically from the epistemological properties of disciplines.

According to Becher (1989), academic communities in general can be divided into 'urban' or 'rural'. The qualification 'urban' is used for small territories; research fields, in which many researchers are active. 'Rural' are those research communities in which few researchers are active in large territories. This dissimilarity creates many differences in academics' social environment. The most important feature here is the competition in the urban communities. As many research groups search for answers to the same questions, it is important to produce and publish results very fast. Researchers in rural territories, by contrast, take their time with their studies and hence produce longer and more balanced articles. Since the research density is low, academics in rural territories cite researchers from a period that may stretch far into the past. In rural communities researchers are used to working independently, while in urban communities research groups are the standard (Becher, 1989).

On the basis of the work by Biglan (1973), Becher (1989) distinguishes four areas which each have a different field of intellectual enquiry ('territory') and a corresponding different academic culture ('tribe'). These areas are distinguished on two dimensions: *hard-soft* and *pure-applied*. Biglan (1973)has described the hard-soft dimension as the degree to which one single paradigm is present in the discipline: one dominant paradigm (*hard*) or several coexisting paradigms (*soft*). The pure-applied dimension refers to the degree to which the discipline is concerned with practical application. The list below gives an indication of which discipline is situated in which area (Becher & Trowler, 2001):

- Hard-Pure area: natural sciences.
- Soft-Pure area: humanities and pure social sciences.

- Hard-Applied area: technologies.
- Soft-Applied area: applied social sciences.

Since Becher's publication (1989) many researchers have adopted his division and found meaningful differences in social and intellectual levels. Stoecker (1993) tried to find evidence for the allocation of disciplines in specific quadrants. Besides the characteristics mentioned above, she found significant differences regarding the time allocated to research and to teaching. In the hard disciplines more time was given to research, while in the soft disciplines more time was reserved for teaching. Becher (1994) questions the practice of only comparing disciplines across different academic areas and pleads for paying attention to disciplines within one academic area, as this might provide indicators or elements that would otherwise be overlooked.

In studies into the research-teaching nexus (Moses, 1990; Robertson, 2007) discipline-related differences have been found, for instance regarding academics' conceptions of the nature of research as well as their approach to teaching. We will here limit ourselves to research and teaching, as they are essential from the perspective of the research-teaching nexus. However, it is important to notice that disciplinary differences are also found in related areas; such as students' approaches to learning (North, 2005), pedagogic culture (Jenkins, 2004), and funding and publishing habits (Stoecker, 1993).

4.1.2 Disciplinary differences in research

Regarding the definition of research, three features are endorsed by all academics. Research should first include a search for new knowledge, second adopt an enquiring method, i.e., a continuous, sceptical reflection on knowledge, and third result in the publication of results and views (Neumann, 1993). The disciplines differ in what they consider to be 'new' knowledge. A critical issue is the question whether synthesising and refining existing knowledge and offering new interpretations constitute 'new' knowledge and hence should be considered research. This is a common form of research in the humanities, but some academics in the natural sciences call it scholarship instead of research (Neumann, 1993). Besides, some researchers see scholarship as a mediator between research and teaching (Boyer, 1990; Moses, 1990). Nevertheless, it remains unclear what counts as research and what as scholarship. The concept 'scholarship' is used in many different ways but dominantly as a term that covers all academic work (Moses, 1990; Nicholls, 2005). This also goes for Boyer (1990),

who distinguished 4 different types of scholarship: discovery (advancing knowledge), integration (synthesising knowledge), service (advancing and applying knowledge) and teaching (advancing and applying knowledge about how to teach and promote learning). Neumann (1993) notes that research traditions vary in the different academic areas. Consequently, using the term 'research' only for the scholarship of discovery is a disciplinary judgment.

4.1.3 Disciplinary differences in teaching

Studies on teaching have mostly focused on general aspects of teaching and thus ignored the disciplinary aspects. Hativa and Marincovich (1995) break through this imbalance by describing significant teaching differences between the varying disciplines. Hativa and Marincovich (1995) also showed that the differences are related to epistemology as well as the culture of the disciplines. Aspects related to epistemology are curriculum, assessment, and cognitive purpose. Curriculum differences echo the nature of knowledge as the cumulative nature of the hard disciplines, in which a large amount of 'basic knowledge' is deemed necessary before students can grasp the 'higher-order knowledge', contrasts with the holistic nature of the soft disciplines, in which knowledge construction is seen as a spiral process (Neumann, Parry, & Becher, 2002). Furthermore, assessment methods and cognitive goals also reflect the disciplines: reproduction of knowledge or knowledge integration and application in the applied areas, a focus towards logical reasoning in the hard-pure areas, and appreciation of creativity in the soft-pure areas. Regarding the cultural aspects, willingness to cooperate in teaching occurs more in the hard disciplines than in the soft disciplines, which reflects the various research settings in which academics work. Furthermore, the different natures of the disciplines result in different teaching settings: lectures and laboratories in the hard-pure disciplines and study groups in the soft-pure counterparts (Neumann, 2001; Neumann et al., 2002). Lindblom-Ylänne and others (2006) use the Approaches to Teaching Inventory to distinguish disciplinary differences among academics. The hard science teachers were found to score significantly higher on the information transfer/teacher-focused scale and the soft science teachers scored significantly higher on the conceptual change/student-focused scale. Comparable results were obtained by Lueddeke (2003) in a different context. This seems to indicate that teachers in the natural sciences are concentrate more on the transfer of information, for instance research findings or the huge body of 'basic' knowledge, while teachers in the humanities are more focused on students' conceptual change.

4.1.4 Disputing the importance of disciplinary differences

Other researchers argue that the importance of the discipline is overestimated. Brew (2008) questions the proposition that discipline is a central construct by doubting the prerequisite that academics have a disciplinary identity at all. Her research shows that although some academics are strongly embedded in their discipline, most academics have a nested or confluent rather than a firm and fixed disciplinary identity. Many academics do not work in one disciplinary area, but on the borders of different disciplines or feel affiliated with both the mother discipline and their specific (sub)specialism. This ties in with the observation that the distinctions between disciplines can not easily be made. The core disciplines can still be recognised, but the borders are fluid (Brew, 2008). According to Pinch (1990) disciplines are in the first place rhetoric. Disciplines are used by academics to identify themselves and others, even though they do not adequately describe reality and might even have a confusing effect as soon as diffuse borders between them are passed. So, it seems that the dispute regarding 'discipline' depends on the question whether academics' perceptions of a discipline or observed differences between the disciplines are taken into account.

In contrast to the studies on the disciplinary differences in research mentioned above, Brew (2001) found in her phenomenographic study on the conceptions of research among senior researchers, that none of their conceptions could be attributed exclusively to one of the disciplines. Her finding that 'discipline' did not matter, might have been affected by the presence of researchers who are exceptional (for instance because of their sub-specialisms) in their discipline. Regarding teaching, Stes and others (2008) did not find a relationship between the conceptual change/student-focused approach and discipline, despite using the same instrument as Lindblom-Ylänne and others (2006); they point out that their results might have been distorted by the low mean score for all disciplinary groups. Another argument against the importance of the discipline is the finding that the differences within disciplines are many times as large as the differences between them. Quinlan (1999), for example, identifies key differences concerning historians' beliefs, orientation towards the discipline and approaches to teaching. She indicates that these differences run along generational and gender lines. So, from this perspective looking at the concept of discipline might be interesting to come to grips with certain phenomena, but the disciplines in themselves are certainly no explanation; differences need to be attributed to academics' backgrounds (Huber, 1990) and institutional characteristics (Ylijoki, 2000).

Regarding the importance of the discipline for the research-teaching nexus, Brew (2003; 2006) states that the disciplinary structure of Academia corresponds to the 'old knowledge', while the merging of disciplines is congruent with the 'new knowledge'. From her point of view society needs an integrated, not a fragmented Academia. This would mean that research and teaching take up completely new positions within the university, as they are no longer opposing each other, but instead together create communities of learners. In her new concept of the university, learning is the key in bringing research and teaching together (Brew & Boud, 1995).

4.2 Context and research questions

In this study we focused on one specific academic area. In 1994 Becher already urged researchers to conduct more in-depth studies concerning one academic area instead of the general ones more common in this type of research. Ylijoki (2000) stressed that significant differences can be found among disciplines in the same academic area. Still, closer looks at just one of these areas are rare. Our research project, therefore, was intended to unravel the special features of the research-teaching nexus as perceived in the pure-soft area, concentrating on the different disciplines within the Faculty of Humanities. In the Biglan classification (1973) culture & literature and history & art history are considered really soft; linguistics is also considered soft, however much closer to the hard disciplines. For that reason differences between culture & literature and history & art history on the one hand and linguistics on the other are expected in case the discipline proves to be of influence.

We aim to contribute to the discussion on the relevance of 'discipline' for the research-teaching nexus by relating academics' preferred types of research-teaching nexus to disciplinary differences within the area of humanities. The differences in preferences regarding the research-teaching nexus are generally expected to be related to academics' conceptions of the underlying concepts, namely knowledge, research, and teaching (Brew, 2003; Robertson & Bond, 2005). These differences between preferred nexus and various conceptions might or might not be related to the discipline. Therefore, we investigated how conceptions of knowledge, research, and teaching are related to the preferred types of research-teaching nexus as well as to the disciplines. It is unclear whether background variables other than discipline are related to the preferred research-teaching nexus. Smeby (1998) reported insignificant connections regarding age and position based on a survey study, however, in his interview study he noticed

that different groups emphasised different aspects of the relationship. Therefore, we considered it worthwhile to investigate the relations between preferred research-teaching nexus on the one hand and age, sex and position on the other.

The metaphor study revealed five different conceptions of knowledge, research, and teaching for 30 respondents from the Faculty of Humanities (see Chapter 2). These three types of conceptions were each positioned on a continuum. Knowledge conceptions ranged from knowledge as (I) facts in the external world, via (II) a continually growing body of understanding of the external world, via (III) an answer to a certain question, via (IV) individually constructed relations between objects, to (V) a personal construct. Research conceptions ranged from research as (I) disclosing patterns, via (II) searching for patterns, via (III) an explaining patterns, via (IV) the researcher pointing out the patterns in the data, to (V) the creation of patterns by the researcher. Teaching conceptions ranged from teaching as (I) knowledge transmission to the students, via (II) interaction between teachers and students leading to student activity, via (III) a teacher showing what to do and not to do with the topic under discussion, via (IV) showing how to deal with knowledge, to (V) teaching students to think critically.

As a next step, all 30 respondents were given a mental visualisation assignment to make them articulate their ideal image of the research-teaching nexus, or preferred research-teaching nexus (see Chapter 3). Five different profiles of the research-teaching nexus became apparent, namely (A) teach research results, (B) make research known, (C) show what it means to be a researcher, (D) help to conduct research, and (E) provide research experience.

In line with our aim to contribute to the discussion on the relevance of 'discipline' to the research-teaching nexus, the following research questions are posed. See Figure 4.1 for their mutual relationships.

1. Is the preferred research-teaching nexus related to discipline?
2. Is discipline related to conceptions of knowledge, research, and teaching?
3. Is the preferred research-teaching nexus related to conceptions of knowledge, research, and teaching?
4. Is the preferred research-teaching nexus related to age, sex, and position?

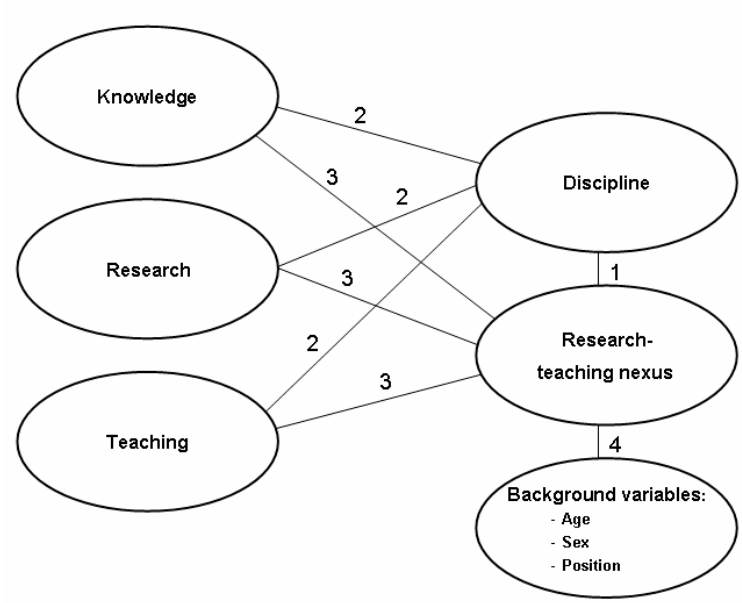

Figure 4.1. Graphical representation of research question

4.3 Method

The sample for this study consisted of 30 academics from the Faculty of Humanities (see Section 2.2.1): 15 assistant professors, 5 associate professors, and 10 full professors. They were equally distributed over the following disciplines: culture & literature, history & art history, and linguistics. All academics were asked what they considered to be their discipline to see whether our preliminary classification corresponded with their personal view (Brew, 2008). Only 3 out of 30 did not immediately associate themselves with the preliminary classification, but in their explanation of their own practice associated themselves with the disciplinary area they had been assigned to. All disciplines are considered to be soft-pure disciplines, however linguistics is considered 'harder' than culture & literature and history & art history. Ages ranged from 30-58, and 43% of the respondents were female. Besides these background variables, for every respondent the following data were available from previous studies, as reported in Chapters 2 and 3: scores on knowledge conception (I-V), research conception (I-V), teaching conception (I-V) and preferred research-teaching nexus (A-E).

First, we calculated chi-square in order to test whether the discipline was related to the preferred research-teaching nexus. Second, we used the Kruskall-Wallis

test to identify relations between disciplines and conceptions of knowledge, research, and teaching. As this technique only tests for differences that are collectively significant (Chan & Walmsley, 1997), we carried out Mann-Whitney tests between the pairs of disciplines that showed plain differences in mean ranks. Both tests are suitable for asymmetric analysis of nominal and ordinal data (De Heus, Van der Leeden, & Gazendam, 1995). Third, we used Kruskall-Wallis tests to determine whether the preferred research-teaching nexus was related to knowledge, research, and teaching conception. In case of significant differences between the medians of the different groups we carried out multiple comparisons between groups, based on Bonferroni inequalities (Gibbons, 1993, p. 49). Fourth, we explored other possible relations between the preferred research-teaching nexus and respondents' sex, age, and positions, using chi-square tests.

4.4 Results

4.4.1 Disciplinary relations

The distribution of the profiles among the three disciplines is shown in Table 4.1. 'Culture & literature' has been shortened to 'culture' and 'history & art history' are shortened to 'history'. The Chi-square test showed no overall significant differences between discipline and preferred research-teaching nexus.

Table 4.1. Distribution of profiles among the disciplines

Discipline	Nexus					Total
	A	B	C	D	E	
Culture	1	3	2	2	2	10
History	3	2	1	0	4	10
Linguistics	2	1	2	3	2	10
Total	6	6	5	5	8	30

The calculation of Kruskall-Wallis between the discipline and the conceptions of knowledge, research, and teaching showed no significant differences. In Table 4.2 the distribution of the disciplines among the conceptions is displayed. However, when we look at the mean ranks the difference between culture and history on the one hand and linguistics on the other attracts attention. As we noticed that this technique only tests for differences that are collectively significant, for all conceptions Mann-Whitney tests were carried out with the pairs culture vs. linguistics and history vs. linguistics. These results showed significant differences for most comparisons. For the knowledge conception a significant difference on the 5% level ($Z = -1.739$, $p = .041$) was found between culture and linguistics and

on the 10% level (Z = -1.625, p = .052) between history and linguistics. A knowledge conception closer to *knowledge as a personal construct* was found within culture & literature and history & art history, and a knowledge conception closer to *knowledge as facts* was found within linguistics. For research conception a significant difference on the 5% level (Z = -1.739, p = .041) was found between culture and linguistics and on the 10% level (Z = -1.625, p = .065) between history and linguistics. Academics within the disciplines of culture and history professed conceptions closer to *research as patterns created by the researcher*, while a conception of *research as disclosing patterns* was more typical of academics within the linguistic discipline. No significant differences were found for teaching conceptions.

Table 4.2. Distribution of conceptions among the disciplines

Conception	Conception score					Mean ranks
	I	II	III	IV	V	
Culture						
Knowledge	2	0	3	2	3	18.40
Research	2	0	1	5	2	18.40
Teaching	1	2	1	4	2	16.80
History						
Knowledge	1	2	3	2	2	17.15
Research	1	2	2	3	2	17.00
Teaching	0	1	5	2	2	17.10
Linguistics						
Knowledge	3	4	1	2	0	10.95
Research	1	6	1	2	0	11.10
Teaching	3	3	0	2	2	12.60

4.4.2 Relations concerning the preferred research-teaching nexus

No associations were found between academics' knowledge or research conceptions and their preferred type of the research-teaching nexus. A significant association (H = 12.973, df = 2, p = .011) was found between teaching conception and the preferred research-teaching nexus. The distribution of the preferred nexus and teaching conceptions is shown in Table 4.3. Academics with profiles D and C differed significantly from each other with respect to their teaching conceptions. Profile D was associated with a conception of teaching as *knowledge transmission* and *interaction leading to student activity*, while profile C was

associated with a conception of teaching as *showing how to deal with knowledge* and *teaching students to think critically*.

Table 4.3. Distribution of teaching conceptions among profiles

Nexus	Teaching conception					Total	Mean ranks
	I	II	III	IV	V		
A	0	1	2	1	2	6	18.33
B	0	1	2	3	0	6	16.00
C	0	0	0	3	2	5	23.30
D	3	2	0	0	0	5	4.50
E	1	2	2	1	2	8	15.00
Total	4	6	6	8	6	30	15.50

No significant differences were found between the preferred research-teaching nexus and sex or age. Yet, a significant correlation was found between position and the preferred research-teaching nexus (Pearson chi square = 12.633, p = .013). Full and associate professors were over-represented in the profiles B (make research known) and C (show what it means to be a researcher), and assistant professors were overrepresented in A (teach research results) and D (help to conduct research), as shown in Table 4.4.

Table 4.4. Distribution of profiles among positions

Position	Nexus					Total
	A	B	C	D	E	
Assistant Professor	5	1	0	4	5	15
Associate Professor & Full professor	1	5	5	1	3	15
Total	6	6	5	5	8	30

4.5 Conclusion and discussion

4.5.1 Conclusion

The question whether there is a relationship between disciplinary background and preferred research-teaching nexus can be answered in two ways. First, we can state that no relation was found between academics' preferred research-teaching nexus and their disciplinary backgrounds. A closer look at the conceptions of the underlying concepts, namely knowledge, research, and teaching nevertheless showed that there was a relation between knowledge and research conceptions and disciplinary backgrounds. The differences found were comparable to earlier findings by, among others, Becher and Trowler (2001), but contrasted with Brew's

findings (2001) on the research conception. The harder discipline, in our study linguistics, was related to a conception of knowledge as *facts* and of research as *disclosing patterns*. The softer disciplines, in our study history & art history and culture & literature, were related to a conception of knowledge as *a personal construct* and of research as *creating patterns*. Teaching conception was found not to be related to the disciplines, which diverged from earlier results by Neumann and others (2002). Interestingly it was this conception that was related to respondents' preferred research-teaching nexus. Profile C, *show what it means to be a researcher*, was related to a conception of teaching as *showing how to deal with knowledge* (IV) and *teaching students to think critically* (V). This connection might be explained by the importance these academics assign to the person of the knowledge producer. They want their students to understand the importance of the way they deal with knowledge and research. This aspect is central in teaching conceptions IV and V and in profile C. Profile D, *help to conduct research*, on the other hand, was found to be related to the conception of teaching as *knowledge transmission to the students* (I) and *interaction between teachers and students leading to student activity* (II). A possible explanation for this might be that these academics want to introduce their students to what is happening in the university, but still rely strongly on themselves as the experts.

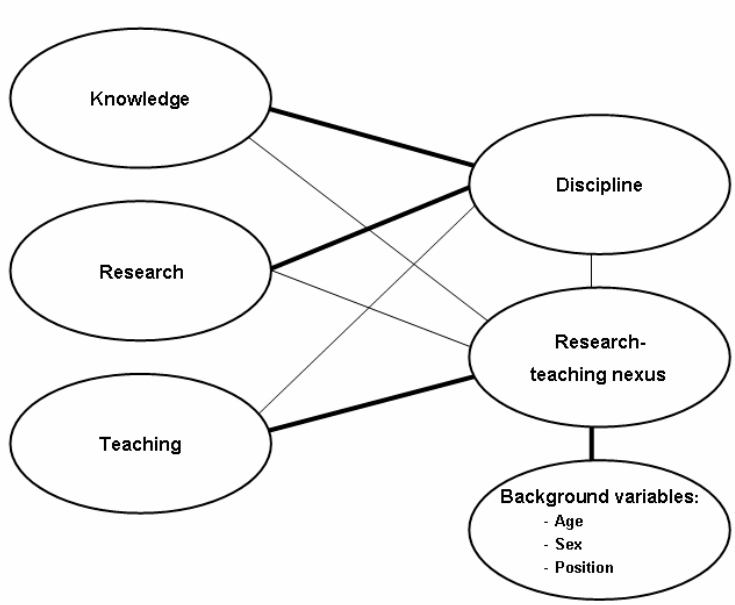

Figure 4.2. Graphical representation of the studied relationships

Thus, although the disciplinary association with the conceptions of knowledge and research is apparent, it is the teaching conception that is related to the preferred research-teaching nexus, and as this conception is not related to discipline, neither is the preferred research-teaching nexus. See Figure 4.2 for a graphical representation. However, we would like to recall that this study was conducted solely within the pure-soft disciplines. Further research needs to be done to find out whether this conclusion could be generalised to other academic areas. Finding disciplinary differences within the same academic area suggests that we might expect even greater differences between disciplines from different academic areas.

4.5.2 Discussion

An issue that we want to pay attention to is the different ways educational researchers decide whether disciplinary influence is involved. Some researchers (Åkerlind, 2008c; Brew, 2001) use the criterion that certain conceptions need to be found exclusively among academics in one specific discipline. In their opinion, if there are examples contradicting the prevalent linkage between a certain discipline and a related conception, a disciplinary relationship should not be assumed. However, other educational researchers (Lindblom-Ylänne et al., 2006; Stes et al., 2008), including ourselves, search for correlations between disciplinary backgrounds and certain conceptions. In this view an exclusive relationship between discipline and conception is not required, as a strong tendency towards a combination of a certain discipline and a related conception is what is looked for. This difference in view might be one of the explanations for the contradictory results found in the literature.

Besides relationships between disciplines on the one hand and preferences and conceptions on the other, we found an association between academics' positions and their preferred types of research-teaching nexus. The differences found between assistant professors on the one hand, and associate and full professors on the other, can be compared with previous research on differences between novices and experts. Hereby we have to note that the position within a university is not primarily based on teaching competence, but on research competence, so academics' position does not by definition reflect their teaching competence or experience. Most novice-expert studies in education are carried out in primary and secondary education. Regarding higher education, Dunkin and Precians (1992) compared novice university teachers to award-winning university teachers. They found that the essential difference between the groups was that excellent

teachers have a more complex and complete conceptional repertoire than novice university teachers, and are better able to decide which strategy to use at what moment. Athanases and Achinstein (2003) pointed to the ongoing discussion in teacher education about development models in which novice teachers pass through several stages of development. A comparable principle might occur in higher education, in which the focus of attention in their preferred type of nexus shifts from explicitly highlighting research to implicitly including it. Assistant professors have a preference for explicitly introducing research, by telling students about research results (profile A) or helping them to conduct their own research (profile D), while associate and full professors like the implicit and reflective way better, by focusing on understanding what the research process involves (profile B) and focussing on the necessary academic disposition (profile C).

4.5.3 Implications

Academics' teaching conceptions were found to be related to their preferred research-teaching nexus. This seems to indicate that in the discussion concerning the research-teaching nexus more attention should be paid to academics' teaching conceptions, especially since previous research by Prosser and Trigwell (1999) has shown that academics' teaching conceptions greatly affect students' learning; they influence particularly whether students adopt a surface or a deep learning approach. This becomes even more important when we realise that teachers in higher education normally have no or only very little pedagogical training, and therefore might not be aware of the impact of their conceptions on students.

Furthermore, we found that the preferred research-teaching nexus does not differ over the disciplines. However, as our research focused on preferences rather than actual practice, this does not automatically imply that all preferred linkages are put into practice in all disciplines likewise. As Neumann and others (2002) found differences in university teaching in the different disciplines, this may mean that some profiles occur more often in certain disciplines than in others. Therefore, we suggest that future research also includes university practice. Meanwhile we consider it worthwhile to discuss the research-teaching nexus beyond disciplinary boundaries, as academics' preferences do not seem to differ across the disciplines.

Our last suggestion considers the departments in which the educational programmes are being developed. As the preferred research-teaching nexus was not related to the discipline in this study, we assume that in most departments the views on this connection differ among the academics, especially as we have seen that assistant professors prefer other linkages than associate and full professors. It is necessary that the department head be aware of these differences of opinion. Instead of guiding everyone in the same direction, it is advisable to discuss the research-teaching nexus with all academics involved and look for complementary and conflicting opinions. For example, a department might want to engage students in research in the following ways: helping them to conduct research (profile D) and showing what it means to be a researcher (profile C). Although all teachers pay attention to these different goals, assistant professors might want to put most emphasis on the former and full professors on the latter. Knowing all academics' preferences enables departments to develop diverse programmes in which students develop research skills as well as an academic disposition. So, discussing the different preferences within the departments may make it possible to construct educational programmes in such a way that the advantages of the different linkages preferred are used to maximum effect, and the disadvantages are limited.