The research-teaching nexus in higher education curriculum design

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Introduction

Mediaeval university was described as a place of learning, not a site for research. Its main focus was on preparing future generations of highly educated employees (King 2004, 3). The modern university is based on Wilhem von Humboldt's (1767–1835) model in which the cutting-edge research was perceived inseparable and even identical to teaching and learning (cf. Fanghanel, 2012, 4–7; McNeely, 2002). According to his ideal, the unity of research and teaching should result in learning on the part of the teacher as well the student. Learning should be valued for its own sake, as a goal itself, without dependence upon employers. (Humboldt 1810/1959, 378; Schleiermacher, 1808/1959, 253, 281.)

Humboldtian image of academic work by teacher-scholar-researcher carries a strong ideological resonance within the present-day academy, although it has not led to the emergence of a coherent model nor implementation, being rather a myth. Yet Humboldtian ideal is the prevailing ethos against which the internal and external pressures of change are reflected in research universities in Finland. We suggest, that even though the set of Humboldtian values has been suitable for elite higher education (HE) in the early 19th century, there is a need for rethinking the balance between research and teaching in the context of 21st century mass HE.

Current European Union's policy stresses providing HE based on research and assuring a high standard in research and innovation. The increased emphasis on linking HE with economic imperatives has introduced a new paradigm for shaping the academy and in attaching research to teaching. Research seems to be in the top priority inside and outside the universities, but concurrently increasingly sophisticated understanding of learning places emphasis on valuing and developing the culture of teaching. In this article we will pay particular attention to the varied constructs of the nexus between research, teaching and learning in curriculum design in HE.

Despite of the long history of the research–teaching nexus there is no consensus on what it actually means to 'attach' or 'connect' research and teaching together. Here we use the term 'R–T nexus' as an acronym for referring to how research in all its aspects interacts with teaching and learning within the specific context of curriculum design. The complexity of the R–T nexus in universities has been discussed widely (e.g. Brew, 1999, 2003, 2010; Brew & Boud, 1995; Hattie & Marsh, 1996; Healey et al., 2010; Neumann, 1992, 1994). Still, the concept R–T nexus is rather slippery, as Trowler and Wareham put

it: 'does it refer to the influence on teaching and learning of students doing research, staff doing research, staff practices being informed by research, the curriculum being informed by contemporary research, the research culture of a particular context and so on' (2007, 22). In previous studies of R–T nexus the perspective to curriculum is limited. Approaching R–T nexus from the point of view of curriculum studies could help deepening the understanding of this phenomenon.

Among academics, the curriculum is often placed within the context of school education rather than HE. Humboldtian thinking makes a relevant distinction between school and university. School is concerned with a socialization process of agreed and accepted knowledge, but the function of university is to stimulate critical questioning and inquiring into problems not yet completely solved (cf. Humboldt 1810/1959, 377–378; Rorty, 1999; Schleiermacher, 1808/1959, 240). Humboldtian ideal rejected prescribed curricula, majors, exams and grades in university studies (McNeely, 2002). However, these do exist in present-day HE.

The absence of research interest on the curriculum design in HE has left room for hidden functions (Margolis, 2001). Barnett and Coate (2005) propose that through the curriculum the core of the discipline and the field of research are put into practice, i.e. teaching and learning. Therefore, the curriculum should be one of the main concepts in the discourse on the purposes and functions of HE. In this study, we approach R–T nexus with the following questions:

What kinds of representations do academics and students give to research in curriculum design?

How could curriculum design promote the nexus of research, teaching and learning in HE?

Understanding curriculum in higher education

For many academics and students, the curriculum generally means the documented degree requirements or syllabus, which typically includes a list of contents of lecture series, the accompanying background reading and knowledge-related areas (Coate, 2009; Neumann, Parry & Becher, 2002). Curriculum, in this sense, is perceived as something to be produced in response to administrative demands or quality assurance (e.g. Barnett & Coate, 2005; Coate, 2009; Fraser & Bosanquet, 2006). The place of research in this view of the curriculum is often understood as courses based on the research interests, contents and results of the academic staff to be delivered to students, commonly known as a research-led approach (Griffiths, 2004; Healey, 2005). This view reflects the product-based view of curriculum (Tyler, 1949; Kelly, 1999).

In contrast, Pinar (2006) provides an alternative strategy for understanding curriculum by studying interdisciplinary reconfigurations of the content knowledge of the curriculum. He also calls for demonstrating how academic knowledge might contribute to the restructuring of students' subjectivities in terms of social reconstruction. Therefore, to have a comprehensive view, we understand HE curriculum as an intentional and dynamic process, which reveals the values and principles in relation to learning, knowledge and disciplines, and the cultural and political purposes of HE (cf. Barnett & Coate, 2005; McKernan,1993; Pinar, 1994; Pinar et al., 1995).

Our earlier work (Mäkinen & Annala, 2010) suggested a comprehensive framework for examining the nature of curriculum in HE. According to our previous results, the academic staff's perspectives on curriculum varied within complementary domains,

composed of polarities and interconnected views. The academics' polarised views reflected a relatively narrow and reproductive approach to the interplay between research and teaching in curriculum design. In that study, there also emerged interconnected views proposing that by curriculum redesign it could be possible to conceptualise the core of a given discipline, learning environment and changes in the world as an interactive process. This interconnected perspective on curriculum seemed to be fruitful in understanding the processes of integration between research and teaching as well as that of students' academic engagement. These findings also raised the need to study the relationship between curriculum design and R–T nexus more closely.

The research-teaching nexus in curriculum design

Among academics, the belief and wish to have symbiosis between research and teaching is strong, following the Humboldtian ideal, as it makes research universities different from other institutions (Clark, 1994; Visser-Wijnveen et al., 2010). In curriculum design, the ideal relationship between them is still contested. Several researchers have suggested that there are a range of relationships, both positive and negative, if there is relationship at all (e.g. Coate, Barnett & Williams, 2001; Hattie & Marsh, 1996; Hughes, 2005). Understanding how the R–T nexus features in curriculum design varies in how students' learning is taken into account (students as audience or participants) and how research is understood (research as contents or processes). Healey (2005) depicts this with four-quadrant schema: research-based, research-led, research-tutored and research-oriented views. This model posits a matrix of relationships between research content, research processes and problems, student-focused and teacher-focused views, and the treatment of students as an audience or as participants.

Brew (2010) summarises conditions that tend to discourage R–T integration. These include narrowly defined research; a lack of research-based activities in curriculum; the strict research culture; government funding based on formulas that serve to separate teaching and research; research funding bodies not encouraging involvement of undergraduate students in research, and, institutional non-commitment to develop the relationship. Brew characterizes HE as a split community where academics, students and support staff work in separate social spaces concentrating on separate tasks and goals. Also Neumann (1992) argues that the supposed symbiosis is partly an illusion; the ideal beliefs and values differ from the prevailing practices.

Neumann's (1992, 1994) framework for R–T nexus shares these cultural notions of academic communities of practice, as more recently described by Brew (2010) and underpins our comprehensive approach to curriculum. Neumann depicts three types of connection between research and teaching: *tangible nexus* which relates to the transmission of factual information and disciplinary advances; *intangible nexus* which relates to the progress in students' inclination, attitude and commitment to knowledge and discovery; and *global nexus* which describes the departmental R–T activities and directions given to study courses arising from the total research involvement of the community. Neumann (1992) argues that only actively researching academics are able to convey these quite subtle and diffuse nexuses in their teaching. Hence, institutional, disciplinary, personal and political factors have a strong impact on the R–T nexus in curriculum design.

When developing the R–T nexus in curriculum design, sometimes the focus gets stuck on matters of principle: is the aim to integrate teaching with research or to integrate research with teaching (e.g. Willcoxson et al., 2011). This in itself is embedded within the

broader context of what a university education should comprise which will inevitably mean various aims, interests and ideas. EU policy emphasises R–T nexus in the name of employability (van Vught, 2009). The employability agenda as well as 'pedagogisation' of universities were criticized by Simons and Elen (2007) who distinguish a *functional approach*, where research is seen as a tool for learning the skills needed in the knowledge society, and an *idealistic approach*, where academic education is understood as participating in research, with a concomitant edifying potential for the student and for the researcher.

According to Simons and Elen (2007), in the functional approach, the focus is on designing student-centred teaching, calling for expertise in teaching among researchers. Instead, in the idealistic approach, following the Humboldtian ethos, the pedagogical expertise is not needed and the demands from society or the labour market do not have a role: the point of departure is autonomous research activity, and a student is considered as a co-researcher from the very beginning. (Simons & Elen, 2007.) As discussed, instead of symbiosis the views of the objectives, practices and interpretations of R–T nexus seem to be rather dichotomized.

Research methodology

The research reported here was conducted in a multifaculty research university in Finland, the profile of which emphasises societal perspectives. The research was carried out in the form of theme interviews during autumn 2009. The data consists of interview transcripts of 27 academic teachers and 23 students representing various faculties and disciplines[3]. All university departments were asked to suggest the names of potential interviewees, a teacher and a student, who were actively involved in curriculum design. The academic position of interviewed academics varied from professors to assisting staff. On average they had 13 years of working experience in HE (range 3–30 years) and about half of them (15) had participated in some pedagogic educations. The interviewed students were involved in curriculum design in the role of a student representative. Most of them were studying their 2nd to 5th academic year[4]. To protect the anonymity of the informants we don't present the results by departments or disciplines but in more general level.

The interview themes covered practices, processes, reforms, topical discussions, objectives and significance of curriculum design. One topic was the informants' view of the significance of curriculum in developing a discipline or a field of science. During the interview, the informants were encouraged to talk about the relevant issues for them. All interviews were recorded (range 26–85 minutes) and transcribed (1287 pages). In this article, we concentrate on the themes addressing the R–T nexus in curriculum design.

The strategy for organizing and making sense of the data was based on qualitative content analysis (cf. Kondracki et al., 2002; Krippendorff, 2004). The analysis was conducted in progressive cycles by combining data and theory driven content analysis, which consisted of close reading, categorising, and summarising. During the close reading, we examined the transcripts through an iterative reading process. In the categorising stage, we used the framework of our previous study on a topic of the various meanings the academics gave to the curriculum development in HE (Mäkinen & Annala, 2010; Mäkinen & Annala, 2012).

The framework relies on Barnett and Coate's (2005) suggested schema of knowing, acting and being where the domain of knowing refers to the core knowledge of the discipline; the domain of acting emphasizes skills and actions that students are expected to

acquire, and, the domain of being ('self') denotes the formation of a student's personality and identity. The other basis for our framework rests on Bernstein's (1996) conceptions of introjection and projection. By introjection Bernstein (1996) refers to the construction of curriculum on the basis of internal disciplinary interests. By projection he describes the curriculum development on the basis of external demands. The framework is presented in Table 1.

Table 1. Framework for understanding curriculum in HE (Mäkinen & Annala, 2012)

Domain	Internal	External
Knowing	Curriculum representing disciplinary knowledge	Curriculum implementing knowledge-intensive education
Acting	Curriculum supporting growth of academic expertise	Curriculum producing competencies in employment market and society
Being	Curriculum contributing to identity formation processes	Curriculum providing individual career success

The basic unit of analysis was either a longer segment containing complete view, or a shorter segment, such as notional expression. During categorising ATLAS.ti software was utilized to find from the database the segments containing one or more of the following keywords: research, discipline, knowledge, science, field of study (in Finnish language).

In the summarising stage of the content analysis, the relevance of the framework was explored, scrutinised and developed from the point of view of the present research aim. The consistency of the emerged representations was assessed by rechecking the basic units and transcription excerpts in their original contexts in the data and by researcher triangulation.

Results

The findings provided a frame of R–T nexus in curriculum design reflecting the contemporary relationship between HE and society. Figure 1 depicts five, partly overlapping representations constructing and summarising the results. These representations entail tensions concerning the internally and externally driven curricular goals of knowing, acting and being, and the ways of understanding the role of research and teaching in curriculum design. We characterise these tensions with a metaphor of 'core point' which represents the ultimate, ideal R–T nexus (Figure 1) with its comprehensive idea of curriculum design in HE. The representations are approaching or receding from the 'core point'.

Next, we present each of the five representations more closely. First, we focus on disciplinary and societal representations on the curricular aims of 'knowing'. Second, we approach the curricular aims of 'acting' with scholarship and functional representations. Third, with future oriented representations we present the curricular aims concerning students 'being'.

The interview quotes substantiating our research findings are numbered and coded, disclosing the speaker's role as a student (STU) or a member of staff (STA) and gender (male M or female F). The quotes have been translated from Finnish to English by the authors.

	Internal	External
Knowing	Disciplinary representations	Societal representations
Acting	Scholarship representations	**R–T Nexus**	Funtional representations
Being	Future oriented representations	
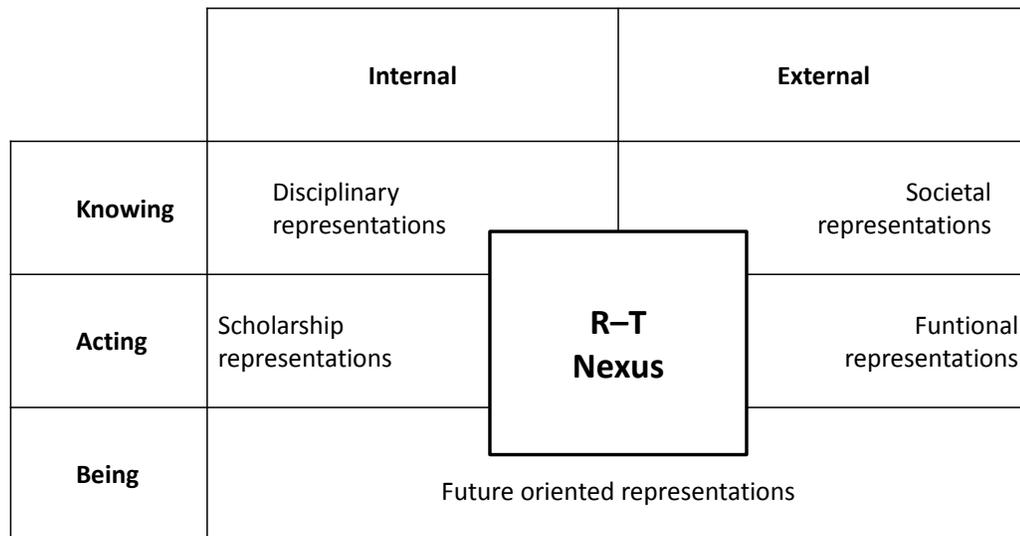
Figure 1. Representations framing R–T nexus in curriculum design

Disciplinary representations

Various views of disciplinary knowledge as a static or dynamic entity emerged in the data. Curriculum was characterized to reflect "the history of teachers, their research areas and interests" (STA3F), and it was often equated with a static syllabus of knowledge to be transmitted to students (cf. Kelly, 1999; Coate, 2009). The curriculum seemed to be based on the academics' preferred knowledge-content, appropriated theories or individual research interests. An extreme example of this view is demonstrated in the following comment: "a student doesn't get the master's thesis completed if it doesn't represent certain theoretical or methodological approach" (STU9M). This particular statement reflects a feature of a hidden curriculum (cf. Margolis, 2001) which becomes apparent in the assumption that the core of the curriculum should be in line with the personal strengths of the academics of a certain community.

In our previous work, we named this viewpoint as a personified curriculum (Mäkinen & Annala, 2010). It follows the Humboldtian idea of academic freedom in teaching, but lacks the idea of discovering knowledge by integrating research, teaching and mutual learning (cf. Elton, 2008). This kind of approach may weaken the R–T nexus in curriculum design. This came out in expressions claiming that it is not possible to promote discipline by curriculum design: "It leads the research nowhere" (STA9M). This is parallel to Barnett and Coate's (2005) arguments that scholars are quite reluctant to engage in critical reflection on the curriculum design. This may be due to the fact that HE is often understood through the narrow perspective of research-led teaching, and consequently, the

curriculum is structured around the subject matter selected among the particular research content of the teaching staff (cf. Brew, 2001; Griffiths, 2004; Healey, 2005). Also Pritchard (2004) found that the academic freedom is more beneficial to staff than students. Ambitions for research-led teaching may also be concerned with reducing the risk of research institutions and teaching universities being, according to rather unpredictable HE policy, separated from each other (cf. Brew, 2003).

While some of the informants emphasised the importance of special subjects or content areas, others expressed a wish for more dynamic and general edification, as characterised in the following way: "[curriculum] should encourage students to pursue what they want, to unite and use knowledge from different subject areas, instead of disapproval, this should be our right and obligation" (STU6M.) The dynamic view of knowledge emerged also in staff's visions with topical and critical questions of certain disciplinary knowledge or areas of research attracting students to processes that enable scientific knowledge generation, like in the following: "[by curriculum] we can promote the students' thinking towards new directions and create basis for the development of the discipline" (STA14F).

Consequently, curriculum was seen both as a disciplinary knowledge to be discovered and as a sustained process of generating knowledge (cf. McKernan,1993; Newswander & Borrego, 2009; Stenhouse, 1975). These views are parallel to Parker's suggestions of discipline-based HE. He proposes that disciplines are not demarcations but communities and have fluid structures based on common concerns, practices and interests (Parker, 2002). In this data, curriculum design was perceived as discovering the diverse ways of developing disciplinary knowledge, especially in new disciplines and interdisciplinary programmes. Thus, the curriculum was perceived as a facilitator of learning processes, which can be characterised as the 'intangible nexus' between research and teaching, i.e. progress in students' inclination, attitude and commitment to knowledge and inquiry (cf. Neumann, 1992) and encouragement to disciplinary wonder.

Societal representations

Interaction between autonomous knowledge creation of the academy and collaboration with its surrounding society emerged as a pivotal dilemma in implementing the R–T nexus in curriculum design. Many academics seemed to prefer universities' autonomous position in knowledge generation and in conducting research as raised in the following student's quote: "In a university, there are enough people who are so focused into their topic that they lose contact to the real world, which is partly cool but at the same time freaky, because every phenomenon has something to do with the reality (STU10M)". This finding is in line with Naidoo's (2005) notion that academics often have a tendency to protect their research interests against those of the stakeholders in surrounding society.

According to the data, knowledge generation was primarily thought of as the domain of academics, and knowledge transmission was targeted for students, because "research proceeds on one track and teaching on another (STA10M)". Therefore, R–T nexus appeared as isolated knowledge creation, giving an impression that research as well as teaching is somewhat divorced from society. This suggests a narrow interpretation of knowledge, research and curriculum (cf. Brew, 2003; Coate, 2009).

In contrast, the students stressed the need for interaction between HE and society, and the necessity of taking advantage of R–T nexus in enhancing social effectiveness:

> It is in the students, what the society needs. The society changes all the time, and when we study and find new focus for scientific interests, or view the changes in society. -- But if we are taught in a way that 'you must know this and this', we can't meet the challenges of the working life and society in the future. (STU6M.)

Also some staff members described themselves as academics seeking to explore contemporary phenomena "that challenge us (STA3F)" and have relevance for the science and the society. They had been involved in research collaboration with faculty and stakeholders concurrently with students' research projects and practical training periods, for example: "They conduct in pairs a study for a real customer" (STA6F). This type of approach to a R–T connection is close to what Neumann (1992) entitles a 'global nexus', but it is more intersectional than just co-operation at departmental level. Extensive links between research programmes, practical interventions and curriculum design were successfully implemented more often in vocational (hard and soft) programmes (cf. Neumann, Parry & Becher, 2002), but also in emerging, non-professionally oriented fields of science.

The academics were aware of the risk of unilaterally following the needs of society, and emphasised the specific nature of university studies: "The reactive curriculum design would be fully possible, if we would just follow the current trends, but that would be quite short sighted -- [curriculum] must be based on research findings, leading the way or at least being awake" (STA13M). In this statement, the R–T nexus in curriculum design is portrayed with an interconnected view, uniting discipline based and societally conscious approaches (cf. Mäkinen & Annala, 2010).

Scholarship representations

In the statements of the students as well as the staff, the R–T nexus in curriculum design was perceived to be significant in creating preconditions for acting in the academic community and by that, creating space for the growth of academic expertise. However, the perspectives of the informants varied in how they understood research, teaching and scholarship. An example of scholarship culture is demonstrated in the following comment: "It often seems that the teachers are afraid of losing their employment due to a disappearance of the area of their own expertise. In such a situation it is always difficult to start for a proactive curriculum change." (STU16M.) This demonstrates the student's awareness of how the R–T nexus in curriculum design may focus on promoting the scholarship of the academics and create preconditions for their position in the scholar communities. This kind of view narrows curricular work as 'trade unionism' to benefit the academics instead of students.

The academics had an inclination to assume that they themselves have to legitimize their existence in the research community through teaching, as the next quote represents: "When a new professor was recruited to the department, his strengths and domains were included in the curriculum" (STA10M). And vice versa, in order to develop as a scholar the focus ought to be on research, as one academic noted: "If you want to reach the top of research you have to concentrate on scientific papers" (STA6F). These two quotations characterise the paradoxical nature of academic work and scholarship, which is incarnated in the varied, often split implementations of the R–T nexus in curriculum. As found in previous studies (e.g. Brew, 2003; Deem & Lucas, 2007; Neumann, 1994), teaching was

often considered secondary compared to research. Some academics perceived research as entirely separate from teaching. In extreme cases, such views indicate the so called fragmentary curriculum (Mäkinen & Annala, 2010) which may turn HE curricula into intellectual department stores (cf. Jaspers, 1960/2009).

Deem and Lucas (2007) found in their study, based on Bourdieus's concepts, that a majority of the academics value *scientific capital* more than *teaching capital*, although they also found signs of emerging new forms of *academic capital*. With *academic capital* they refer to collaborative approaches to teaching and research, of which there was also evidence in the present data. Instead of seeing research entirely separate from teaching, there appeared to be some inclusive views of raising a new generation of scholars, uniting the intellectual interests of staff and students. There were some genuine efforts to see the curriculum from the point of view of students' growth of expertise by creating room for their acting, like in the following: "Our task is to teach the students, how to do research. So, that is the nexus between teaching and research, one aspect, as opposed to telling the students, what kind of research I'm doing." (STA11F.) This view is similar to the research-based and research-oriented ideas presented by Healey (2005) in which he argues that students are not merely audience but participants.

In the present study, especially the students expressed their wish to enter into the academic community by assisting the staff with research: "[professors] shouldn't be persons who do research in their own chambers, but instead be central figures in the academic community with some skill for interaction. They should be obligated to take students along when doing their research." (STU2M.) Brew (2010) has argued that involving students with research carried out by academics benefits the students differently compared to students doing research with their peers. At its best, the growth of academic expertise is mutual, which Brew describes to be based on shared responsibility: to induct newcomers into the community of practice, thus carrying the community into the future. In the data, this was depicted as a modern way of uniting personal scientific aims and the common good of students as well as the academy, like in the following comment by a professor:

> I think that my research should be directed parallel with the curriculum. --I think I'm professional as a researcher and I can conduct research on different themes. -- It is a question of harnessing my proficiency for teaching and for the service of academy. (STA25F.)

Concerning the scholarship representations, we could not identify much variance between the disciplines. Instead, the staff with inclusive views reflected their identity as a university teacher, or highlighted that their department positively values not just research, but also teaching.

Functional representations

The various aims of HE relating to employment and employability appeared in the statements of interviewees. Although often heard of as academics' wish for the new researcher generation, according to the data, it appeared to be a narrow and inconsistent perspective as a curricular approach. Namely, teachers pointed out that, in fact, there is no room for great numbers of emerging researchers – even ten per cent of their graduates would be too much. Students described how the curriculum was designed as if most of

them would become researchers, but in reality, very few do. The following quote describes this dilemma: "Some are very pleased with getting a scientific profession, and getting a disciplinary position at the university. But the others are very practical and they would like to study by doing, or by developing their practical competences." (STU17F.)

This kind of reflections appeared in vocational as well as in non-vocational degree programmes. However, the academics in this study perceived it contradictory to implement R–T nexus and to become, concurrently, more open and relevant to the needs of the labour market and society at large: "The problem is how to combine our own research interests and teaching content. It is also a problem with the curriculum design to define the needs of labour market." (STA16M.)

This 'employment-approach' indicates a current shift in a focus from teaching subject matter to that of students' learning outcomes and competencies. In extreme cases, the outcome-based curriculum represents the product based view as a technical exercise having the objectives set, plans drawn up and applied, and finally the products (learning outcomes) measured (Bobbit, 1918; Tyler, 1949). This was depicted in the following quote: "Indeed, the curriculum should be designed so that the labour markets would need us, that someone would like to employ us" (STU20F). Some academics stressed the risk of this kind of curriculum development to recede from R–T nexus, or to devalue the aims of R–T nexus by serving only external and functional goals (cf. Simons & Elen, 2007).

Yorke (2006) suggests an alternative perspective by arguing that it is useful to distinguish the term employment from employability because of the vulnerability of the labour market to factors outside the control of the individual. According to him, employability refers to a person's capability of gaining employment. In the present study, the students especially called for explicitly articulated academic competencies for demonstrating employability and creating connections with a range of possible employment opportunities available.

Many interviewees considered that so called transferable or generic attributes of graduates are the most important employability-related factors besides research skills within various disciplines, but according to Bennet et al. (2000) they are seldom openly declared in curricula. Therefore, the curriculum ought to include explicit expressions on how learning to conduct research, process information analytically, make knowledge-based solutions, and bring challenging processes to a successful conclusion help students to confront with challenges in working life. These attributes are similar to the concept of competency, which refers to the potentials the students have to acquire in order to achieve high levels of performance (cf. Rowe, 1995; Dubois, 1993).

Reflecting on these findings, we would argue that overall, it is a question of transparency of the curriculum and articulating what the significance of scientific understanding is inside and outside the academy. This is important especially for students with exclusionary views of professional and scientific/disciplinary goals, like "I think talking about research is boring, with all the graphs and quantitative stuff (STU5F)". Many students believed that reflecting the needs of the changing society and conceptualising the R–T nexus could affect their learning positively. By integrating and clearly articulating the significance of research within subject-specific areas, the competencies that are intended to be transferable and the employability-related capabilities in the curriculum, students could be facilitated to cope in different contexts (cf. Barnett & Coate, 2005). The need to face the reality of contemporary students was present also in some academics' views:

> We have to react somehow when discussing with students. We can't just require them, for instance, to know the Poetics of Aristotle, and not have them know what to do with it. I'm not abandoning the ideal and holiness of the Arts, or that research is fundamental, but at the same time we should investigate what's going on in the field, because there hasn't been such a radical change for130 years. (STA25F.)

According to another perception, the questions of employability and the tensions between theory and practice should not be taken as a threat when implementing R–T nexus, but as a pedagogical challenge, assisting students in making a leap from learning theories out of books to application in the field: "Vocational, professional and scientific aims are contradictory. It should not be denied. We should defend the status of scientific approach and research. But most of all we should think of how we could take advantage of these tensions pedagogically." (STA1M.) Barnett (2011) makes a similar point when he proposes that we cannot escape the presence of prevailing ideologies in society, affecting HE, but we can face them as pedagogical challenges and try to reinforce their virtuous aspects instead of pernicious ones.

Previous could be characterized by the praxis model of curriculum introduced by Grundy (1987). Here, the curriculum design develops through the continuous dynamic interaction of ongoing research in action and its reflection. Thus, the integrative and working life conscious curriculum seeks to respond to R–T nexus through competency needs expected by job markets, but positioning them into the academic R–T practices and curricular ideals.

Future oriented representations

The interviewed academics and students raised only a limited number of thoughts on students' future and identity building. However, there is evidence from the literature that an individual's relationship to time is considered to be a basic dimension of human identity forming and functioning (Horstmanshof & Zimitat, 2006). Zimbardo and Boyd (1999) have found that it is important to consider this temporal orientation, because it is mostly a non-conscious process that gives order and coherence to one's expectations for the future.

The interviews raised for us as researchers, a question of the relation of R–T nexus to the student's own meaning making and identity building, supported by thoughts of Barnett and Coate (2005). With the concept of 'being' they emphasise the formation of student's personality and identity. In this data, the students' personal experiences, existential issues and dilemmas linked through an awareness and exploration of a career are focal questions for the students and the staff. Some students argued that the staff members are not able to reflect the students' potential needs for their career outside the university. The academics' notions of the R–T nexus in curriculum development were inclined to refer to a quite one-sided or narrow perspective on students' partnership in a research community, as mentioned in the following quote: "It is rather a special discipline that requires more like a traditional university student's mentality" (STA19M). These kinds of notions indicate that for the staff, there may be inflexible views of students' life course and career development. Research by Vest (2005) states that universities, particularly the ones with a research focus, has a fundamental role in helping students to see the connections between their degree, disciplinary communities and career.

In the data, contradictory views appeared when talking about students participating in research and sharing intellectual experiences during their studies. The academics mentioned challenges in encouraging the students to create experiences that would engage them with their own creativity, critical thinking, problem solving and application of the scientific models. One staff member commented: "For instance, the student union has resisted the workshop themes that are in line with staff's research projects, because they consider that we won't do a stroke of unpaid work for you, so do your research yourselves" (STA25F). This kind of cultural ethos puts down efforts to find new ways of integrating academics' and students' aims towards the same direction and to learn from each other.

Instead of the traditional academic ethos of research-intensive and scientific aims, some interviewed students had relatively high expectations of the HE curriculum to be designed in a way that courses satisfy their actual needs, like in the following:

> They will be socialised by studying here in the world of science and research, but then they gradually begin to socialise to their professional life also, and then they develop an attitude that research is 'yuck' (STA1M).

McInnis and Hartley (2002) point to changes in societies as one factor affecting students' academic engagement and continuation of studies. As Horstmanshof and Zimitat (2003) have noted, some students are continually evaluating the costs and benefits associated with the demands made on their time and energy by their competing roles, investing in those roles that are perceived to be more rewarding and disinvesting in those that appear relatively more costly. According to our previous analysis, we propose these kinds of curricular views as signs of a commodified curriculum which might encourage students to make use of curricula just for the worth of their own interests (Mäkinen & Annala, 2010; see also Autio, 2003, 2006; Molesworth et al., 2011). The risk is that R–T nexus is entirely non-existent in commodified curriculum.

Besides the commodified approach, there also emerged contributive views. Some students emphasized the importance of supporting certain kind of qualities and dispositions; arguing that the attainment of certain knowledge-base or methodological skills are not as important as encouragement to do things:

> To teach us that kind of attitude that we begin to follow our passions and interests. I'd like to see that the curriculum design, it should make it possible for students to follow their own hearts or [laughs] listen some disciplinary voice and to go this way, to investigate this problem, this is interesting (STU6M).

This student's quote reflects Boyer's (1990) definition of scholarship as a discovery which, for him, comes closest to the idea of holistic approach to research as an internal process, where the intention is to gain understanding (cf. Brew, 2003). A teacher from the same department as the student above admits that contemporary students have a more comprehensive view: "Our students come here with a passionate spirit [laughs], year by year they think more of their employment and similar real things, not just that they should save the world but it would be nice if they would make a living out of it, too [laughs]" (STA12F). Fostering integration of theory, practice and students' identity building as well as the R–T nexus indicates the autobiographical view on curriculum as articulated by Pinar

(1994), which animates students' habits of mind. Costa (1991) suggests this is what intelligent people do when they are confronted with problems, and are making decisions to which there are no immediately apparent solutions. This phenomenon could also be characterized by Brew's (2003) notion of the R–T nexus as a *journey view.*

The autobiographical curriculum is reminiscent of the cyclical process of learning in which the student's experiences of his/her own past and visions of the future dovetail into each other. Together they help students to attach themselves to study processes and to position themselves in their post-education life trajectories, and by that HE is promoting the active citizenship and well-being. Pinar's (1994) notion of this autobiographical curriculum concurs with what Vallance (1986) calls the personal commitment to the curriculum. Commitment promotes the idea of lifelong learning and makes a connection to the continuing changes in working life and society. Likewise according to Barnett & Coate (2005), a personal relation to knowledge and knowing plays a pivotal role in HE. They speak of curriculum as 'engagement, in which the cornerstone of study is not the intrinsic value of knowledge, the subject taught, competence or learning outcomes but rather the process of coming to know'(Barnett & Coate, 2005, 59).

In curriculum design these arguments indicate the comprehensive and processual approach (cf. Barnett & Coate, 2005; Pinar, 1994; Pinar et al.*,* 1995). In this sense, curriculum design could be seen as a dialogical process between teachers, students and disciplinary knowledge which is grounded in practice, not only by performing but inquiring and examining (cf. Pinar 1994; Stenhouse, 1975; McKernan, 1993). From the students' viewpoint this may suggest that curriculum design focuses on engaging students in various forms of inquiry and encouraging them to become analytical and critical thinkers. In all, according to Barnett (2005), HE in general should edge its practices in the direction of 'disciplinary wonder' and away from the technical rationality implicit in the 'skills agenda'.

Conclusions

This study aimed to extend understanding of the complexity of R–T nexus from the point of view of curriculum studies. The study revealed various interpretations of the aims of curriculum design and the ultimate aims of HE, portraying university as a split community. Accordingly, there were tensions between research and teaching, theory and practice, university and surrounding society. It seems to be a question of academic communities of practice comprising values and academic cultures, as well as conceptions of scholarship, research and student learning.

The results are consistent with Neumann's (1992, 1994) and Brew's (2010) notions of the academic communities of practice playing significant roles in framing the R–T nexus. According to the present results, the curriculum design approached the 'core point' of R–T nexus when the academics and students were ready to give up the split nature of academic practices. R–T nexus in the ideal 'core point' seemed to include five pivotal criteria featuring the comprehensive curriculum, which are summarised in Table 2.

Table 2. Summary of the pivotal criteria promoting R–T nexus in comprehensive curriculum design

Representations	R–T nexus in curriculum design
Disciplinary	**Intangible R–T nexus:** Curriculum facilitating progress in students' inclination, attitude and commitment to knowledge and disciplinary wonder.
Societal	**Intersectional R–T nexus:** Curriculum interconnecting faculty level research with stakeholders and students concerning contemporary phenomena.
Scholarship	**Socially constructed R–T nexus:** Curriculum creating preconditions for acting in the academic community and offering space for the diverse growth of academic expertise.
Functional	**R–T nexus implementing competency needs:** Curriculum encountering the expectations of labour market, but positioning them into the academic R–T practices and curricular ideals.
Future oriented	**R–T nexus as contributive journey with students' autobiographical experiences:** Curriculum animating students' temporal orientation and habits of mind.

In order to create comprehensive and proactive curricular culture towards the nexus of research, teaching and learning in HE, there is an obvious need to give close attention to processual approach in curriculum design. Curriculum as a process encourages academics in professional development activities to conduct research, to add new to existing knowledge and to contribute to society through integrating and disseminating the research ideas and knowledge (cf. Brew, 2003). It enables academics to facilitate educational incidents in interaction with students and colleagues. Thus, the curriculum will be socially constructed and, as such, will reflect the R–T nexus and the engagement of students and academics.

Compared to the static, syllabus view of curriculum representing the knowledge generated and transmitted by 'the others', the dynamic view of curriculum enables the generation of new knowledge and discovery by academics and students alike, following the original Humboldtian idea of mutual learning. This, we would argue, has significant effects on students' ways of being citizens after leaving the academy and developing the communities of practice in the society. That is why it is important to reflect the curriculum design from the point of view of autobiographical curriculum (cf. Pinar 1994).

Although the questions of employability and taking the surrounding society into account may contradict Humboldtian ideals of learning for its own sake (Schleiermacher, 1808/1959, 276, 281), in contemporary society the majority of graduates do need employment. To be aware of the surrounding society and life outside the university does not devalue the importance of disciplinary research and ways of approaching knowledge generation. Yet in order to promote R–T nexus from outside the university, the prerequisites should be revaluated: the strategic priorities and institutional, national and global reward systems for HE (cf. Brew, 2003, 2010; Coate et al., 2001).

This study suggests that future research on R–T nexus in curriculum design would benefit from investigating, for example, how students and academics develop R–T nexus on the basis of their personal learning, teaching and researching experiences. In addition, the question of how to give more prominence to the collaborative research-based teaching is of great importance. Furthermore, it would be interesting to study the contemporary ideas of

higher education, also other than Humboldtian, and discover the current mixture of values emerging in HE curriculum design.

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[4] The interviewed students were studying as follows: 1st year one, 2nd year five, 3rd year five, 4th year five, 5th year five, 8th year one, 9th year one. In Finnish research universities, the students are directly admitted for a Master's degree (a Bachelor's degree is included in the studies for a Master's degree).

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