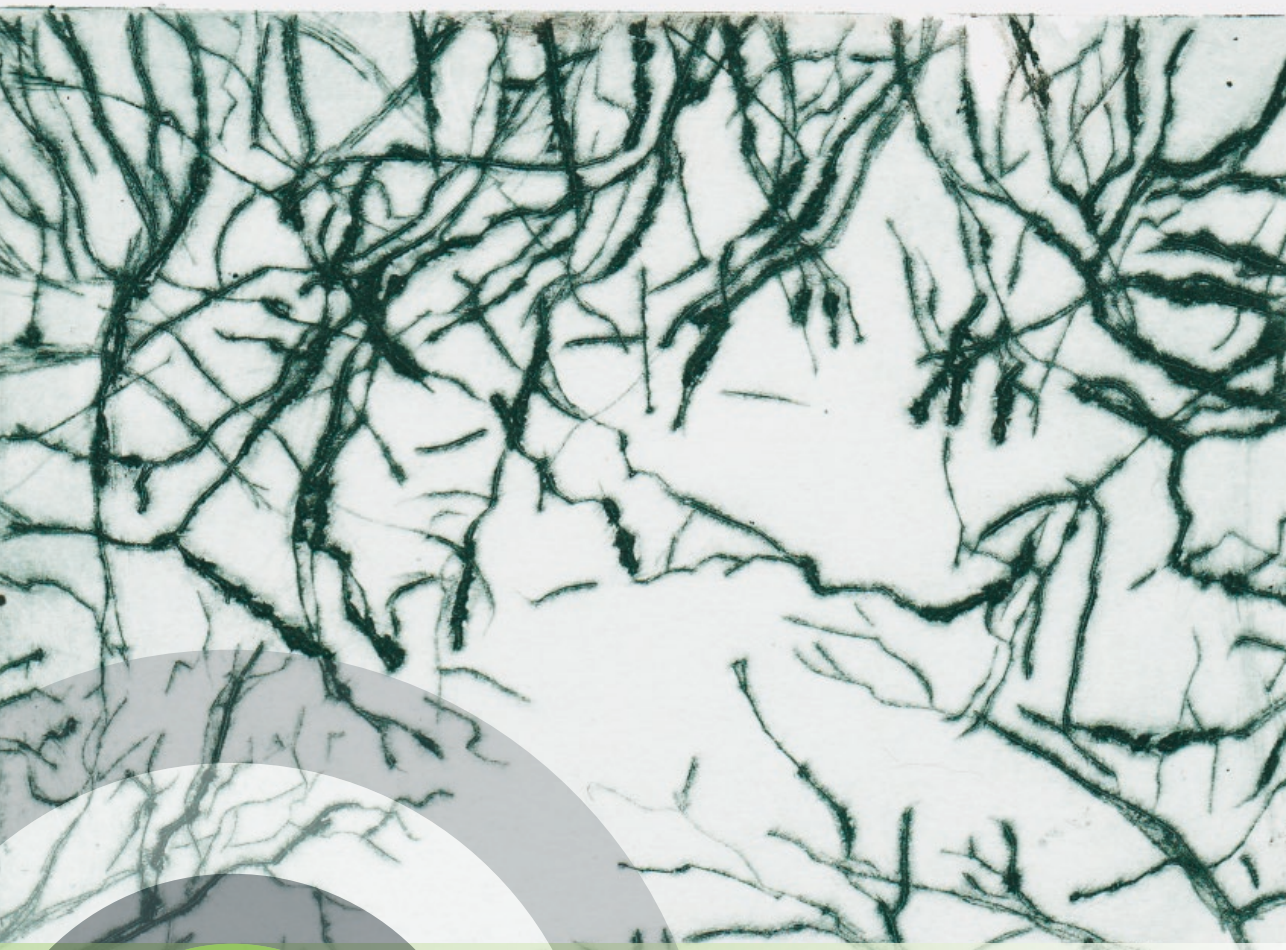

Boundary Practices

Educators and researchers in development

stoas | Vilentum
UNIVERSITY OF APPLIED SCIENCES WAGENINGEN

Niek van den Berg

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Colofon

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The ecology of boundary practices

From an ecological perspective, nature is a collection of relationships. Connections exist within and between ecosystems. An ecosystem is open to outside influences (e.g. light, rain, temperature), in addition to being flexible. When something changes within an ecosystem or the factors surrounding it, this changes the system as a whole. An ecosystem is continually reacting to changes, and it is constantly in search of new balance. Developments occur in iteration through the course of time. Within this process, forms of cooperation exist and emerge, with relationships that are beneficial to all parties. One example is offered by lichens - a partnership between algae and fungi that allows both to grow. Variety (diversity), an array of types in a specific location, the more types, the greater the diversity in interactions and relationships: this strengthens the system and makes it responsive, resilient and thus better equipped to withstand unexpected changes.

In Boundary Practices, Niek van den Berg refers to various ecosystems in the world of research and teacher education: that of the researcher, of the educator, of the student, of the profession and of science. In our view, divisions between these entities impede the ability to search for and find appropriate answers to current practical and research issues. Such issues are complex in nature, touching upon interests, as well as various domains of knowledge and disciplines. In our opinion, the sustainable resolution of these issues calls for ways of working other than those that have been customary to date. Are there lessons to be learned from ecology? Which changes does this require? Minor changes in nature can have major consequences (e.g. a pebble can cause an avalanche), and greater disturbances can transform it into another system. What does this mean for our practice of research on learning and development?

Niek focuses her question on the role of research in the resolution of professional issues in educational contexts. If we consider her question and approach from the aforementioned basic ecological principles, we can identify each one of them in her analysis, approach and agenda for the lectorate, beginning with the statement, “Relationships hold my attention: relationships between research, practice, innovation and professional development in education.” Other aspects that are easily identified include ‘collaboration on complex professional issues’, ‘ways to reinforce boundary practices’, ‘diversity of interests and knowledge domains: trans-disciplinarity’, ‘delay and iterative processes: research ability’, ‘managing by conditions: which conditions are supportive’. The approach is ecologically inspired, and it is focused on breaking through the divisions between systems, seeking and crossing one’s ‘own’ boundaries and searching for cooperation with other ecosystems, with the expectation that this will result in more suitable and directly applicable answers to professional questions.

In the image that graces the cover of this publication, we see tree branches reaching out to each other. If you look at it for a long time, you will become dizzy. Will they reach each other? Which type of growth is needed in order to grow together within the open space? In her address, Niek brings us along in the elaboration of this question. The term 'boundary traffic' brings to mind back-and-forth traffic: skipping across and then quickly returning to your own ecosystem. The term 'boundary practices' brings to mind partnerships between research and practice. For example, we could think of teachers and researchers addressing professional questions within a 'common space'. Feedback loops, both large and small, emerge within this space, generating circularity within and between the ecosystems, as well as a process of continuous development on the part of all partners and domains involved. Both the process and the outcomes of research can contribute to the development of boundary practices and the research culture within the university of applied sciences (in Dutch: Hogeschool) and the relevant professional practice. The teaching and research mandate for Niek van den Berg's lectorate, Boundary crossing Practices of Educators and Researchers, will help us along the way. Perhaps in a few years, the cover of the publication containing the results from the lectorate will feature an image of mycorrhiza, a fertile symbiosis between a fungus and a tree root, as a metaphor for new boundary practices.

Madelon de Beus
Director, Stoas Wageningen | Vilentum University of Applied Sciences

“Why not jump in?”

About 25 years ago, I was conducting my doctoral research (Van den Berg, 1992). I wanted to learn how basic education for adults had taken shape - after all of the relatively diverse precursors had been merged - and how the environment, the organisation and the supply of education related to each other. I spent a week in each of 17 institutions conducting archival research, class observations and interviews. Throughout one academic year, I experienced the ins and outs of basic education, including the work pressure and commotion of the weeks preceding the summer holidays. One team that I had observed called me a week after my visit because my interviews had brought about quite a stir. The underlying tensions between the precursors had suddenly become clearly visible, and the team did not want to leave for the summer on that note. They had organised an extra team day in order to re-open a discussion, and they were asking me to attend. In this way, they would have an independent observer and rapporteur, and I would gather supplemental material for my research. I had never before witnessed how the act of conducting research could have such a direct impact on practice, and how this impact could be immediately used in a constructive manner. Several years later, when a colleague asked me to recall inspiring moments in my work, I recounted this case and how much I would enjoy working with teams in this way more often. He asked me why I wasn’t doing that. At that time, I had no idea how I would be able to support myself doing something so fascinating.

In November 2015, during the EAPRIL conference in Luxemburg, I heard myself asking the same question to a colleague who was conducting research on the consequences of dissertations in practice: “Why not jump in?”

Through the years, the relationships between research, practice innovation and professional development in education have been areas of exceptional interest to me. How are knowledge from research and knowledge from practice related to each other? When and how do research and practitioner inquiry help educators to achieve further professional development? How can research contribute to the improvement of the teaching profession with regard to learning and development? I am constantly searching for ways to work with others to arrive at answers to these types of questions, as well as for ways to make these answers productive in practice. One new environment within which to do this is the lectorate Boundary crossing Practices of Educators and Researchers at Stoas Wageningen | Vilentum University of Applied Sciences (Stoas).

Stoas regards research as a way to enrich the working and learning environments of its staff, students and external partners. Research contributes to the development of knowledge within the university of applied science, as well as to the professional development of teachers and an improved curriculum. It also provides for the circulation and valorisation of knowledge, and it can generate new insights and knowledge concerning practice within the teaching profession. From here at Stoas, we would like to use research to make a lasting contribution

to and with the practice of professionals in the field (including ourselves). In the process of conducting research, we would like to help professionals and organisations in their further development. We refer this as an ecological approach. It is a unique 'colour' of practice-based research, which has been known for several years as Ecologically and Transdisciplinarily Inspired (ETI) Research (De Jong, De Beus, Richardson & Ruijters, 2013). Two fundamental tones, connection and transdisciplinarity, resound throughout this book.

Although the specific form that research takes when conducted in working and learning environments, what it requires of educators and researchers, and its benefits have been topics of discussion for some time, until recently, they had yet to be fully explicated. In order to address this situation, the Research group on Research in the Bachelor's Programme (RRBP, in Dutch: Onderzoeksgroep Onderzoek in de Bachelor (OOB)) was created in 2014, and the lectorate Boundary crossing Practices of Educators and Researchers was established in 2015. In this public lecture, I provide further elaboration on the approach to be taken within the lectorate. Section 1 provides an outline of the inspiration for and the context of the lectorate topic, followed by a discussion of the central question and definitions. Section 2 addresses the nature of professional issues, the complexity of which is an important factor in determining the manner in which research can play a role. Section 3 discusses the context of research ability, which is one of the two types of qualities that educators and researchers must possess in order to collaborate on professional issues. Section 4 concerns the second quality: transdisciplinary ability. The final section (Section 5) outlines the research agenda for the lectorate.

The main text is interrupted by text frames containing a variety of illustrations and digressions. You are free to choose where to accelerate or decelerate your reading.
Do you have ideas on the subject? Would you like to join in? Let us know!

Niek van den Berg

1 Reinforcing boundary practices

Research plays an important role in our society, despite differences in insight concerning this role and how it should best be designed. In this section, I explain how particular visions on research can have consequences for the way in which we interact with it. I focus my essay on the role of research in the explanation and resolution of professional issues in educational contexts. In particular, I emphasise the manner in which researchers and professional practitioners collaborate in practitioner research and practice-based research. This forms the foundation upon which I formulate the central question for the lectorate.

1.1 More innovative, investigative professionals in society

As stated in documents by the Netherlands Educational Council (Onderwijsraad, 2014), in the Dutch government's 2015-2020 Strategic Agenda for Higher Education and Research (Rijksoverheid, 2015) and in other sources, knowledge and innovative ability are becoming increasingly important in society. This is also changing the demands that are imposed on professionals. Routine skills are becoming less important, while non-routine skills and cross-disciplinary competencies are playing an increasingly important role. For example, consider analytical, investigative and reflective abilities. For professionals, such qualities are important to optimal functioning. For organisations, they are essential to improving responsiveness, innovation and productivity (Onderwijsraad, 2014, p.9).

The increased need for research and innovative ability in society is evidenced by the role that academic universities and universities of applied science play as educators of high-level professionals. Research proposals are currently expected to contain explicit statements concerning the societal relevance and the applicability of the research. The role of universities of applied science has shifted from that of developing applications for scientific knowledge to that of active knowledge development. In 2001, the changing social task of higher professional education was boosted by the introduction of lectors and the opportunity for teachers to engage in research. The Higher Education and Scientific Research Act (in Dutch abbreviated as WHW) was revised along these lines in 2010. Article 1.3 of this act identifies the three core duties of higher professional education in the following terms:

- the provision of Bachelor's education and, in some cases, Master's education;
- organising practice-based design, development and research activities and
- contributing to the development of professions on which the education is focused.

Thinking about the role of research within and by the system of higher professional education has developed at a rapid pace. In 2000, many were still arguing that research should be reserved to universities and that higher professional education should be concerned only with work relating to design and development or, at most, applied research. A decade later, the term practice-based research has become nearly a household word (Andriessen, 2014). According to the Netherlands Educational Council (Onderwijsraad, 2014), the knowledge and innovation function of the system of higher professional education is nevertheless in need of an additional boost, particularly through the reinforcement of 'the triangle' between education, research and the vocational field. In order to train students to become

innovative professionals, it is important for the curriculum to move closer to the vocational field and, in the process, for more attention to be devoted to current professional issues and research needs. Achieving these goals, however, requires investment in the capacity of lectors (both lectors and teacher-researchers). For this reason, the 2015-2025 Strategic Agenda for Higher Education and Research (Rijksoverheid, 2015) provides resources for expanding the lector capacity within the system of higher professional education. Moreover, the Netherlands Educational Council has underscored the necessity of embedding the research function of higher professional education more explicitly within the university of applied science, as well as in strategic networks with the professional field (Onderwijsraad, 2014).

1.2 What is the status of the educational domain?

When considering educational degree programmes and the associated professional field (educational institutions and other organisations focused on learning and development), we might wonder what would be required of professionals in order to achieve the aforementioned strengthening of 'the triangle'. The Netherlands Educational Council expects professional teachers to have a critical/inquiring stance, to possess practical wisdom, to know what they stand for and to engage in continuing dialogue with others on this point (Onderwijsraad, 2013). The Knowledge Base for Teachers emphasises the inquiring stance, explicitly mentioning the researcher role for teacher educators (HBO-raad, Vereniging Hogescholen, 2011; Velon, 2011).

Attention to research in the Knowledge Base for Teachers and Teacher Educators

The importance of research ability (or components thereof) has been expressed in various sources, including the Generieke Kennisbasis Tweedegraads lerarenopleidingen *[Generic Knowledge Base for Second-level Teacher Training Programmes] (HBO-raad, Vereniging Hogescholen, 2011, p.54). Teachers in secondary (vocational) education are expected "to acknowledge responsibility for their own professional development, in addition to examining, specifying and developing their own interpretations concerning teaching and their own competency. This requires newly qualified teachers to possess an inquiring stance, in addition to competencies. They should be capable of conducting practitioner research, with the goal of using it to improve the teaching practice, as well as their own actions. They should be capable of collaborating with colleagues in professional learning communities to develop the form and content of continual educational development, corresponding to the policy of the school or the professional or other programme. (...)"*

Research is also an important domain in the Kennisbasis voor Lerarenopleiders *[Knowledge Base for Teacher Educators] (Velon, 2011). In the interest of providing further support, and perhaps with an eye towards the adaptation of this Knowledge Base, Lunenberg, Dengerink and Korthagen (2013) conducted an international review study on the profession of teacher educators. Based on this review, they distinguish six roles, two of which emerge prominently from the literature they examine (in addition to the roles of supervisor, curriculum developer, gatekeeper to the profession and bridge builder between teacher-education programmes and the workplace). The first of these two roles is that of teacher of teachers (with self-study and reflection are identified as strategies for professional development). The second role is that*

of researcher - a role that is being mentioned more frequently, although it is not always regarded as self-evident (particularly not by teacher educators themselves). The research conducted by teacher educators is aimed primarily at particular disciplines or school subject, students and/or teachers and the teaching practices of individual teacher educators. According to the authors, this focus is an important stimulus for teacher educators to engage in research.

The attention devoted to research in the Knowledge Base for Educators is reflected in the curriculums of educational degree programmes. In a parallel development, we are seeing an increase in boundary traffic between research and educational practice. For example, consider the growing group of lectors, teachers with Master's degrees and teacher-researchers, as well as professional learning communities and academic workplaces. One recent development, the practice of facilitating lectors in the system of intermediate vocational education (Bussemaker, 2015), is of particular interest to me, due to the pioneering work in this area that various scholars, including myself, have done and are continuing to do (Delies, 2009; Den Boer, 2009; Ritzen, 2008; Van den Berg, 2006; Van den Berg et al., 2011).

Although the body of practitioner research and practice-based research is thus growing, this development is subject to several inevitable challenges. For example, researchers argue that their findings are not used to the extent that they should be, while educators argue that research is too often engaged in bashing in open doors, in addition to being reported in an inaccessible manner and containing no concrete guidelines for application (Broekkamp & Van Hout-Wolters, 2006; Onderwijsraad, 2006, 2011; Teurlings et al., 2011). Strengthening the usability and use of research will require more than the merely adding usability requirements. It will require more than imposing research duties on educators and expanding lectorate capacity. Even enhancing the findability and accessibility of research - however necessary this may be - will not be enough. Access to research that has been conducted does not mean that we, as educators, should also read, interpret and actively use this professional literature. That depends in part upon the research and the researchers, and in part upon ourselves and the contexts in which we work.

"For adolescents, the school day continues to start at a time at which their minds are still asleep"

On 7 November 2015, Aleid Truijens (2015) wrote about this in the newpaper called de Volkskrant, *in response to research on learning by jumping. It helps to move while we learn. Moreover, school performance was found to be better in schools that do not allow smartphones in the classroom. This is indicated in research results, as is the case with many things that have a positive effect on learning. Nevertheless, teachers continue doing primarily what they have always done, even if studies demonstrate that these practices are not effective, that they are counter-productive or that their effectiveness is at best questionable. Why do we not take the knowledge developed through research more seriously? According to Truijens (2015), it could be because we would very much like to believe that pre-school education, smaller classes and similar efforts truly do help. Wishful thinking, the spirit of the times, habit - at any rate, we need more than "Studies have shown..." to be able to use research to improve education.*

Addressing questions about learning and development by working in a systematic, inquiry-based manner, if possible in collaboration with external partners (e.g. related organisations, researchers), offers exceptional opportunities for realising sustainable improvements in our teaching practices. At the same time, experience has shown that persistence is also at play. Even if everyone were to endorse the importance of research and work to bridge 'the gap' between research and teaching practice, the work practices of researchers and educators will not come together on their own. Boundary crossing by educators and researchers has proven to be quite complicated, even when conditions appear favourable (Schenke, 2015). Partners in innovation projects fail to complete their learning cycles, and research often does not make the desired contribution to practice (Den Boer & Teurlings, 2015; Van den Berg, 2013).

Innovation-driven research or research-oriented innovation?

In a reflection based on the Rijnmond part of the Workplace Learning Breakthrough Project, Jan Streumer and I proposed that the relationship between research and practice has yet to be precisely determined in practice-based research. The willingness and competencies of researchers and teaching professionals to collaborate on urgent issues appear to be particularly important factors in success. "Theoretical insights and practical experiences can develop simultaneously and in collaboration only if the relationships between and input from the various partners are properly coordinated. Experiences with knowledge communities and similar operational partnerships have demonstrated that research often dominates practice (with the opposite occurring in some cases), that the quality of the research is sometimes lacking and that the same is true of the actual contributions to educational improvement (Pieters & De Vries, 2005; Ten Dam, Volman & Wardekker, 2004)" (Van den Berg & Streumer, 2011a, p.52).
We are also pointing our fingers at ourselves. The aforementioned project involves 'double' innovation, with a focus on both the Breakthrough Method and the learning of students and educators in learning departments. In retrospect we determined that the process of conducting the study has rested primarily with the researchers, that the quality of the research could nevertheless be questioned and that the study had contributed less than had been hoped to changes in practice. The study's effects consist primarily of insights that educators had acquired through their participation in the project. Conversations between researchers and educators concerning concretely applicable solutions resulted largely in further research. Might they perhaps opt for further research too quickly, too often or too easily, even if there are concrete possibilities for behavioural change that could be implemented without further research? Perhaps more patience is needed, because the reality of workplaces is just too complex to grasp within the space of three years (Van den Berg & Streumer, 2011a, 2011b).

What makes collaboration between educators and researchers so difficult? Images, expectations, preferences and circumstances play a role, as does the specific nature of the cycles of practice and research to which we are all accustomed. The linear RDD model of knowledge development followed by development work, diffusion and application (Research-Development-Diffusion) still appears to flow through the veins of knowledge and educational infrastructure. This is not to say that nothing is changing. For example, the RDD model is being increasingly supplemented by alternative models (e.g. practice-based research in professional learning

communities, knowledge workplaces and academic workplaces. As advocated by Gibbons and colleagues (1994), this involves supplementing knowledge development in Mode 1 with knowledge development in Mode 2, which is an elaboration of approaches including the previously mentioned ETI approach (De Jong et al., 2013). In this approach, researchers and practitioners engage in transdisciplinary collaboration in order to understand and resolve issues in the context of education. Practical knowledge and scientific knowledge both have a voice in knowledge development, and all partners involved in the conversation learn from this (cf. De Jong, 2015, 43-57). It is therefore a way in which to contribute to the general base of knowledge (i.e. theory), as well as to practice.

Although such interactive approaches are clearly on the rise, RDD thinking continues to hold a prominent place in our systems, including the associated processes of agenda-setting, funding and accountability. In this regard, Wehrens (2013) proposes that we open a discussion concerning the practice of speaking in terms of 'bridging the gap'. The image of a gap can reinforce the image of research and practice as two separate worlds with completely different logics, motivations and routines, thereby needlessly complicating the process of building bridges. The boundary traffic is actually more intense and fertile than could be expected based on the image of two separate worlds. The perspective of mutual knowledge development entails looking at what does exist - the boundary practice, the bridge and, particularly, the traffic (active dialogue and negotiation concerning issues that belong on the agenda) - instead of at what does not exist (the void of the gap).

Academic Workplaces: bridge or boundary traffic?

Wehrens (2013) investigated the general development of the Academic Workplace for Public Health. In this investigation, he contrasts the concept of separate worlds connected by a bridge with that of co-production, determining which of these two concepts offers more 'explanatory power' for the interactions between research, policy and practice. Wehrens (2013) focuses on three elements of the boundary practice between researchers, policymakers and professionals:

- *processes of coordination and accountability (weighing different perspectives against each other, finding feasible solutions for dilemmas, attempting to achieve mutual agreement concerning problems and activities, and reaching compromises);*
- *structures in which collaboration takes place; and*
- *the development of collaboration over time (e.g. with dilemmas concerning a small scale in the beginning phase and rapid growth in later phases).*

The research results lead to the conclusion that the perspective provided by co-production offers more insight than does that of separate worlds. For example, Wehrens observes that Academic Workplaces constitute a promising boundary practice, although there is still considerable ground to be gained in a number of aspects. Accountability processes (e.g. the requirement to publish work in academic journals) have proven particularly threatening to negotiation and consensus. For this reason, it would be desirable to position Academic Workplaces as spaces for experimentation. This would allow them to be less tightly bound to the traditional and often strict accountability structures that continue to stand in the way of collaboration between researchers and professionals (Wehrens, 2013).

1.3 Don't build bridges; reinforce boundary practices instead

As should be clear from this discussion, much work remains for educators and researchers in their joint efforts to clarify professional issues and to contribute to solutions. To this end, we should also ask ourselves several questions and determine our own position. For example, as educators, at what points are we likely to stumble upon issues that we are not able to understand immediately? Which images do we have of practitioner research and practice-based research? Do we ever discuss these images with researchers? How willing are we to acknowledge our prejudices and compare them to the opinions of others? Are we sufficiently open to findings from research? What do we need in order to convert information from research into guidelines for action in our own practice? As researchers, we should also be asking several questions of ourselves. What are our views on the contribution of research to educational practice? Does our interest centre on appealing, current but primarily theory-oriented research, in which we formulate several recommendations and applications for practice? Would we be willing and able to make our research primarily dependent upon the issues with which schools are struggling? Are we capable of using our research to contribute to the development of practical indications and instruments? Do we discuss this with educators?

As research in and with the field of practice, practitioner research and practice-based research focuses on explaining, expressing and assigning meaning to issue with which educators are struggling, as well as on finding and expressing solutions for these issues. This entails a specific responsibility for researchers. They must do more than simply conduct good research. They must also address the issue through dialogue with professional practitioners, with the goal of developing the practice. It is engaged research, which takes into account its potential effects on the surroundings. It is research whose positive influence on practice is regarded as being of equal importance as its implications for science. This means that educators, students and other actors from the professional field should be involved in all phases of the research process. It therefore poses a challenge to the usual standards and criteria for success in scientific research (Edwards, 2002; Rickinson, Sebba & Edwards, 2011; Van de Ven, 2007; Verbeek & Wassink, 2014).

In the interest of enhancing our understanding of the course of collaboration between educators and researchers on issues related to learning and development, as well as our understanding of how such collaboration can be improved, the lectorate in Boundary crossing Practices of Educators and Researchers centres on the following question:

How can boundary practices between educators and researchers be reinforced?

The question can be elaborated as follows:

How do educators and researchers collaborate on professional issues related to learning and development? What qualities do they apply? How can they achieve further development in this regard? What are the benefits? What conditions can support this process?

In this context, educators should be understood to include teachers, knowledge managers and innovators (including those in training) and their own educators (see Figure 1).
I understand researchers primarily as those who conduct research in and with the field of practice, whether as a practitioner-researcher, a practice-based researcher or something in between (see Figure 2).

In its Bachelor's programmes, Stoas trains students to become **teachers** in preparatory/intermediate vocational education (VET) and **knowledge managers**. Students in the Master of Learning and Innovation programme are trained as innovators in learning.
These teachers, knowledge managers and innovators play a variety of roles for their students and colleagues (e.g. supervisory, instructional, teaching, innovating). In this text, I summarise all of these roles as the role of educator. Their own **teachers (and teacher educators)** should also be regarded as the educators discussed further in this address.

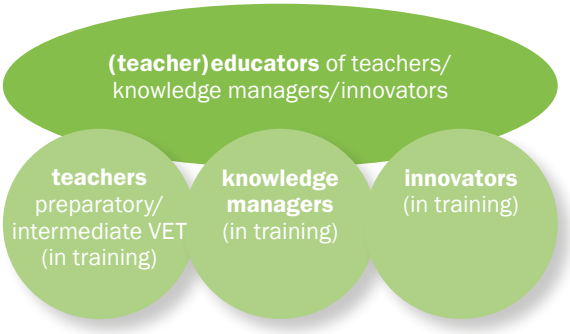

Figure 1: Definition of 'educators'

The **researchers** that I have in mind are largely those who aim to connect with research in, with, by and for the field of educational practice, with the active input of theoretical and practical knowledge. Two primary types of researchers – with a wide range of combinations between them – are:
Practice-based researchers: researchers who are actively involved with research on professional issues concerning learning and development, but outside any specific research context, and who actively involve educators in this process (not only as respondents).
Practitioner-researchers: professional practitioners within a research context, who are actively involved with research on professional issues concerning learning and development, with which they are confronted directly.
The overarching term **'practitioner-researcher and practice-based researcher'** combines the two.

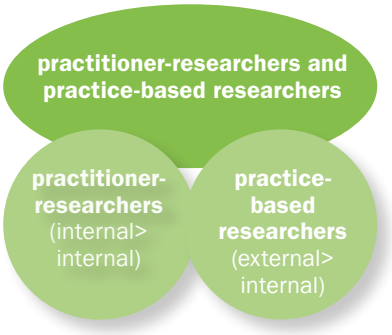

Figure 2: Definition of 'researchers'

We proceed from the assumption that educators, practitioner-researchers and practice-based researchers all need certain qualities (e.g. wisdom) in order to contribute successfully to the explanation and resolution of professional issues concerning learning and development. This requires choices, as well as the ability to make and implement them.

I distinguish two primary types of boundary crossing qualities of educators and researchers:

- *research ability*: the capacity to work with an inquiring stance, to utilise existing research and to conduct research independently (a view expressed by Andriessen, 2014), and a fourth element: supervising the development of research ability of students.
- *transdisciplinary ability*: the capacity to collaborate and engage in mutual learning across theoretical and practical boundaries. This consists primarily of conducting good research, engaging in interactive collaboration on research and teaching about research.

Both educators and researchers should ideally possess both of these types of ability. In my elaboration of *research ability*, I focus on educators first, and then on researchers (Section 3). I reverse the order for *transdisciplinary ability* (Section 4). In the following section, however, I begin by addressing the nature of *professional issues* (Section 2).

2 Slow thinking about professional issues

The nature of professional issues plays an important role in determining the contribution that research can make to the resolution of such issues, and thus also to the role of educators and researchers (Figure 3). In this section, I explain this in greater detail. I also address 'quick' and 'slow' thinking and their relationship to research.

Figure 3: Types of issues and the role of research

2.1 Issues and the role of research

The manner in which issues concerning learning and development are addressed depends primarily upon their relative simplicity or complexity, as well as upon the clarity of the solution. The more complex and persistent the issue is, the greater will be the role that research can play. In this regard, I distinguish three primary types within a continuum ranging from simple to persistent issues.

Simple issues, in which both the actual issue and its solution are clear, form a context of certainty (Geerligs, Mittendorff & Nieuwenhuis, 2004). In this type of situation, it should suffice to deploy substantive expertise in order to improve existing rules and support behavioural change. Schein (2005) refers to this as the expert model. These types of issues generally lend themselves well to informative learning (Illeris, 2010), single-loop learning (Wierdsma & Swieringa, 2011) or serial learning (Den Boer, Geerligs & Nieuwenhuis, 2004), as is the case with learning from a book in which knowledge is applied. In such cases, the *role of research* could consist of evaluating whether the solution is actually sufficient, or whether the situation has been complicated by unexpected circumstances. One might wonder, "Why conduct research if you are already sure of the outcome?" In most cases, conscious reflection (taking an inquisitive view of the issue), discussion with colleagues and students, and possibly engaging in a mutual search for potential improvements should suffice. Have I supervised my students well today? What has the team meeting achieved?

For *complicated issues*, the issue is clear, but the solution is not. Such situations require diagnoses and remedies, as outlines in Schein's (2005) doctor/patient model. Does our curriculum offer sufficient flexibility to students? How can we improve the correspondence between interim formative assessments and final assessments? In these situations, 'the right solution' is developed in behavioural prescriptions and tools. The learning is

assimilative (Illeris, 2010) or double-loop learning, focused on innovation in the rules (Wierdsma & Swieringa, 2011). 'Individual wisdom' and dialogue within a small circle are no longer sufficient. Additional sources must be tapped. *Research* can help to create an overview of existing solutions (e.g. through a literature survey or expert panel), as well as to test these solutions (e.g. through design study). In many cases, however, it is enough for educators to adopt an inquiry-based approach. They need not proceed through a complete research cycle, as long as they (as a group) make systematic use of existing data as a foundation for decisions that could contribute to improvements in their own work practices (Van der Zwaard, 2014). Examples could include a literature survey for a policy plan, a market survey for new programmes, satisfaction measures, analyses of data from student-monitoring systems, project evaluations, annual evaluations, internal audits and project-based approaches to innovation. Commonly used tools in this regard include the PDCA cycle (Deming, 1996), CIMO logic (Denyer, Tranfield & Van Aken, 2008), the 5W1H method for problem analysis (Migchelbrink, 2008), the five keys to successful innovation (Van den Berg & Geurts, 2007) and lesson study (De Weert & Logtenberg, 2011). Attention to practitioner inquiry is also reflected in concepts centring on the use of available data, including result-oriented working methods, evidence-informed education and positive behavioural support (see e.g. Bruggink & Harinck 2012; Schildkamp, 2012).

The term *complex and persistent issues* is used in reference to situations in which the core of the problem is not particularly clear and/or those for which no solution is immediately clear. In such cases, Geerligs and colleagues (2004) refer to a context of uncertainty. Such contexts call for a path in which the issue is dissected and possible solutions are explored. It is conceivable that such situations require fundamentally different ways of looking, thinking and acting (i.e. transitions). This could entail assigning new meanings to situations and circumstances, adjusting expectations, changing habits, developing new knowledge and skills, building upon what already exists, creating new opportunities and seizing opportunities for growth (De Lange & Van Staa, 2004, p.144). According to Den Boer and colleagues (2004), parallel learning (i.e. learning by doing) is appropriate to these types of situations. Issues that require only the replacement of old routines entail accommodative learning (Illeris, 2010). If more extensive changes are necessary, transformative learning is needed. Instead of calling for expanding our knowledge and abilities, such situations call for us to change the nature of our knowledge and abilities, across the entire scale (Illeris, 2010). In this regard, Wierdsma and Swieringa (2011) refer to triple-loop collective learning, which calls into discussion both the 'what' and the 'why' of changes. *Research* can support learning in a variety of ways in such situations. For example, it can be used to describe and clarify the issue, to offer perspectives, to identify possible explanations, to mention and compare possible solutions, to conduct experiments and to monitor processes. In this way, research could fit well with efforts to build sustainable development in education and schools. Both processes proceed in an iterative manner, and both are characterised by a relatively slow pace. The interaction could be described as a continual process in which research helps to improve our understanding of practice and to support school development, which in turn serves as a source of theory development (Schenke, 2015, p.80-81). It is therefore reasonable to assume that this also applies to persistent issues in educational settings other than schools.

2.2 Research as 'slow thinking' on the part of educators

In broad terms, different types of research are thus suited to issues of different levels of complexity. This refers to reflection, practitioner inquiry and 'true' research. There is also a certain extent of linguistic confusion with regard to exactly what research is. With my researcher's eyes, I see 'true' research as a focused, reproducible and systematic form of data collection within a research cycle governed by methodological rules (Cochran-Smit & Lytle, 1993; Ponte, 2012; Zwart, Smit & Admiraal, 2014). In contrast, my practitioner's eyes see research as a much broader concept, which also encompasses reflection and practitioner inquiry.

Research helps... but research?! Help!

In order to explore the images that educators have of research, the Zadkine lectorate in vocational education, the Dutch Centre for Expertise in Vocational Education and Training (abbreviated in Dutch as ecbo), and the Dutch Platform for Vocational Education (abbreviated in Dutch as HPBO) organised two workshops in early 2011, with the title Help(t) onderzoek?! [*Research helps... but research?! Help!*]. *In their responses to the question,* "What is research to you (in your work practice)?" *participants revealed that the term 'research' calls to mind a wide array of associations. These associations can be clustered into the following categorisation of images of research (Van den Berg, 2012):*

1. *That which distinguishes research and practitioner inquiry from 'ordinary practice': Research implies a different manner of viewing/thinking. It implies taking time, venturing into uncharted territory, working from within an inquiring stance. Research is thus a persistent entity.*
2. *Inquiry-based behaviour: asking questions, resolving issues, collecting data and consulting sources.*
3. *Research as a tool: for objectifying, for neutralising - or even for exercising deliberate influence in the process of research - for reconstructing what has been done, for making knowledge accessible and explicit, for finding solutions, for determining what should be done, for providing input for reform and innovation, for providing input for the PDCA cycle, for supporting opinions, for convincing superiors and for personal development: "Looking at your work through a research lens increases your professionalism as a teacher".*

The educators in the workshops thus emphatically supplemented the image of scientific research with forms of research and practitioner inquiry that are (or could be) quite close to the daily practice of teachers. In doing so, they gave an assignment to researchers. If educators have a sense of 'ownership' of the research because it concerns their own questions, they are more likely to use the results to adjust their behaviour, even if the results are inconvenient to them. Research should therefore begin with the translation of questions from the professional field. It should support practice and generate the development of knowledge that extends beyond practice (Van den Berg, 2012).

The manner in which research is currently defined could cause a sort of natural brake that would impede many educators from using research. "The student always comes first", is a

well-known argument for pushing the tasks of reading professional literature and work consultation to the periphery of the agenda. This manner of working yields satisfied students who can proceed immediately, as well as teachers who feel that, in this way, they have put their working hours to better use than they would have by investing in efforts that would pay off only in the long term. If "research shows" that change would help to improve educational practices, the first impulse that many educators have is to relativise or deny these outcomes. Research outcomes are obviously relative by definition. It goes without saying that what has been found does not always apply in every situation. "Research shows ..." thus does not necessarily concern our work practice here and now - but there are other aspects to consider. 'The student always comes first' is also an argument for doing what we naturally prefer to do. As an educator, you (like everyone) are accustomed to taking decision continually and nearly automatically with regard to a wide range of interventions (of all magnitudes), based on the practical knowledge that you have personally acquired. This is obviously a good thing. Without tacit knowledge and fast thinking, we would always be uncertain about how we should act. As in Monty Python's football match between German and Greek philosophers, we would never score except by chance. In many cases, quick action based on practical knowledge is not only customary and advisable, but also appropriate. During a workshop on the utilisation of knowledge, one teacher made the following observation: "Sometimes, your common sense makes you do exactly what is in the books" (EAPRIL, Luxembourg, 27 November 2015). The context of the conversation reveals that she was referring to more than simply common sense. This observation concerns the practical wisdom (phronesis) about which the Netherlands Educational Council has written (Onderwijsraad, 2013), and which develops within the interaction between experience and theory. They form the foundation for individual, wise but nevertheless quick decisions about how to act.

What does it mean for us, as educators, to apply reflection, practitioner inquiry and research in order to help improve our work practices? Given the dominant (and often quite appropriate) pattern of action based on tacit knowledge, the relative slowness that accompanies the clarification of and reflection on assumptions will at least take some getting used to. This is what we experience as teachers and knowledge managers (including those of us in training) as we conduct peer review interviews, write reflections or conduct research. The type of thinking that is involved in this context concerns the quality of our judgements and of what we do. It helps us to explore possibilities and to make choices with regard to complicated issues and dilemmas for which there is no one 'best' answer (Kahneman, 2011). A critical, inquiring stance should thus be inseparably related to our professional identity. Within a professional learning community with a inquiry-based culture, this attitude should be expressed explicitly in dialogue with colleagues, as well as with supervisors who support and encourage this culture through their exemplary behaviour (Lunenberg, Dengerink & Korthagen, 2013; Onderwijsraad, 2013, 2014; Ros et al., 2013; Snoek, 2014; Van den Bergh & Ros, 2015; Vloet, 2015). Within this context, research is part of a professional learning strategy. When we, as educators, reflect, work with a research focus or conduct research, we look at our goals and efforts in a more conscious and result-oriented manner, in addition to providing a stronger foundation for our actions (Bolhuis & Kools, 2012). In this process, we regularly encounter bumpy moments, in which we might struggle for priority as educators, innovators and researchers and in which there is something to be said for every perspective.

Jan Hoed on encouraging and investigating learning for sustainable development
Jan Hoed is an Institute Trainer for Stoas in the Green Consortium. Since September 2015, he has been a member of the Stoas knowledge network. He conducts research on sustainable learning and working within the context of *Regioleren* (learning in and with the region), he tells about bumpy moments he has encountered in his roles as a teacher, researcher and innovator.
A bumpy moment is a moment of interaction within daily teaching practice, in which teachers have acted legitimately according to their own insight, but in which they could identify a legitimate alternative for action in retrospect (Van Kan, Zitter, Brouwer & Van Wijk, 2014). My bumpy moment as a teacher, researcher and innovator emerged in a conversation with a team leader from Terra. The conversation concerned the positive results of my coaching of a colleague at Terra, as well as the coaching of the team in the continued development of Regioleren. *I would like to involve the same team members in my research on learning for sustainable development within the context of* Regioleren. *One bumpy aspect is that the team and I are collaborating in a completely judgement-free search for the optimal form of supervision and coaching within the context of* Regioleren. *At the same time, I see considerable room for improvement on the point of learning for sustainable development (amongst many other points). Within the context of team training, I would thus like to devote attention to what would appear to me to be the optimal way of coaching students. I would also like for the same team to work with me to investigate the manner in which learning for sustainable development can assume a more explicit place within the context of* Regioleren, *such that students can learn better (at least in my view).*
The following are several of the questions that this raises for me: Should I tell my colleagues about my idea that knowledge in the area of ecology and system thinking could be very helpful within the context of sustainability thinking? Should I chart their knowledge in the area of ecology and system thinking, or should I focus on the supervision of students in general? From within my professional role, should I tell my colleagues about what everything that they could improve in their supervision, or should I proceed from my research role, explaining the emphasis on what colleagues could learn from research? To what extent should my opinion play a role? For example, should I allow my colleagues to have a voice in decisions concerning the eight didactic principles of learning for sustainable development, based on what they regard as relevant? Alternatively, should I define the framework by explaining that all eight are relevant in the search for translation to the vocational field?

2.3 Researchers have seen it all...

What has been said about educators in the discussion above applies to the work practice of researchers as well, although much less has been written about this aspect. Just like all other people, we researchers have the urge to cling to our own routines and preferences instead of looking for what is actually needed. Do we have (or do we take) the time to devote more consideration to a research idea? Do we simply get off to a quick start, for fear of losing the base of support to undertake action, making it impossible for us to conduct 'our' research? Some issues require us to behave differently. For example, if we the situation calls

for using a screwdriver, we would nevertheless reach for the hammer with which have previously been so successful in driving nails. This applies to substantive perspectives (e.g. selection, differentiation, talent development, learning problems, didactics, professional content, testing, negligence, motivation, professional orientation, team development), as well as to methodological approaches. It is equally tempting to opt for a traditional, linear research approach, because we are accustomed to and comfortable with it. We do this also, however, when the issue and its context call for something that is actually different, as with more direct contact between researchers and educators, with more short-cycle feeding of practice from research (Martens, 2010). The following is thus one of the tips for organisations that would like to apply research: Look for inquiry-based researchers who are 'exemplary' in their behaviour. They should be curious and not eager to place their own research knowledge in the spotlight, although they should also avoid accepting existing practical knowledge at face value. In short, look for researchers who reflect on their own role in developing knowledge and in contributing to change in the field of practice (Van den Berg & Verdonschot, 2012, p.26).

2.4 'The place of effort' for educators and researchers

Differences in the complexity of issues thus call for different strategies. Particularly for complex issues, it could be helpful for educators and researchers to start working together. Nevertheless, people have a natural tendency to simplify issues to such an extent that existing routines will suffice to address them (Kahneman, 2011). This is a strategy in and of itself. We prefer to avoid 'the place of effort', and thus the more extensive processes of learning and change (Schenke, 2015; Wierdsma, 1999; Wierdsma & Swieringa, 2011). This is logical, as reflective and critical thinking demands time and effort. Courage and wisdom are needed in order to seek the 'place of effort' and to confront ourselves with possible prejudices and other errors in our thinking. The urge to think from within existing patterns can cause us to opt for quick solutions. For example, to counteract student absence, we might be tempted to introduce a required attendance policy, create registration systems or report to parents instead of adopting an approach that would require more time and transformation. Such an approach could focus on the motivation of the student, the quality of the teacher's lessons and the adaptive capacity of the team. One consequence of our preference for existing patterns could also be that we would opt for a traditional, linear research approach, in which interactive research would presumably yield more sustainable benefits.

At the same time, we should not make things any more difficult for ourselves than necessary. No reflection for the sake of reflection. No research for the sake of research when we already know the answers. If an issue concerning learning and development does call for the type of slow thinking that is known as research, the conditions should be such that educators and researchers are actually capable of successful collaboration. The following two sections address the two primary concepts that I distinguish in this regard: the boundary crossing qualities of research ability and transdisciplinary ability.

3 Research ability

The concept of research ability is the overarching term for various elements (Andriessen, 2014; Onderwijsraad, 2014; Rijksoverheid, 2015):

- possessing an inquiring stance and the ability to think and work from within this attitude,
- being capable of applying knowledge from available research in one's own work practice and
- being able to design conduct small-scale practice-based research independently.

Research ability is an integral part of our professionalism, and it should thus always be seen in relation to other qualities that make us who we are and what we so: our professional identity. As educators, our roles as researchers are combined with those of developers, educational specialists, didacticians, supervisors, team members, learners and more.
In addition to the three elements of research ability that have been listed - and which are generally applicable to professionals trained in universities of applied sciences - there is another overarching element for specifically educators. One special characteristic of educators is that they - even more than other professionals - support others in the process of learning, including in the development of research ability (Nijenhuis et al. 2015; OOB, 2015). This is true of both teacher educators and the educators of knowledge managers, given the professional profiles for which they train students. It also applies to other educators in universities of applied sciences, given that the professional profiles of the practitioners whom they train also require them to possess a certain level of research ability. VET teachers constitute another group to which it applies, given that their students will need research ability in their roles as citizens, practitioners and participants in continuing education.

I have chosen the concept of research ability, as it expresses the inquiry-based aspects of these settings. Conducting research is but one component. Moreover, anything that applies to educators applies to researchers as well. As researchers, we are also expected to possess research ability. Although this may appear to speak for itself, it is interesting to explore this assumption further. Do we offer more resistance to the tendency towards 'fast thinking' than others do? What is the situation as regards our inquiring stance? Are we truly curious, and do we actually delay judgement until we have achieved full understanding of issues? Do we apply new insights concerning our profession (i.e. conducting research) in our own work practice? What could be said of the quality of our research? The review systems of journals would indeed have something to say in this regard.

In the following sections, I address the elements of research ability in greater detail (Figure 4). I share the view expressed by Andriessen (2014), although I would also like to add a fourth element - 'supervising the development of research ability' - as well as the insight that the elements 'operating from within an inquiring stance' and 'conducting research' together form a continuum, with the element 'applying research' being of a different order.

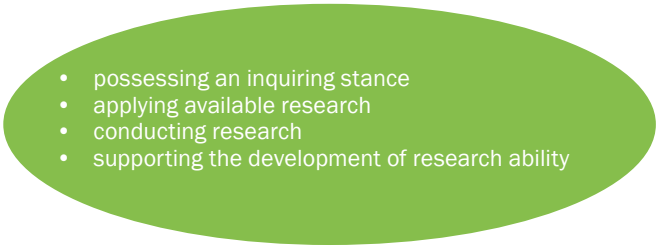

Figure 4: Elements of research ability

3.1 Inquiring stance

Based on his research on the views of 23 scholars in the exact sciences, Van der Rijst (2009) defines a stance of scientific inquiry as the tendency to want to be critical, to understand, to achieve, to share, to innovate and to know. Drawing on a survey of Dutch and international literature, Bruggink and Harinck (2012) list characteristics of an inquiring stance on the part of current and aspiring teachers. They regard such a stance as being 'focused on one's own professional development: anchored in one's own professional practice and/or related to professional issues' (op. cit., p. 47). They distinguish the following generic characteristics of a professional inquiring stance:

- being curious, wanting to know, wondering;
- having an open attitude, searching for one's own presuppositions, being able to suspend judgement;
- being critical (Is that really the case?), calling matters into question;
- wanting to understand, wanting to develop insight, wanting to comprehend;
- being willing to change perspectives;
- distancing oneself from routines, questioning the obvious, daring to leave the beaten path, daring to choose one's own direction;
- being focused on sources, wanting to build upon previous views and ideas;
- being focused on knowing for certain, wanting to use good sources, wanting to be accurate;
- wanting to share with others, and wanting to be part of learning communities.

Three dimensions of an inquiring stance?

In all of the programmes at Saxion, Miriam Losse and Roel Nahuis are investigating the attention devoted to research ability in the curriculum: what is the status, and where would we like to go? They distinguish three dimensions of an inquiring stance (Losse & Nahuis, 2015):

- *having an open attitude, being curious, wanting to understand;*
- *being critical, wanting to support, wanting to justify;*
- *wanting to build, wanting to concede, wanting to innovate.*

It will soon become clear whether this substantively conceivable trichotomy also emerges distinctly from the data they have collected.

Results from an original qualitative exploratory study conducted amongst teachers, students and work-site supervisors in the agricultural teacher-education programme and VET indicate that comparable terms are used in these settings in order to make the concept of an inquiring stance more concrete. They further identify this stance as the most important component of the research ability of educators, in addition to being a pre-requisite for conducting research (Van den Berg & Van der Ven, 2015). Van der Rijst (2009) also refers to an inquiring stance as a pre-requisite for conducting research. We could argue that, without an inquiring stance, research would remain limited to a trick, a mechanical procedure that is not fuelled by any curiosity about answers to the issues being investigated. As discussed in one of the following sections, however, the relationship can also run in the opposite direction, with the process of conducting research (or learning how to conduct research) contributing to an inquiring stance (or its development).

How does an inquiring stance appear in behaviour? Although skills in research and reflection do not necessarily constitute a component of an inquiring stance, they are important 'tools' for its application and thus its contribution to the assignment of meaning and the ability to improve action (Bruggink & Harinck, 2012, p.50-52). The distinctions between types of issues, as made in Section 2, can be useful in this regard. For relatively simple issues, an inquiring stance is manifest in asking reflective questions, engaging in discussion with colleagues and students and possibly collaborating to identify opportunities for improvement. In this case, the inquiring stance is thus the attitude of reflective practitioners, who build delays into their actions. For issues of a more complex nature, behaviour based on an inquiring stance is not merely reflective, but also more inquisitive. In studies by Bruggink and Harinck (2012) and by Greve, Munneke and Andriessen (2015), this is summarised with the terms 'inquiry-based learning' and 'proper examination'. Keywords include flexibility, soft knowledge, personal question/situation, sharing and short-term. Finally, for issues that are even more persistent, an inquiring stance has been shown to consist of the methodical application of research skills, with keywords including formal, tight, harder knowledge, broader question of interest to the professional field, publication and longer-term. In this regard, we refer to practitioner research (by educators), practice-based research (by researchers) and everything in between.

3.2 Applying research in our own work practice

Applying research in our own work practice contributes to keeping the vocational field current. It entails modernisation and innovation based on existing research rather than according to intuition and experience. Some research knowledge has been included in manuals, and some remains for current and aspiring professionals to read on their own in scientific publications and to use in their actions. In addition to gaining substantive knowledge, this can help them to learn about the research methods of their sources and to apply them in their own research (Geerdink, 2010, p.69-70). As observed by Lunenberg, Dengerink and Korthagen (2013, p.45), teacher educators are often insufficiently abreast of the literature, in addition to being insufficiently focused on reinforcing their theoretical equipment. According to these authors, it would be desirable for teacher educators to develop themselves in this regard.

As argued by the Netherlands Educational Council (Onderwijsraad, 2006, p.9), research can "yield a reliable judgement concerning the suitability of methods and approaches, thus preventing the protracted ideological discussions and "trial and error" in practice." The Council does not advocate the wholesale adoption of evidence-based education, but a phased and differentiated approach. Depending upon the state of knowledge in a given area, this is expected to generate a systematic process of exploratory research, development work and practical experience that will ultimately produce an overview of what works, as well as why and how it works. Only then can hard experiments with control groups be justified (Onderwijsraad, 2006). This approach could be compared to the model elaborated by Van Yperen, Veerman and Bijl (2013), who distinguish four levels of evidential value (applied o the context of youth services):

1 Descriptive evidential value, which demonstrates the *potential* of interventions
2 Theoretical support for *promising* interventions
3 Indicative evidential value, based on well-defined interventions that have proven *effective*
4 Causal evidential value, which demonstrates the *efficacy* of interventions

This model does justice to the notions of practice-based evidence and evidence-based practice, two movements in which the four-level model of evidentiary value can help to realise the interaction between practice and evidence (Van Yperen, Veerman & Bijl, 2013). Two examples from my own experience with such interaction are provided in the text frame.

Research and practical knowledge on the design and effects of competency-based education

In 2006, I started as a lector at the Zadkine regional education centre. Colleagues at the Zadkine Academy attended my public lecture on Verbindend beroepsonderwijs *[Vocational Education that Connects] (Van den Berg, 2006) and asked whether we might be able to do more with the overview of research literature on competency-based education. For the Academy, this served as a good starting point for discussing competency-based education in teams, although it would be necessary to make the text more accessible. At that time, 17 of my colleagues from Zadkine assisted in creating the brochure entitled* Competentiegericht onderwijs. Wat is het en hoe werkt het? *[Competency-based education: What is it and how does it work?] (Van den Berg, 2008), with which the teams at the Zadkine Academy teams could support their efforts to compare insights from research to their own practical experiences. Scientific knowledge and practical experience are also connected to each other in* Het glas vult zich *[The glass fills itself] (Van den Berg & De Bruijn, 2009). We conducted a traditional literature survey of scientific publications, in addition to an analysis of knowledge from practitioner publications created within the field of vocational education (e.g. Master's theses by VET teachers). For this analysis, we issued a call to submit practitioner publications, in addition to organising working sessions in four regions. We concluded that the knowledge from both research and practice was quite fragmented and that there were few systematic connections between the two manners of knowing.* "There has yet to be any reflection or combination of the various types of information that could produce powerful reasoning" *(op. cit., p. 80). We therefore advocate an agenda for innovation research, consisting of three areas of operation: 1) formal scientific research, 2) practitioner research by schools, directly*

linked to innovation and professional development, and 3) the reciprocal connection of formal and practical knowledge in innovation and research projects, as well as in the knowledge infrastructure for the vocational education system (op. cit., p. 81).

At that time, the Netherlands Educational Council ascertained that the base of support for evidence-based working methods was increasing both within and outside the system of education. The inter-university Top Institute for Evidence Based Education Research (TIER), which was established in 2008, is one obvious manifestation, involving both a research programme and an education programme. The action programme *Onderwijs Bewijs* [Educational Evidence] is also targeted towards stimulating the development of evidence-based educational innovation through controlled experiments, thus generating insight into what does and does not work in the field of education (see http://www.onderwijsbewijs.nl/).

Building on available research as a foundation for individual actions is nevertheless no longer commonplace. Some attribute negative connotations to evidence-based working methods. The concept is associated with hard evidence and a linear approach to research that would lead to prescriptions for action set in stone for educators, without allowing room for their own practical wisdom. This negative connotation threatens to allow 'fast thinking' to take precedence above the desire for innovation - one of the characteristics of an inquiring stance (Bruggink & Harinck, 2012; Van der Rijst, 2009). One effect could be the absence of motivation on the part of educators to start working with research outcomes. It could potentially be beneficial to encourage then to develop an inquiring stance, thus making them curious about the outcomes of research. At the same time, they would also become more critical and less likely to accept research outcomes as irrefutable truths. They would be more likely to see such results as a supplement to their practical knowledge and as a potential foundation upon which to base their own actions (Enthoven & Oostdam, 2014; Verbeek & Wassink, 2014).

3.3 Conducting research

According to some, the heart of practitioner research by educators consists of adopting a critical, inquiring stance towards their own practices (Leeman & Wardekker, 2010). As I have previously noted, there are gradations to working from within an inquiring stance, ranging from reflection to practitioner inquiry to conducting research. A critical inquiring stance is a common characteristic of all three gradations. Without such a stance, meaningful research cannot exist. I reserve the term 'conducting research' - with my researcher's eyes - for targeted, reproducible and systematic data collection (Cochran-Smit & Lytle, 1993; Ponte, 2012; Zwart, Smit and Admiraal, 2014). It entails a research cycle in which methodological rules are followed in order to clarify an issue; to map literature; to design a research approach; to collect, process and analyse data; to describe results; to derive conclusions; to make recommendations and to report about all of these actions.

Example: Action research

Ponte (2012, p.22-23) defines action research as follows: "An entirety of activities to be undertaken by teachers, who use techniques and strategies from social-scientific research

to develop knowledge about their own actions and the situation in which those actions take place. Based on the knowledge obtained in this manner, they attempt to improve their actions and the situation in which they take place, building upon it to arrive at new knowledge. This cycle can be repeated several times, until sufficient insight has been developed and the research problem has been solved."

Conducting research can contribute to insight into one's own actions, to the process of building on insights from others, to the development of knowledge of their own changing profession, to the professional development of educators and to the quality of their work practice (Admiraal, Smit & Zwart, 2013; Bruggink & Harinck, 2012; Van Veen, Zwart, Meirink & Verloop, 2010; Vanassche & Kelchterman, 2014). Conducting research also contributes to the reinforcement of an inquiring stance and to the acquisition of knowledge and skills with regard to conducting research (Van der Linden, 2012). It is also an effective learning strategy that contributes to self-directed learning. Research skills and study skills overlap to a large extent (Geerdink, 2010).

In their international literature survey of peer-reviewed research published by teachers, Admiraal, Smit and Zwart (2013) distinguish four types of research: action research, lesson study, self-study and design-based research. "As a result of the practitioner inquiry of teachers, their substantive knowledge increased, they became better equipped to link theory and practice and they exhibited an increased capacity for critical thinking. (...) teachers who conduct research can increase their self-confidence in functioning as teachers (...) often assume leading roles in their schools, as they feel that they are able to work pro-actively and make changes within their schools (...). Most importantly, however, participation in research appears to be a meaningful form of professional development for teachers (...)" (Admiraal, Smit & Zwart, 2013, p.25). The authors observe that few of the practitioner studies that they examined had contributed to the generation of scientific knowledge concerning education, even though such results could be expected, given their selection criteria (i.e. peer-reviewed and published research). The scope of teacher research thus apparently remains limited to the base of knowledge within the field of educational practice. In my opinion, this 'limitation' appears to be more than worth the trouble, in light of the often painstaking effects of research conducted by foreigners in practice. The publication of practitioner research in peer-reviewed scientific journals is of less direct importance to the practice of education than is the involvement of individual working environments in assigning meaning to the results of such research. The frequent practitioner publications on completed Master's research in professional journals (e.g. *Didactief* and *Profiel*) attest to the benefits that practitioner research can offer to teachers, their teams and their efforts in the areas of school development and research quality.

Studies by Ros and colleagues (2013) and by Van den Bergh and Ros (2015) provide a deeper treatment of the contribution that can be made to school development when teachers conduct their own practitioner research. In this regard, they distinguish between feedback and dialogue as functions of the research. The feedback function occurs when the results of the research are used in order to work systematically on the improvement of and innovation in the quality of education. This entails the second component of research ability: the

application of research in one's own work practice. According to the aforementioned authors, the dialogue function of research emerges as educators develop knowledge of the topic and a shared vision through the research process and in reflective dialogue (compare to the first component of research ability). This could help them to improve the coordination of their actions with each other. The role of the school management (a facilitating, stimulating and exemplary role) is the most important pre-requisite for the achievement of these two functions of practitioner research (Ros et al., 2013; Van den Bergh & Ros, 2015).

3.4 Supporting the development of research ability

The fourth element of research ability is supporting others in the development of their research ability (OOB, 2015). This applies to both teacher educators and educators elsewhere in the domain of education (including researchers in such roles as guest teacher or research assessor). In their near futures, students will need to possess a certain level of research ability in their roles as citizens, practitioners and participants in continuing education. With reference to studies by Ruijters and Simons (2006), by Kegan (1994) and by other scholars, the Research group on Research in the Bachelor's Programme (RRBP) (OOB, 2015; see also Nijenhuis et al., 2015) proposes that the development of research ability has a transformative character. In other words, it could be expected to entail a fundamental change in the manner in which we look at ourselves and the world, as well as in the ways in which we behave. It has less to do with knowing and being able to do more than it does with our adopting an inquiring stance as practitioners, in addition to knowing how to apply available research and conduct research on our own.

The most efficient manner of reinforcing the research ability of students in the teacher-training programme is not yet clear (Bruggink & Harinck, 2012). For several years, teacher-training programmes have been working to gain insight into this matter and to build attention to research ability into the curriculum. Vision documents and pilot projects are being developed, experiences are being exchanged through articles and during conferences. In its visitations and accreditations, the Accreditation Organisation of the Netherlands and Flanders (abbreviated in Dutch als NVAO) has devoted particular attention to the topic, and it encourages further development and documentation in several aspects. Given the transformative character of research ability and its integration into professionalism, education focusing on its development should be anchored within the entire process of vocational preparation. It should not be restricted to a separate component of the curriculum or to the acquisition of research skills (Geerdink, 2010; Onderwijsraad, 2014). Nevertheless, we can see that the attention of universities of applied sciences continues to focus largely on the development of learning continuity pathways and modules. The broadest attention is devoted to the development of research ability (in broad terms), with the Bachelor's level emphasising the attitudinal aspects that should be developed by conducting research (and learning how to conduct research). On the one hand, this focus on conducting research is understandable, given the relatively short history of attention to research in the curriculum of universities of applied sciences. There simply remains much to do in this regard. On the other hand, there is a risk that isolated attention to conducting research will not make a sufficient contribution to the development of integral quality on the part of beginning practitioners.

Exemplary research education
At Fontys, Van der Linden (2012) designed and tested an introductory course for the university programme for teacher education. One important aspect involves the presentation of a large number of examples of research by educators and the manner in which research can be positioned within educational practice. The students identified the 'inquiry-based design' of the session as particularly valuable: encouraging the sharing of prior knowledge and conceptions, discussing them and being required to support opinions and views. Such curriculum characteristics contribute to the inquiring stance of students, as well as to their knowledge and skills relating to research (Van der Linden, 2012).

Intervention cycle as a guideline
In the context of the educational degree programmes of the HvA, Enthoven and Oostdam (2014) advocate having students conduct one of the types of research from the 'intervention cycle': problem-analytical research or diagnostic research (for Bachelor's students), design research or monitoring research (for Master's students) or evaluation research (for doctoral students). At the Amsterdam University of Applied Sciences (HvA), professional development for teacher educators takes place through sessions on types of research within the intervention cycle. According to Enthoven and Oostdam (2014), these sessions should be supplemented by the joint development of assignments.

Conducting research in order to develop research ability
The Faculty of Education at the University of Applied Sciences of Arnhem and Nijmegen (HAN) has established a framework for the development of a learning continuity pathway in research, with the reflective professional as a central concept in the Bachelor's programme, as is also the case at the HvA. For students, conducting practitioner research is both a professional learning strategy and a tool for developing and maintaining an inquiring stance and a positive attitude towards research (HAN Faculteit Educatie, 2012). The expectations for graduates who are qualified to begin careers as teachers and educational specialists with regard to an inquiring stance and inquiry-based action are described in nine exit qualifications, including "open their own insights and working methods, as well as those of others to discussion" and "involving stakeholders in the research process." Coordination, peer review, conducting independent research and other forms of professionalisation are being used to guarantee the professionalism of supervisors and assessors (HAN Faculteit Educatie, 2012).

Vision on research education
Greve, Munneke and Andriessen (2015) investigated the degree programmes at the University of Applied Sciences Utrecht (HU) with regard to various aspects, including visions on the role of research is realised in the profession and in professional products. Opinions were unanimous that universities of applied science are not intended to train their students as researchers, but that research should serve primarily to reinforce professional qualifications. Programmes differ in the extent to which they explicitly elaborate links between research and professional products. In part, this has to do with clarity (or lack thereof) concerning professional products, as well as with views on 'true' research.

Since mid-2014, the Research group on Research in the Bachelor's Programme (RRBP) at Stoas has been charged with highlighting and reinforcing attention to research in the curriculum. In the vision document entitled *Vanzelfsprekend nieuwsgierig* [Naturally curious], the RRBP has consciously opted to broaden its manner of looking at the curriculum, which also entails broadening the attention devoted to research on research ability. Elements of research ability and quality characteristics should be identified in greater detail in association with each other and elaborated where necessary. The underlying principle is that certain requirements should be imposed on each element van research ability (and thus not only on the process of conducting research) with regard to transformative character, practical relevance and methodological rigour. In this regard, it is important to note that some combinations are more obvious than others; hence the checks and question marks in Figure 5 (OOB, 2015; Nijenhuis et al., 2015).

Supporting the development of research ability

Research ability	Transformative character	Practical relevance	Scientific rigour
Inquiring stance	√	?	?
Applying research	?	√	?
Conducting research	?	?	√

Figure 5: Schematic representation of research ability (OOB, 2015; Nijenhuis et al., 2015)

It is expected that this model will develop as it is used in practice. The aspects addressed in this public lecture will have an influence, and practical experiences and research will provide input for subsequent versions of the model.

Supporting the development of research ability on the part of learners implies demands on educators, in addition to curriculum development. Educators must possess research ability, stay abreast of current knowledge (including research knowledge) within the discipline for which they are being trained, continually update their education according to systematic analyses of literature and practice, serve as examples of inquiring stance and be able to conduct research on their own (Geerdink, 2010, p.73). They must obviously be able to transfer these skills to learners and inspire them to adopt an inquiring stance. This is more easily accomplished when the learning environment has a culture of research (Van der Linden, 2012). An increasing number of educators have been developing themselves in this area (e.g. through courses, master classes, Master's programmes, independent research). Many personnel advertisements currently call for teachers with research experience, and researchers are regularly invited to give guest lectures or to assess research. It is nevertheless important to note that a good football player does not necessarily make a good coach. The greatest challenge is to assign teachers/ teacher-researchers/research teachers/researchers in such a way as to ensure balance at both the individual and team level in terms of subject content, teaching skills and research ability. At the same time, integral attention to research ability is needed in both the curriculum and in vocational preparation.

I cannot teach anyone anything. I can only make them think.
This quotation from Socrates (Greek philosopher, 469-399 B.C.) appears on 20 January 2016 in my contribution to the Bildung 2016 Scheurkalender [*block calendar*] *(Sissing, 2015). What do teachers at various levels do? When does it work? What makes an individual a good teacher is his or her ability to transfer information, skills and other aspects while stimulating people's curiosity - their desire to know and to understand. These are fundamental characteristics of an inquiring and learning stance. When this stance is reinforced, it becomes more likely that, in addition to assimilating and processing information (informative learning), learners will undergo changes in their manner of thinking and acting (transformative learning). This is of substantially more importance to sustainable returns of education than it is to the use of checklists in diploma factories. The Socratic method is one way to ensure sustainable learning. This method involves a group of individuals in discussion to exploring an issue by asking questions about a concrete case. Good Socratic discussions are characterised by mastery in the art of asking questions and in the art of listening to each other's answers.*

3.5 Professional issues and research ability

Differences in the complexity of issues, as described in Section 2, can be related to the various dimensions of research ability. Considering the possibilities of 'applying research' can be of relevance to any type of issue. The dimensions 'working from within an inquiring stance' and 'conducting research' nevertheless form a sliding scale, which corresponds to the increasing complexity of issues, in which explicit research knowledge and skills play an increasingly important role (see also Enthoven & Oostdam, 2014):

- Educators as reflective professionals (Bachelor's level, with starting professional qualifications) with an inquiring stance and the skills needed in order to understand themselves and their contexts. This reflective ability can help to comprehend and resolve simple issues.
- Educators as inquiring professionals (experienced, developing towards the Master's level) with the skills needed in order to adopt practitioner inquiry and conduct research. This can be accomplished through such actions as designing interventions based on rigorous problem analysis and insights from previous research and the subsequent monitoring the implementation and results of these interventions. This type of research can help in the resolution of issues that may be more complex or persistent.
- Educators as professional researchers (PhD level), who devote themselves in part to the development of generalisable knowledge, thereby distancing themselves to some extent from the research context. This need not impede teacher-researchers from serving both science and practice.

Improved self-regulation on the part of students
Within the Master's programme in Learning and Innovation at Stoas, Pepijn van Hove is conducting a study on the Sports and Physical Education programme at the HAN. The programme has ascertained that the level of self-regulation amongst students at the end of the programme is too low. Pepijn van Hove has designed an intervention to encourage students to start thinking about the programme's assessment criteria and other matters at an earlier point in the programme. They will also be expected to take a more active role in determining how they will approach assignments. He is now conducting a study on the effects of this intervention, and he is conscious of his roles as educator (e.g. teacher within the educational experiment), innovator (designer of a new educational approach) and researcher (study on the active elements of the approach). He is thus aware that, in the study, he will not be able to rely solely on his own observations and analyses. For this reason, he has taken such actions as having students conduct some of the interviews and involving a fellow MLI student in the analysis (Van Hove, 2015).

The following are amongst the questions that could be derived from the preceding discussion: How do educators, researchers and students see the components of research ability? How do these components relate to each other? How does research ability relate to other qualities of educators? What does working in the field of vocational education (student learning, team functioning) demand with regard to the research ability of teachers? Which issues concerning learning and development are addressed, and how can research ability be used to help in this regard?

These types of questions can be - and are - addressed in a variety of ways. I return to this in Section 5. First, however, Section 4 addresses the other central concept of the lectorate: *transdisciplinary ability*.

4 Transdisciplinary ability

Section 2 concerns the nature of professional issues and how we cope with them. Section 3 concerns research ability as the first important boundary crossing quality needed in order to address professional issues. What else is needed in order to support professional development with research? Whereas the preceding section largely concerns the research ability of educators, this section focuses primarily on what researchers need in order to contribute to the comprehension and resolution of professional issues. An elaborated conceptual framework such as those formulated by Andriessen (2014) and others for research ability, however, has yet to be developed. For this reason, I explore what this second cluster of qualities should be called and what its constituent elements are.

What do researchers need?
During a 'campfire talk' at a conference, I posed the following question: "If teachers must possess research ability, what do researchers need?" My partners in the conversation (educators and researchers) mentioned "the ability to translate research results into solutions for a school". They thus regard the concrete relevance of research as important. They also identified 'teaching or having taught in the classroom' as an advantage for educational researchers. According to those present, this also makes it easier for them to level with educational practice, in addition to making them more acceptable as practice-based researchers (NRO conference: Samen op expeditie! [*Together on an expedition*], *Amersfoort, 4 November 2015, Session 22).*

"As long as there's something I can use ..."
Teurlings and colleagues (2011) also talked with educators about their expectations with regard to research (and researchers). The results indicate that, in any case, research should be simply good research. Educators should be able to trust that this is the case. They also consider co-makership important: research examining questions that are explicitly posed by practitioners and in which practitioners play an active role in the research. Educational professionals also place particularly emphasis on the practical relevance of research: helping teachers to improve their own teaching practices. It is no coincidence that the report is entitled "Als ik er maar wat aan heb..." [*As long as there's something I can use...*]. *Research can be used if it is understandable, accessible, acceptable, legitimate, insightful and applicable. Teurlings et. al (2011).*

Through reading and discussion, I arrived at the term 'transdisciplinary ability', which consists of the elements listed in Figure 7. It is interesting to note that, at first glance, 'practical relevance' does not appear to be included in the list. As I elaborate further in the following discussion, this concerns the character of interactive, transdisciplinary research in and with the field of practice. Practical relevance can be seen as woven into this fabric. Mutual knowledge development begins with the practical relevance of the issue, continues in several steps through the practical relevance of possible solutions towards actual change within the field of practice.

Figure 6: Elements of transdisciplinary ability

4.1 Simply conducting good, usable research?

Just as the primary task of educators is simply to be good educators, researchers should simply conduct good research. Validity and reliability are two demands that are addressed in every manual on research. Meeting these demands is known as 'scientific rigour'. That which is scientifically rigorous depends upon the further definition of validity and reliability. For example, these aspects are defined differently for qualitative research than they are for quantitative research. For qualitative studies, the demand for reliability (e.g. whether the same aspect will produce the same results each time) is either supplemented or replaced by requirements concerning the reproducibility or controllability of the study. With regard to the demand for validity (e.g. whether the study actually measures what it is intended to measure; whether the results could also be generalised outside the group being investigated), Anderson and Herr (1999) have formulated several alternatives for practitioner research and practice-based research, in addition to or in replacement of existing interpretations of the concept of validity. They distinguish the following:

- result validity (the research contributes to the solution of the problem);
- process validity (the research approach corresponds to the manner of development within the organisation);
- democratic validity (the stakeholders are involved in the research);
- catalytic validity (the stakeholders feel that the research provides additional insight for improving practice);
- dialogical validity (the research includes sufficient exchange between stakeholders).

These alternatives concern the *mutual efforts* of researchers and educators, as well as *research conducted by educators*. Directly related to this is the *usability* of the research in the development of educational practices. Verschuren (2010, quoted in Geerdink, 2010) refers to this as implementary validity and proposes that it, along with ethical validity, should be an additional demand for practice-based research, in addition to requirements concerning validity and controllability.

Various dimensions of the quality of practitioner research and practice-based research that have been identified based on the literature (e.g. Akkerman, Bronkhorst & Zitter, 2013; Andriessen, 2014; Butter & Verhagen, 2014; De Bruijn & Westerhuis, 2013; De Jong et al.; 2013; Den Boer et al., 2011; Ros & Vermeulen, 2011; Ruijters, 2015; Teurlings et al., 2011; Van de Ven, 2007; Vanassche & Kelchterman, 2014) include the following:

- *'Simply good research'*:
  - *'Classic' validity*: the extent to which research measures that which is intended to be measured, as well as the validity of the results within and beyond the group under investigation.
  - *Reliability*: the extent to which research is careful, transparent, reproducible and repeatable.
- *Mutual knowledge development in interactive research*: active collaboration by researchers and educators (with research ability) in various phases of research, from professional issue up to and including valorisation, all with input in the form of both practical and theoretical knowledge. Practical relevance thus takes on an integral form within this process of mutual knowledge development.

It is not always possible to unite the various dimensions of quality in practice-based research. For example, studies by Andriessen (2013, 2014) and by Vanassche and Kelchterman (2014) address the tension between scientific rigour and practical relevance. Objectivity, independence and generalisability are not always consistent with the advisory and interventional character and local validity of practitioner research, even though the latter characteristics are indispensable to the usability and effects of research in practice. Practical relevance can be interpreted in a variety of ways, ranging from explanations of how the research can benefit practice to 'valorisation', or its actual use in practice (Butter & Verhagen, 2014). One interesting finding in the study by Teurlings and colleagues (2011) is that professional practitioners who have been using research for some time attach less importance to its translation into directly applicable methods, instruments and recommendations by researchers (either internal or external). Some may even have little or no active involvement in research. This presumably has to do with lack of experience on the part of these practitioners with deriving useful elements from research. Those who have little or no involvement in research are likely to have a greater need for concretely applicable returns than do others who have more experience with conducting and using research.

The consideration and combination of the aforementioned dimensions of quality (e.g. valid, reliable, interactive) are involved in any practitioner research and practice-based research, and they require researchers and educators to explain the choices that they have made. However important and complicated it may be to think about validity and reliability may be, I set this topic aside for the time being. My focus at this point is on interactive knowledge development in the boundary practices of educators and researchers, as well as on the contribution to change that emerge within and from these boundary practices.

4.2 Interactive knowledge development as a contribution to change

The basic idea is that mutual knowledge development (Mode 2, Ecologically and Transdisciplinarily Inspired (ETI) Research, interactive research, co-creation of knowledge) by educators and researchers yield more than they would if they were to operate separately. In other words, professional issues can best be explained and resolved when researchers and practitioners engage in transdisciplinary collaboration, when both parties have a say in designing the process of knowledge creation, and particularly when this approach is insightful to both practitioners and researchers (c.f. Gibbons et al. 1994; De Jong et al. 2013; De Jong, 2015). Such research thus contributes to the general knowledge base (theory), as well to changes in the field of practice. In this regard, Ellström (2008) refers to the research cycle and the practice cycle interactive research that serves practical, scientific and educational functions, with the latter function being a pre-requisite for the other two. Mutual knowledge development at the boundary of practice and research thus does not necessarily emerge on its own. The process can be impeded by differences in culture and pace. Boundary traffic nevertheless offers learning potential, which can be expressed in various ways (Akkerman & Bakker, 2011, 2012; Akkerman, Bronkhorst & Zitter, 2013; Burchert, Hoeve & Kämäräinen, 2014). The research cycle and the practical cycle fuel each other within boundary practices (as represented by the ball in the middle of the models in Figure 7), as long as mutual learning and knowledge development take place within the process.

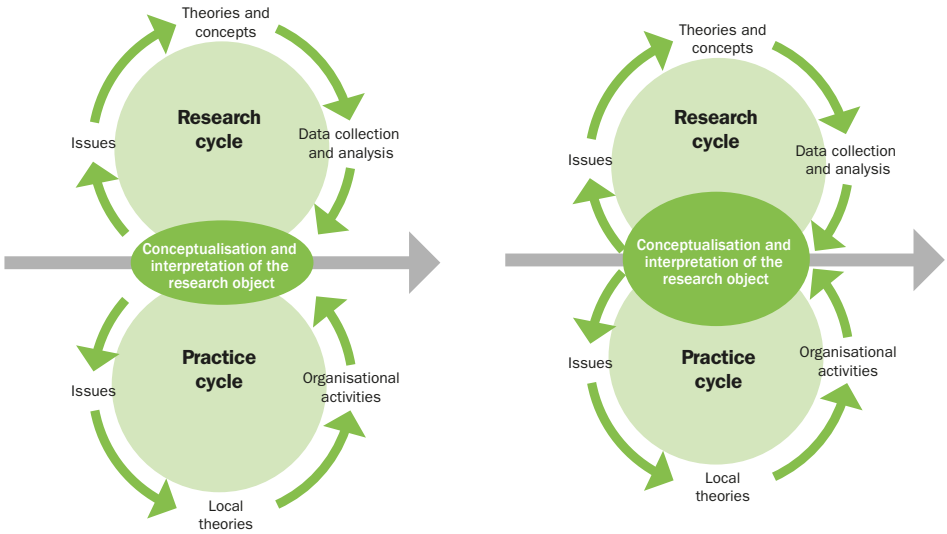

Figure 7: Interactive research as a boundary practice (based on Elström, 2008)

Various terms are used to refer to intensive forms of interactive boundary practices, including *research-practice partnerships* (RPPs). They are explicit, long-term partnerships between practitioners and researchers, consciously established with regard to professional issues and for the purpose of using research to improve practice (Coburn, Penuel & Geil, 2013; Ruijters, 2015; Schenke, 2015). Research-practice partnerships yield benefits for both

practitioners and researchers: research is used to benefit practice (informed practice), and newly acquired knowledge and insights contribute to theory. The challenge facing RPPs consists of linking the dynamics of the development of practice and practical knowledge to the dynamics of the development of research and research knowledge in the course of collaboration. This calls for attention to differences in culture and pace, mutual interests and trust, and the relationship between factors at play within and outside the RRP. This attention should ensure the proper conditions for exchanging information and for using and reinforcing each other's insights, instruments or other qualities (Coburn, Penuel & Geil, 2013; Ruijters, 2015).

Several practical examples of RPPs and other interactive research have been presented in the discussion above, including Breakthrough projects, Academic Work Sites and the lectorate work at Zadkine. Educational design studies offer another example of a boundary practice. In this regard, Akkerman, Bronkhorst and Zitter (2013) refer to three converging cultures or motives relating to investigation, design and change, respectively. Researchers must therefore continually determine which of these cultural systems is being addressed. They must also be able to cope with conflicts between them.

De Bruijn and Westerhuis (2013) demonstrate how they have designed boundary practices in innovation projects in the field of vocational education. They refer to the research role and the practice role, arguing that the roles of both researchers and practical actors demand a certain level of role stability. This is because research and practice each has its own perspective, and both of these perspectives are connected (at least temporarily) during collaboration. In addition to role stability, this connection also requires a certain level of role development, as argued by De Bruijn and Westerhuis (2013):

- For the practical actor: an inquiring stance, knowledge and skills as a foundation for systematic self-study and critical reflection.
- For the researcher: developing types of validity and reliability appropriate to the nature of practice-based research, along with working from within the notion of scholarship: work that is informed (by theory and practice), intentional (with methods that are related to goals), from within a continuous process of development, and characterised by transferability (transparency).

Other accents are possible in addition to this perspective, which emphasises role stability. I return to this point in Section 4.4. In order to arrive at proper coordination and role distribution, interpretations and desires with regard to role stability and role development should be discussed according to concrete boundary practices. The best option depends upon the issue being addressed (see Section 2), as well as upon the context. Which practical knowledge is already available? Which insights does the literature provide? Are educators willing and able to take an active role in collecting data? At what point should a broader group of stakeholders be informed? Should the research culminate in products for concrete application, or are educators able to develop such products independently? Such questions should be addressed from the very first explorations for the study. They should also be apparent in the design, process and conclusion of the study. One possible implication is that the intensity of the boundary traffic will change during the various phases of the process:

the ball in the middle of the model in Figure 7 can be either larger or smaller at different points (see also Schenke, 2015).

4.3 Requirements for interactive researchers

In order to allow interactive research to contribute to its usefulness and to the actual development of practice, practitioner-researchers and practice-based researchers should simply conduct good research, in addition to possessing the following qualities.

First, they should possess a *development-based stance*. In other words, they should proceed from the ambition and willingness to understand the complex field of practice and to contribute to the development of this practice. Contributing to change calls for researchers to broaden their perspectives beyond issues that are considered important in the field of science to include issues that are important to educational practice (Schenke, 2015). It also implies that they must go beyond collecting information, making diagnoses and proposing remedies, adopting instead a primary focus on increasing the learning capacity of the parties raising the issue to be investigated. Schein (2005) refers to this as the role of process consultant, as distinguished from that of the substantive consultant (expert model or physician model).

Second, researchers should be able to clarify issues or topics systematically, in collaboration with practitioners, in addition to sharpening them to reveal the core. In this iterative form of *issue articulation*, they should *actively value practical knowledge*. This calls for researchers to do justice to the complexity of practice and to observe it in a holistic manner, taking various perspectives into account, as well as insights from the various disciplines (Fortuin, 2015; Spelt, 2015). Researchers should be able to guide practitioners in their efforts to consider the past, the present and the future of an issue, as well as its context. They should also help practitioners to recognise any 'problems behind the problem'. This path of clarification and sharpening to reveal the core (the definition of the professional issue) is an art unto itself. It has characteristics of short-term and long-term research, based on explorations in and with the field of practice, with a short-cyclical character and a continuously shifting perspective (Butter, 2015; Butter & Verhagen, 2014; Heikkinen, 2014; Schein, 2005). For example, as researchers, we possess certain substantive expertise (which is often the reason we are asked), and this acts as a filter on our lens (the theoretical framework). Discoveries in the documentation concerning the issue and in conversations with stakeholders concerning their practical knowledge help us to arrive at ideas for delving into certain research literature, probing more deeply into these aspects in subsequent conversations. Such issue-articulating conversations should also include discussion concerning the extent to which the resolution of the issue that has been defined will actually require research (or follow-up research), or whether other activities might be preferable. In other words, the analyses in the initial phase could lead to the conclusion that something other than research is needed in order to continue the process, thus possibly concluding the collaboration. If it becomes clear that research would be desirable in order to support the development of practice, however, the professional issue should be elaborated into a research question, based on insights from previous research.

Interactive research also imposes demands on the design of the study (De Jong et al., 2013; Gibbons et al., 1994; Rickinson, Sebba & Edwards, 2011). For this reason, researchers should be *able to design and conduct studies with practitioners*, with an appropriate role for these practitioners, ranging from respondent to sounding board to co-researcher, and from outsider to active participant. Views concerning the distribution of roles between researchers and practitioners will need to be discussed and adjusted repeatedly, against the background of the interaction demanded by the professional issue. Based on the results of a study on collaboration between school managers, teachers and researchers in research and development projects in secondary schools, Schenke (2015) advocates collaboration from the start (the original professional issue) up to and including the consideration of the implications of the research results for the field of educational practice. Schenke concludes that, in a collaborative project, the boundary practice that emerges and the learning mechanisms that occur are determined by the mutual reasons for collaborating, the division of tasks amongst those involved and the manner of communication. More boundary traffic (e.g. an active data-collection role for educators; the involvement of researchers in considering school development) increases the presence of transformative learning mechanisms. It also increases the likelihood that new routines will emerge in the school (e.g. more practitioner inquiry with regard to school development) and amongst the researchers (e.g. more transdisciplinary working methods).

Other important aspects include the ability of researchers to *provide explicit clarification* of research activities, outcomes and returns (both during and after the study). This entails - also in consultation, and with a division of roles that remains to be specified -

- statements concerning the usability of the research for the vocational field. Usable research is perceived as relevant, understandable, acceptable, ethical, plausible, legitimate, inspiring, insightful and applicable.
- Resolutions for professional issues in the form of guidelines for action and instruments.

Finally, it involves *implementation/innovation/valorisation capacity*: the ability to provide proper guidance to the vocational field throughout and following the research, in addition to inspiring practitioners in the development of new behaviour and the use of new instruments (valorisation, innovation, transformation).

The 'secret' of practice-based research

Together with Suzanne Verdonschot, I embarked upon a search for the 'secret' that equips lectors to bring knowledge development and change. In a round-table discussion with lectors from the fields of healthcare, education and policy practice, we arrived at the following:
Agenda-setting and/or clarification: *If a professional issue is the starting point, research can initially contribute to the further exploration and clarification of the issue. What exactly is happening? What is causing so much 'friction' that we would like to do something about it? Can further research help us in this process? Research that begins with a knowledge question can serve an agenda-setting function. For example, if the theory is that a 'trialogue' between student, practical supervisor and teacher is a good form for conducting a study-career interview, a test of the theory in practice might indicate that such interviews consist largely of talking*

about *the student instead of* with *the student. This insight could lead schools to seek improvement in this regard. Both theory development and practical development benefit from the combination of scientific research with small-scale practice-based research and from the development of concrete tools for schools (e.g. frames of reference, conversational guidelines and trainings) (Van den Berg & Verdonschot, 2012).*
Joining forces for mutual learning and improvement: *Practical knowledge and involvement is important in order to improve research and to stimulate discussion in practice. For example, working at the HAN Knowledge Centre for Learning Quality, Miranda Timmermans (2012) conducted a doctoral study on the quality of teacher-education school. Together with educational practitioners, she developed new measuring instruments, not because no theory was available, but in order to use the existing practical knowledge and involvement to arrive at valid measuring instruments. She thus also created a base of support for actually using the outcomes of the study. Joining forces can also occur when practitioners or students are involved in data collection (e.g. by sending questionnaires with students to their internships). In this regard, Cees Sprenger notes, "Completing a questionnaire (or having one completed) is an intervention in and of itself. Such an action can help to open the dialogue" (Verdonschot & Van den Berg, 2012, p. 47). Joining forces is also important when considering the implications of research. For example, researchers should avoid giving advice, instead 'limiting themselves' to conversations concerning the research results. With regard to the Daring-Sharing-Doing Expedition (an innovation project focusing on sustainable innovation in secondary education), Femke Geijsel observes, 'In the past, I collected research data, analysed them, drew conclusions and noted the implications. I do not do this anymore. I place results on the table, and I have a conversation about them. This allows the stakeholders to gain their own insight into what they are doing' (Verdonschot & Van den Berg, 2012, p. 46)*

4.4 Teaching about research

In the beginning of this section, I address the notion that researchers should also teach. Teaching in the classroom can help researchers to *level* with the field of educational practice. It can make them more likely to be accepted, and it can be seen as enhancing the legitimacy of their roles as practitioner-researchers and practice-based researchers. At the same time, researchers who teach could contribute to the development of practice in the process of their teaching. Conducting research with students, giving lectures (or guest lectures), supervising or assessing student research - all of these activities are examples of boundary practices in which research can enhance teaching. According to Visser-Wijnveen (2013), this can occur through 1) the reinforcement of the inquiring stance of students, 2) imparting knowledge to students with regard to a subject area or discipline, 3) helping students to become familiar with the phenomenon of research and 4) contributing to the recruitment of research skills in students. Conversely, teaching can enhance research: through input from students, through reflection by researchers on their teaching roles, and through the broadening of the research focus as a result of the specific approach demanded by teaching (Visser-Wijnveen, 2013).

Everything that applies to researchers in this regard applies to educators as well. In Section 3.4, I address the fact that the *supervision of learners in the development of research ability* entails more than merely teaching about research. In that section, I refer to the necessity of assigning educators and researchers in such a way as to ensure balance at the individual and team level in terms of subject content, teaching skills and research ability. I also advocate embedding an integrated form of attention to research ability in the curriculum, as well as in vocational preparation. It is of great value to present examples of research (and its application) and to exhibit exemplary behaviour. This leaves open the possibility of at least some level of confusion on the part of certainty-seeking students when their supervisors 'aren't quite sure either', proposing that they put their heads together and consider the various ways in which an issue could be addressed. How do we ensure that the student will retain ownership in such situations? How can we achieve a balance between knowing and doubt? How and when should we use practical wisdom instead of research in order to help learners to gain an overview of the consequences of particular choices?

Learning how to cope with such issues in current practice within the system of higher professional education is one type of 'jumping in' for researchers, educators and students. It is accompanied by a certain amount of interdisciplinary role development for all parties involved, not in a temporary boundary practice between professionals, but as a new interpretation of the role of professionals. Allow me to offer a few examples.

Bakx, Bakker and Bijaard (2014) conducted interviews in order to investigate the manner in which 16 teacher-researchers experienced the process of conducting doctoral research in terms of boundary practices. Did the perceive boundaries and, if so, how did they cope with them? Were they able to cross these boundaries and make connections between the two communities? The results indicated that the teachers involved in the study perceived differences between the two *communities*, including with regard to culture and time perspective. They also perceived and sometimes emphasised boundaries, subsequently shifting between the two communities. For example, they reserved certain working days for their teaching and others for their research, in addition to creating separate computer files and action lists. Only a few integrated the perspectives of teacher and researcher in the course of their work (Bakx, Bakker & Bijaard, 2014).

In their professional practice, the members of knowledge networks also encounter different roles (e.g. teacher, team leader, consultant and researcher). They shift between roles, thereby encountering 'bumpy moments', in which they must choose one of the roles or to integrate the various roles.

Boundary practices of team leaders and researchers

Jeroen Bode is a team leader in secondary education. Since 2011, he has been a member of the Stoas knowledge network. Jeroen conducts research on 'delayed time', the question of how teams can think and collaborate creatively despite time pressure (Bode & Ruijters, n.d.). When asked about bumpy moments he had encountered in his own professional boundary practice, Jeroen wrote the following:

As a team leader, I conduct performance reviews with teachers who work with fourth-year students in senior general secondary education. These conversations centre on the teacher's professional development, and the fact that it is being discussed constitutes a delay in and of itself. In conversations that proceed smoothly because the teacher is comfortable discussing both difficulties and successes, I can easily shift between my role as a team leader and my role as a researcher. In such situations, I do not see any problem with talking about the subject of my research. This helps the teacher to become aware of the art of delay. I see difficult conversations as a different situation, and I doubt the wisdom of bringing up the issue of delay. If the teacher becomes blocked when discussing personal development and continues to talk about the limited facilities and difficult conditions, I am not sure which role I should exhibit. It feels as if I am taking risks that I cannot clearly justify. In such cases, I seem to doubt my actions.

This raises the question of why it feels different. In my role as a team leader, I automatically have the rights and duties associated with the job. I do not need to request permission before confronting a teacher about his professional development. The legitimacy in this situation is assumed by myself, as well as by those in my surroundings. As a researcher, the situation is different. For example, before conducting interviews, researchers discuss what they will do with the data. As the research group becomes familiar with them as researchers, this step can be eliminated, and a relationship of trust has been built. Suppose that a good case should emerge while I am conducting a performance review. I cannot secretly start collecting data. How could I open this for discussion so that I can apply my value as a researcher and retain valuable data?

Another aspect has to do with the formal judgement of whether a teacher's performance has met expectations. In my experience, it has been easier for me to guide difficult discussions when I present myself more as a researcher than as an assessing team leader. As a researcher, I suspend my opinion and focus entirely on what is happening in front of me. This is more difficult when a performance review is part of an assessment plan (e.g. for a new teacher).

Many Master's students and teachers with Master's degrees are also active as *boundary crossers*. They have several years of practical experience. Those from the Master's programme in Learning and Innovation at Stoas also have experience in the role of inquiring innovators of learning. They are faced with the roles of educator, innovator and researcher. Section 3.5 contains an example of the combination of these roles. The following example from Lydia de Jong illustrates how she proceeds through a course of development as a means of achieving professional development and innovation.

Building creative processes in primary school

Lydia de Jong, a graduate of the MLI programme at Stoas, conducted a study on the benefits of a work-study programme for learning how to stimulate creative processes. She is employed by the Avans university for teacher education and in the knowledge network on 21st-century skills at the INOS Foundation. She provides the following example of her work as an inquiring innovator:

Monday morning, 7 December, primary school De Wegwijzer *[The Compass]. 'Okay, people, it seems that you will all be spending the night here, but I am going home to cook'. I am surrounded by an enthusiastic team that is having a hard time stopping. It is also difficult to start any other activities when the ideas start flowing. Fortunately, the pause is only temporary. Two weeks before, one of the teachers had posed the question of how she could guide her students in their creative processes. She needed knowledge on this topic. I offered to consider the issue with her. Shortly thereafter, I was asked whether the entire lower-level team, including the internal supervisor, could be trained in this area. Although they were probably expecting a traditional training session, I decided against this option. Inspired by the theory of Learning Landscapes (Ruijters, 2006), it seemed better to relate to the current work practice. Using the creative compass (De Jong, 2014a, 2014b), I asked one of the teachers to tell me about a creative process that she had completed in her work. The other teachers helped her think about this. We put our heads together to chart the course of this teacher's creative process, relating it directly to the theory about creative processes. We then attempted to apply these insights to come up with ideas for activities for the students. These activities have been brought into practice since 8 December. In addition to trying to stimulate creativity, the teachers are continuing to examine their own teaching practices in this regard. They are making films and keeping logbooks, maintaining the focus on their own actions as teachers. This will allow them to identify what works well and what does not work as well when guiding creative processes. Groups that engage in strong reflection within an atmosphere of cooperation have been shown to realise more innovations, and at a higher level of quality (De Dreu, 2015). This is what we are hoping. We would like to become consciously qualified in the guidance of creative processes, based on the expectation that this will keep everyone's ideas flowing.*

Inquiry-based learning by doing has emerged at several points in this essay. Schenke (2015) observes that the development of transdisciplinary ability emerges through active participation in an inquiry-based, transdisciplinary project. The deliberate design of the intensive interaction between researchers and educators can support both the role and process of professional development. In the same vein, the deliberate design of limited boundary traffic can support professional role stability. Fortuin (2015) reaches a similar conclusion in a different context (i.e. environmental issues). The results of Fortuin's study indicate that transdisciplinary ability develops primarily within a combination of the following elements:

- experience with concrete interdisciplinary or transdisciplinary projects (and, within these contexts, coping with incomplete data, uncertainty and complexity);
- close interaction and discussion with people of different backgrounds and interests (e.g. scientific or cultural);

- theoretical input (e.g. concerning transdisciplinary research or differences between social and scientific practices);
- explicit moments of reflection.

4.5 Transdisciplinary ability in a model

I open this section with reference to three elements of transdisciplinary ability: simply conducting good research, interactive research by educators and researchers together, and teaching about research. The preceding elaboration of these elements can be used to supplement the image of what is entailed in transdisciplinary ability, as depicted in Figure 8. This scheme proceeds from the assumption that the relevance and usability of research are determined by its interactive character, which also increases the likelihood that the research will actually be used.

Elements	Aspects
Simply conducting good research	Conducting valid research Conducting reliable research
Engaging in interactive research	Possessing a development-focused stance Articulating the issue Actively valuing practical knowledge Designing and conducting research in collaboration Making the results and products of research explicit Implementation/innovation/valorisation
Teaching about research	Supervising the development of research ability Supervising the development of transdisciplinary ability and role development

Figure 8: Elements and aspects of transdisciplinary ability

This model calls for further support and investigation. Questions in this regard could include relationships between the various elements and aspects in concrete boundary practices. Which forms of collaboration between researchers and educators can be distinguished? To what extent do educators and researchers exhibit role stability and role development? Which learning mechanisms are manifested in the realisation of these boundary practices? Which opportunities and problems occur in this process, how are they addressed and which factors (e.g. sources, condition) contribute to the achievement of successful practices?

In the following section, I outline how I would like to address these types of questions, as well as those addressed in Section 3.

5 Agenda for the lectorate

This public lecture draws upon literature to explore ways of reinforcing boundary practices between educators and researchers. I have explained the roles played by the complexity of issues and the importance of slow thinking in this process. Two important boundary crossing qualities have been distinguished: research ability and transdisciplinary ability. Both of these qualities are important to both educators and researchers.

The contexts in which I would like to proceed (in collaboration with others) are largely those in which research, educational degree programmes and the vocational field converge, as well as those in which Mode 2 and the ETI perspective are (or can be) addressed. These situations offer the greatest opportunity for transformation as a learning mechanism for all stakeholders (Akkerman & Bakker, 2011; Schenke, 2015). Examples could include:

- practitioner inquiry and inquiry-based learning within the Green Consortium (i.e. the seven agricultural education centres (abbreviated in Dutch as AOC's) collaborating with Stoas as training schools. These agricultural education centres focus on the workplace learning of teachers-in-training in relation to school development (see http://www.stoasvilentum.nl/stoas/projecten/groen-consortium/);
- the practitioner research and practice-based research projects of organisations (including the training schools) for Stoas Bachelor's students (educators in training), supervised by teachers and workplace supervisors;
- innovation activities of students in the Master's programme in Learning and Innovation (all of whom are experienced educators), supervised by study coaches/research supervisors, along with clients within their own work practices.

In these contexts, students and colleagues have many roles, including those of teacher, teacher-researcher, knowledge manager, innovator and researcher. These are exciting combinations with many crossovers, along with the dilemmas associated with them. Their research is a tool with which to contribute to the development of professional practice (including their own) by helping to resolve complex professional issues. Other contexts in which professionals in organisations use research and practitioner inquiry to improve and develop work practices include Stoas, in which the Research group on Research in the Bachelor's Programme (RRBP) is working to reinforce and increase the visibility of attention to research in the Bachelor's programmes. Other examples include projects by consortiums of VET teachers, teacher trainers and researchers. In the Netherlands, such projects are facilitated by the Netherlands Initiative for Education Research (abbreviated in Dutch as NRO), the Innovation Alliance Foundation (abbreviated in Dutch as SIA) and other groups. One example is the NRO 'Responsive Team Leader' project, as designed and carried out by Manon Ruijters and Tom van Oeffelt, in collaboration with Groenhorst and Lentiz, as a research-practice partnership. This also involves developmental and innovation projects with components of practice-based research, as facilitated by the Platform for Vocational Education, and for which the Regional Investment Fund for intermediate vocational education has created opportunities (more specifically, the option of linking lectors to collaborative projects between intermediate vocational schools and the vocational field).

I am an active participant in some of these contexts, acting in part from the perspective of the lectorate. For me, working within the triangle of research, education and the vocational field implies that I am involved in the Master's programme in Learning and Innovation as a teacher, supervisor, assessor and team member. I also serve as a consultant to the RRBP, and I am active in the professionalization in research methods and techniques for colleagues at Stoas. This learning continuity pathway addresses methods and techniques for research, based in part on issues concerning the supervision of student research. I see these work practices in part as research contexts for the lectorate, and I hope to contribute to their development through reflection, practitioner inquiry and research. The same applies to the aforementioned work practices outside Stoas, particularly within the field of vocational education.

Building on Section 3, questions for the lectorate agenda include the following: How do educators, researchers and students see the components of research ability? How do these components relate to each other? How does research ability relate to other qualities of educators? What does working in the field of vocational education (student learning, team functioning) demand with regard to the research ability of teachers? What does their research ability contribute to whom (e.g. students, themselves, their teams, the vocational field), and what exactly does this contribution entail? What are the conditions for developing and using research ability?

Building on Section 4, questions include the following: Which views do researchers have concerning practitioner research and practice-based research? What do educators think of this? How do practitioner-researchers and practice-based researchers realise their roles, which conditions are addressed and what benefits do they realise? How do they see this for themselves, and how do educators see it? To what extent, on which points and in what way would researchers like to develop in their roles? What do educators perceive that researchers need with regard to role development?

Building on both sections, one question concerns the relationship between research ability and transdisciplinary ability when addressing professional issues.

These questions will be addressed in a variety of ways. For example, the aforementioned RPB group is already working to reinforce and increase the visibility of attention to research ability in the Bachelor's curriculum at Stoas. In the spring of 2014, interviews and a document analysis were conducted in order to chart the manner in which research can play a role in the curriculum. In the vision document entitled *Vanzelfsprekend nieuwsgierig* [Naturally curious], the RPB group broadens its perspective from conducting research to include the application of research ability. The underlying principle in this regard is that certain transformative, practically relevant and scientifically rigorous demands could be imposed on each element of research ability (and thus not only on the process of conducting research), although some combinations are more obvious than others (OOB, 2015; Nijenhuis et al, 2015).

Supporting the development of research ability

Research ability	Transformative character	Practical relevance	Scientific rigour
Inquiring stance	√	?	?
Applying research	?	√	?
Conducting research	?	?	√

Figure 9: A schematic representation of research ability (OOB, 2015; Nijenhuis et al., 2015)

In 2016, a new survey will be conducted at Stoas, this time without research ability as a central concept. The questions will thus concern both the desired and the actual level of attention to research ability. This survey is intended to arrive at a learning strand within the curriculum focussing on research ability, wich will reveal the areas in the curriculum in which the components of research ability are addressed, along with the demands that should be imposed on education in this regard. In addition to research ability, the RPB group might include transdisciplinary ability in its conceptual framework.

In the extension of the work of this group, I would like to conduct research on research ability and transdisciplinary ability in the Master's programme in Learning and Innovation at Stoas. The common theme in the curriculum is the development of students into inquiring innovators of learning. How are research and innovation related to each other? How is this revealed in the topic products, portfolio and thesis? Which roles do students have in their working environments, both during and after their degree programmes? What does this imply for the manner in which we, as a team, supervise students?

Another research topic concerns the research ability of students in secondary education (including senior secondary vocational schools). What does this entail, and what does it demand with regard to its development by teachers? As a Master's student at Stoas, Martijn Sijtsma (2015) conducted a study at the Groene Lyceum. He concluded that teachers can make a deliberate contribution to the curiosity of students, as well as to their ability to ask questions. Examples of what teachers can do in this regard include allowing students the freedom to select topics that interest them, encouraging them to ask questions, refrain from giving answers and modelling behaviours that reflect curiosity (Sijtsma, 2015). Stan Frijters (member of the Stoas knowledge network) is conducting a study on didactic principles of Learning for Sustainable Development in preparatory and advanced vocational education, including the development of an inquiring stance. Having students conduct research (including action research) on familiar, realistic and meaningful topics relating to sustainability appears to be a suitable way to proceed in this regard (Frijters, 2015). Jantine van Beek (also a member of the knowledge network) will be conducting further research on the research ability of VET students and what this demands of teachers in the area of supporting the development of research ability. Jan Hoed (also a member of the knowledge network) will be conducting a study of topics including the articulation of questions in the triangle of students, clients and teachers, within the framework of commercial projects in Regioleren. Arjen Nawijn (Stoas and Bètasteunpunt Wageningen) and Karen Laarveld (network coach at Technasium) are exploring the preferences and possibilities of placing the research ability of students and teachers in Teacher Development Teams and Technasia on the research agenda. The

rationale underlying these initiatives is that the research ability that learning in general, workplace learning, continuing education and social functioning require of students can serve as an additional catalyst for the development of research ability in teachers.

Another initiative is that we are currently working with a group of researchers, teachers and team leaders to explore the possibilities for practice development and research relating to the role of teacher leaders - educators who supervise teams in the inquiry-based and systematic improvement of educational quality - and what is needed to equip them for this role. Studies on innovation projects in the field of education have indicated that inquiry-based learning and practitioner inquiry are currently not addressed to any great extent (Den Boer & Teurlings, 2014; Van den Berg, 2013). There is evidence of a positive relationship between the research ability of educators and the quality of education, although the available research on this point remains relatively sketchy and fragmented (e.g. Imants, 2010; Ros et al., 2013; Snoek, 2014; Van den Berg et al., 2011). Teachers who are involved in practitioner inquiry through a Master's programme or in some other way could serve as inquiring, transdisciplinary educator-leaders in their teams, largely by contributing to the process of mutual working and learning for the purpose of quality improvement (see e.g. Castelijns, Koster & Vermeulen, 2009; Verbiest, 2012, 2014). Results from a study by Van den Bergh and Ros (2015) in training schools for the university for teacher education reveal that, in most of the schools investigated, Master's level teachers (and teachers-in-training) are assigned according to their substantive expertise, and thus not (or not yet) according to their research expertise. Not every school manager is aware that research constitutes an important part of any Master's programme. The positioning of Master's level teachers (and teachers-in-training) at both the school and supra-school levels could be improved through such actions as having them lead research groups (with supervision by an experienced researcher of teacher-researcher). In addition to possessing research ability, teacher leaders should possess team and leadership qualities, including a belief in their own abilities, as well as those of the team. Formal and informal recognition for teacher leaders, the willingness to engage in mutual practitioner inquiry within teams, a clear vision on the management of practitioner inquiry and a culture of inquiry within schools are indispensable to the successful introduction of practitioner inquiry directed towards the quality of education (Krüger, 2010; Snoek, 2014; Van den Bergh & Ros, 2015; Van der Zwaard, 2014).

In closing, I would be contradicting myself if I were to carry out the agenda of this lectorate without addressing professional issues and without taking the ownership of educators into account. In carrying out these plans, I will thus be actively forming and maintaining partnerships with them.

Acknowledgements

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The other half of my work week is spent at *Strix Aluco - Onderzoek en Innovatie* [Research & Innovation]. This is a fine combination with the lectorate, as my Rotterdam 'wise owl and cuckoo' also focusses on inquiry-based learning and practitioner inquiry in and surrounding vocational education. I am also grateful to everyone with whom I have worked in this regard for their critical/inquiring collaboration and inspiration.

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Abbreviations

5W1H	Who, what, where, when, why and how
CIMO	Contexts-interventions-mechanisms-outcomes
EAPRIL	European Association for Practitioner Research on Improving Learning
ETI	Ecologically and Transdisciplinarily Inspired
HAN	University of Applied Sciences of Arnhem and Nijmegen
HvA	Amsterdam University of Applied Sciences
HU	University of Applied Sciences Utrecht
MLI	Master of Learning and Innovation
PDCA	Plan-do-check-act
RDD	Research-Development-Diffusion
RPP	Research-practice partnership
RRBP	Research group on Research in the Bachelor's Programme
VET	Vocational Education and Training

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About Stoas

Stoas Wageningen is a faculty of Vilentum University of Applied Sciences and part of the Aeres Groep. Stoas educates educators and knowledge managers on bachelor level in the land-based, life sciences and consumer technologies, and delivers Master's graduates who specialise in learning and innovation. Stoas aims to become a knowledge centre for sustainable connected learning and development for professional education and business communities. Professors and researchers carry out practical research and participate in projects in the field of learning and development for educators, innovators and knowledge managers.
Ecological intelligence is our underlying philosophy. All of our activities focus on the connection between people and their environment, with special attention paid to the relationship between people and nature and the relationship among people. Our new circular building in Wageningen reflects this philosophy. More information available at: www.stoasvilentum.nl.

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