

# **DEVELOPING TEACHERS' RESEARCH LITERACY**



# **DEVELOPING TEACHERS' RESEARCH LITERACY**



INTERNATIONAL PERSPECTIVES

Editors: Pete Boyd, Agnieszka Szplit, Zuzanna Zbróg

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# Prologue

PETE BOYD, AGNIESZKA SZPLIT & ZUZANNA ZBRÓG

There is overwhelming agreement, internationally, that the quality of teaching is a fundamental element of effective education systems. Within this consensus however, the contribution of teachers themselves is somewhat contested. A teacher might be positioned along a continuum between a technician, delivering evidence-based practice, and a professional, using research-informed judgment to decide what and how to teach. Clearly, the resources available within national education systems affect teacher recruitment, initial education, working conditions, retention, and continuing professional development. There are also significant policy and cultural differences between national contexts, for example the extent of centralised national prescription of curriculum content and the status of teaching as a profession within society. This book examines the concept of ‘teachers’ research literacy’ by drawing on international critical perspectives on policy and practice in initial teacher education and in professional development for experienced teachers. The issue of teachers’ research literacy is important internationally because it has considerable implications for policy, teacher recruitment and development, school leadership and classroom practice. Building teachers’ capacity for professional inquiry and professional judgment within the development of research literacy is particularly important in our post-truth era. In this era, feelings or personal beliefs are often considered to be as important as the facts, and science denial has become part of ideological persuasion leading to a post-truth politics (McIntyre, 2018).

Part one of the book focuses on the concept of teachers’ research literacy. In provisionally defining the central concept of teachers’ research literacy in chapter one, Pete Boyd argues that a research literate teacher must have a capacity for professional judgment in deciding what and how to teach.

Within this, he discusses three key elements: the complexity of the field of education and of classroom teaching including the varying contexts in which teachers work; the philosophical issues of purposes and values underpinning education systems and teaching; and the contested nature of theory and research, ways of knowing, within policy and practice in education and teaching. Chapter one expects teachers' professional judgment to include everyday in-action decisions but also a capacity for professional inquiry, leading to the development of research-informed practice and change. In this chapter, a provisional working definition of teachers' research literacy is presented as: 'Demonstrating a reasonable understanding of the contested nature of 'ways of knowing' (epistemology) within the field of education, including appreciation of purposes and values and the interplay between research and practical wisdom in deciding what and how to teach, as well as practical skills in critically evaluating different sources of research evidence as an element of professional inquiry into practice.' To provide a broader systematic consideration of what we know about teachers' research literacy, Leah Shagrir in chapter two provides a literature review focused on seven carefully selected studies. She finds that despite the value and ambition of teachers regarding engagement with theory and research, many currently do not feel they have sufficient research literacy to support professional inquiry and development of research-informed practice.

Part two of the book focuses on development of student teachers' research literacy. It is worth noting at this point that language is a powerful influence on thinking. On principle we therefore prefer the terms 'student teacher' or 'beginning teacher' and 'teacher education', which lend themselves to the development of teachers as professionals. These terms seem preferable to 'trainee' and 'teacher training' which imply development of teachers as technicians. In chapter three, colleagues based in the Netherlands, Quinta Kools, Rutger van de Sande and Willem Maurits, investigate student teachers' professional inquiry stance through engagement with Design as research. These authors position 'Design as research' within the range of approaches to teachers' professional inquiry but argue for its distinctive advantages. For example, as an approach it considers all decisions made by the teacher to be an element of design and therefore open for discussion and change and it emphasises enactment so encouraging classroom experimentation and evaluation. The chapter offers a fresh perspective and approach to developing student teachers' research literacy through

professional inquiry. In chapter four, UK based colleagues Karen Blackmore and Jennifer Hatley critically evaluate the affordances of ‘close to practice’ research for the development of student teachers’ research literacy. This approach emphasises collaboration in empirical research focused on an issue identified by an experienced teacher, with the student teacher in this case positioned as researcher. The Netherlands is a leading nation with regard to the development of teacher education and another team based there, Bregje de Vries, Hanna Westbroek, Wilma Jongejan and Anna Kaal, focus in chapter five on the development of student teachers’ personal theories. In this empirical study they develop the definition of teachers’ research literacy beyond interpretation of research literature using goal system representation to help student teachers understand and articulate their personal theories. In chapter six, colleagues based in the Caribbean, Jennifer Yamin-Ali and Murella Samburcharan-Mohammed, investigate the impact of action research journals on student teachers’ developing research literacy. They contribute to understanding of teachers’ research literacy by emphasising the emotional element of working through research-informed change in practice. The final two chapters in this section focus on the knowledge and learning of teacher educators. In chapter seven, UK based colleagues Elizabeth White and Claire Dickerson, provide and evaluate practical resources consisting of ‘narratives of practice.’ These stories are designed to enhance teacher educators’ use of modelling to help student teachers connect theory and research to classroom practice. In chapter eight, colleagues based in Poland, Agnieszka Szplit and Anna Babicka-Wirkus, use a study of university-based teacher educators and a framework of critical pedagogy to analyse how critically reflective learning supports the development of professional inquiry and research literacy.

Part Three of the book focuses on the development of research literacy by experienced teachers. Policymakers often seem to prefer the more contained system of initial teacher education when claiming to address quality of teaching, rather than considering action to support the more complex continued professional learning of the majority of teachers who are in schools making a difference to children. However, in chapter nine colleagues based in Croatia, Dragana Božić Lenard, Josip Juraj Strossmayer and Ivan Lenard, evaluate the perspective of teachers towards a national policy that seeks to encourage lifelong learning for teachers through practitioner research. They find that teachers have a professional

commitment to lifelong learning, are familiar with research procedures and occasionally read scholarly literature. They do not feel they currently have a strong level of research literacy but are open to developing it and being involved in collaborative research. In chapter ten, within the UK context, Hilary Constable and Pete Boyd report on their study of ‘master teachers’ who have completed a part-time masters level programme. They find that these teachers demonstrate a research literate stance when reflecting on their studies. However, within the interplay of professional learning in their school workplaces the practical wisdom of teachers is privileged and critical engagement with the public published knowledge of relevant theory and research is constrained. In chapter eleven, UK based colleagues Jack Whitehead and Marie Huxtable consider how a Living Educational Theory Research approach supports teachers to develop their research literacy as they realise their educational responsibilities as professional educators. In this approach the lifelong study by a teacher comprises an evolving educational curriculum including development of research literacy. The final two chapters in this section focus on developing the capacity of experienced teachers for professional inquiry and their research literacy. In chapter twelve colleagues based in Israel, Smadar Donitsa-Schmidt and Ruth Zuzovsky, consider attempts to address low levels of teacher research literacy across a national education system. They identify tensions around the value of different forms of knowledge within teacher education but perhaps more significantly also recognise the influence of social status of teachers and their working conditions in relation to developing research literacy. In chapter thirteen, UK based colleague Bethan Hindley focuses on the need to develop the research literacy of school managers and facilitators of coaching and professional learning. Informed by analysis of teacher survey responses and review of the literature she argues convincingly for professional learning through school-based professional inquiry supported by research literate colleagues. In chapter fourteen, Zuzanna Zbróg argues for professionalization of teacher educators’ pedagogical approach in response to a national policy requirement in Poland for higher education programmes to prepare students as researchers. These issues of collaboration and leadership of change contribute further to the critical development of the concept of teachers’ research literacy. Teaching is arguably a collaborative endeavour and so teachers’ research literacy might be considered also to be a collective capacity.

## Prologue

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Overall, the different authors provide a range of perspectives on teachers developing research literacy through different forms of professional inquiry. Your engagement with chapters of this book may be selective and based on your particular contexts and interests, but we consider the synthesis of these international perspectives to be useful in developing a nuanced and critical perspective and definition of the concept of teachers' research literacy.

# Developing Student-Teachers' Professional Inquiry Stance through Design as Research

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## ABSTRACT

In this chapter, we describe and evaluate the 'Design-as-research' (DARe) approach which we apply in our institute for teacher education in the Netherlands. After exploring the idea of teacher inquiry as a professional development strategy, we elaborate our search for a suitable approach for inquiry that fits the teaching profession. Stretching our view to other disciplines, we found that viewing inquiry as a design process offered new perspectives. In the Design-as-Research approach, an inquiry stance is combined with reflection and enactment. We describe our experiences with the approach with our student teachers. Our main conclusion is that this approach suits the nature of teaching and encourages continuous professional development.

**KEY WORDS:** Teacher inquiry, professional development, design as research

## Introduction: setting the stage

In this chapter, we address the ‘Design-as-research’ approach which we apply in our institute for teacher education. Before explaining our rationale for this approach, we will first describe the context of our case.

We work at a teacher education institution at a Dutch University of Applied Sciences. This institute offers a four-year bachelor programme (240 European credits) to educate teachers for secondary and vocational education. During their 4 years of study, student teachers deepen their knowledge on the subject they are about to teach (for example mathematics, geography, or French as a foreign language) and they work on pedagogical knowledge and skills. Student teachers also spend a lot of time (about 60 credits) in internships in educational practice. Throughout their study, we aim to help student teachers develop an inquiry-stance, because we hold the opinion that this will serve as a professional learning strategy throughout their career.

In addition to educating student teachers for a teaching career, we also provide support in professional development trajectories for experienced teachers. Instead of offering fixed courses on specific subjects, in our trajectories, teachers are challenged to do inquiry focused on issues they encounter in their daily practice.

## Teacher Inquiry as a means of Professional development

Over the last few decades, teacher inquiry (for example, action research) has been established as a prominent ‘bottom-up’ approach to both curriculum innovation and teacher professionalization (Cochran-Smith & Lytle, 1999; Cochran-Smith & Lytle, 2009; Fichtman-Dana, Thomas & Boynton, 2011). Teacher inquiry reportedly has the potential to contribute to improving the fidelity of implementing instructional innovations (Ermeling, 2010), the growth of teaching efficacies (Henson, 2001), and the development of teachers’ research knowledge and skills (Meijer, Oolbekkink, Meirink & Lockhorst, 2013) to name just a few beneficiary effects. The potential of teacher inquiry seems to be associated with the principle that teachers’ professional concerns and beliefs are taken as a starting point and that

teaching practice serves as focus point for their self-directed professional learning and for innovation.

Bolhuis (2012) elaborates the vision behind the idea that teacher inquiry is a professional learning strategy. In contrast to the idea that teachers are just executors of educational tasks that have been developed by others, nowadays, the vision has changed. Teachers are seen as professionals who are actively engaged in defining and developing education for their students/pupils. According to Bolhuis (2012), being a professional consists of seven responsibilities, which all have to do with inquiry or an inquiry habit of mind. The first responsibility is that professionals are able to justify their work and enactment to 'society'. Being active in inquiry helps to underpin and to account for their behaviour. The second responsibility is to be active in renewing one's own work and to keep one's knowledge up to date. Also, in this second responsibility, an inquiry habit is a key value. The third responsibility is to take responsibility for the quality of one's work, by assessing the quality. To do so, one must be able to compare observed and expected quality and draw conclusions. The fourth responsibility is to be an example for student teachers, by modelling an inquiry habit as a professional standard. The fifth responsibility is to be an active contributor to the knowledge base of the teaching profession. Being active in inquiry leads to new (practical) knowledge, that can be shared with others through presentation or publication. The sixth and seventh responsibility have to do with pupils/students. It is the responsibility of teachers to ensure that the voices of the student/pupils are heard and taken into account in practitioner inquiry in education, since their input is essential for finding solutions for practical issues. By inviting them to participate in inquiry pupils/students also notice that an inquiry stance is 'normal' in a profession, and they see how their teachers actively work on the quality of education. So, according to Bolhuis, teacher inquiry is part of the teacher's profession.

As mentioned earlier, teacher inquiry has been broadly recognized as a valuable aspect of the teaching profession. In the Netherlands, this can be inferred from the fact that every teacher education program includes modules aimed at learning to conduct teacher inquiry in some shape or form (Vrijnsen-De Corte, Den Brok, Kamp & Bergen, 2013).

There still is a lively discussion though, about the way this inquiry component needs to be framed. For a long time, scientific educational research served as the role model for the inquiry component in teacher education in

Universities of Applied Sciences in the Netherlands. The research assignment for bachelor students seemed to be a misinterpretation of the framework for qualifications for European higher education<sup>1</sup>. Andriessen (2013) addressed this problem and stated that students in Universities of Applied Sciences do not need to become researchers, but that they need an inquiry habit of mind (or inquiry stance), as a tool in their profession. Kelchtermans (2019) stresses the fact that the best way to prepare future teachers for the inevitable changes in their future teaching practice is to develop their ability for critical thinking and inquiry as stance. The critical analysis of their insecurity, uneasiness and practical discomfort offers powerful possibilities to develop their professionalism. Therefore, in our Teacher Education Institute, we want to prepare our student teachers for their future careers not only by equipping them with subject knowledge and pedagogical skills, but also by equipping them with an inquiry stance.

### Search for an approach for inquiry that fits the teaching profession

Around 2003, student teachers in our institute had to study a problem or an issue in education, with the use of educational research methodology, data gathering, analysis and writing a report. This ‘practitioner research’ was scheduled in the last year of the bachelor programme as graduation assignment and proved to be a nuisance for a lot of student teachers. They struggled to find a research question, had difficulties in gathering data and struggled to write a report. This was not only a problem in teacher education, but also for other students of Universities of Applied Sciences in the Netherlands. As mentioned above, the report from Andriessen (2013) helped us to change this vision and make a shift from ‘research’ into ‘inquiry’. Following this idea, we wanted to develop an inquiry approach that fits the teaching profession and that is an attractive approach for our student teachers. In an effort to stimulate inquiry as a way to empower teachers to improve their practices, we searched for models that try to reshape teacher inquiry into processes that (1) feel more native to teachers, so they are easily embedded in how teachers operate in daily work and (2) prevent associations

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<sup>1</sup> [ecahe.eu/w/index.php?title=Framework\\_for\\_Qualifications\\_of\\_the\\_European\\_Higher\\_Education\\_Area](http://ecahe.eu/w/index.php?title=Framework_for_Qualifications_of_the_European_Higher_Education_Area)

with social-scientific research as exemplary for teacher inquiry. In developing our approach, we combined ideas on inquiry and professional development of teachers from different authors.

Fichtman-Dana (2015) inspired us with her views on teacher inquiry. She stresses the importance of teacher inquiry being a part of the teaching profession and not a separate activity. She also stresses the fact that teacher inquiry is not a linear process, but 'teacher inquiry is a continuous cycle that all educators spiral through throughout their professional lifetimes – a professional positioning or stance, owned by the teacher, where questioning, systematically studying, and subsequently improving one's own practice becomes a necessary and natural part of a teacher's work' (Fichtman-Dana, 2015, pp. 163–164).

This 'continual cycle' that is mentioned by Fichtman-Dana reminded us of the interconnected model of professional growth of Clarke and Hollingsworth (2002). This model represents the professional learning process of teachers. In their model, Clarke and Hollingsworth (2002) describe teacher learning as a process of reflection and enactment through four domains, namely the external domain, the personal domain, the domain of practice and the domain of outcomes (see Figure 1).

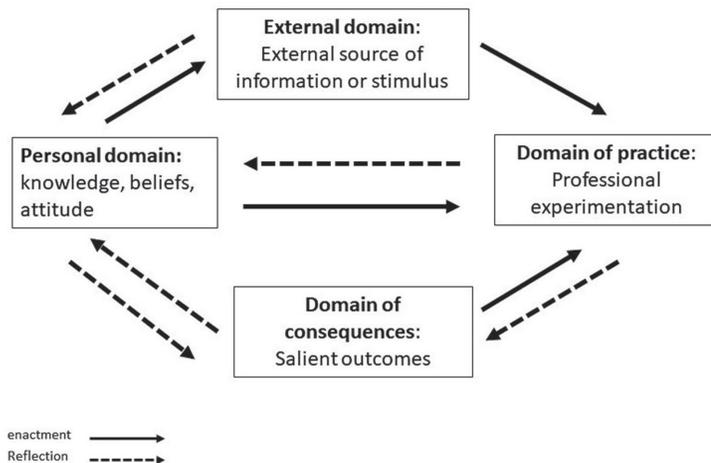


Figure 1. Interconnected model of professional growth (from Clarke & Hollingsworth, 2002, p. 951).

The process can start in each of the four domains. The *external domain* represents all kinds of different external sources. This could be a scientific paper or theory, a lecture or workshop, input from an expert, or an input from a colleague or a pupil. The *domain of practice* is the educational practice where the teacher is working with the students. The *domain of consequence* refers to the outcomes of the domain of practice, this could be pupils results on an assessment, or their reaction to a certain teaching approach, or their motivation in class. The *personal domain* is the domain of the teachers attitudes, beliefs, opinions. Between the domains, there are arrows for 'reflection' and 'enactment'. A reflection arrow between two domains, means that reflection takes place. For example, a teacher can reflect on new knowledge she heard in a workshop (external domain) and change her ideas about instructing pupils (personal domain). The arrows for 'enactment' represent the acting that results from reflection. For example, based on her new insights, (personal domain) the teacher decides to change the way she instructs pupils in her practice (domain of practice).

The model of Clarke and Hollingsworth is a model about professional learning of teachers, it describes that teachers learn through continuously moving between the domains via reflection and enactment. The model thus represents the continuous cycle that Fichtman-Dana describes, it offers a framework to 'map' the inquiry stance and helps to envision the way this inquiry stance works as a process. In her paper, Fichtman-Dana (2015) elaborates three components of an inquiry stance for teachers, which further demonstrate the connection with the teaching profession and teachers' professional learning. The components are:

- 1) 'Data collection' takes place as part of the teaching (instead of apart from teaching). There is a lot of data available in the work of teachers, for example: classroom observations, student work, digital pictures, video, reflective journals, weblogs, surveys, quantitative measures of student achievement, critical friend group feedback, and literature (Dana & Yendol-Hoppey, 2014). Some forms of data, such as observation or student work, closely connect to and are easily associated with the natural and normal acts of teaching and learning that occur in the classroom on a daily basis. Fichtman-Dana (2015) stresses that when a teacher approaches inquiry as a stance, data collection more and more becomes a normal and natural part of teaching.

- 2) The role of inquirer and the role of teacher become seamlessly blended and integrated with one another. As an inquirer, the focus is on systematic exploration of the issue at stake. As a teacher, the focus is on using this information to improve instruction and teaching. A classroom conversation with a pupil about conceptual understanding of mathematics is both an interview AND input for a new way to explain the concepts.
- 3) The underlying premise of the inquiry is to create better learning opportunities for the pupils, to improve teaching practice. This component stresses the fact that teacher inquiry is not a goal in itself, but it is a means to improve teaching and education.

### Towards a new approach for teacher inquiry: Design as Research

In our search for inquiry approaches that seem a better fit to the nature and dynamics of teachers' daily pursuit of creating learning opportunities for their students, we started looking for examples in disciplines other than those stemming from the educational domain. Our attention was captured by ideas about inquiry as proposed by a long line of authors from the design disciplines, especially architecture.

We would like to stress here that the idea that educational practice could gain from studying ways of working and learning in the design disciplines is certainly not new. Over the years, different authors have pointed this out from different perspectives and for different aspects of design. Schön (1985), for instance, proposed that professionals' development of 'reflection-in-action' could benefit from learning in "design studios", modelled on common practices in architecture education. Tripp and Bichelmeyer (1990), to give another example, proposed a "rapid prototyping" design methodology for education, originating from software engineering.

More integral notions of design as an approach to educational research have also been presented (e.g., Brown, 1992; Van den Akker, Gravemeijer, McKenney & Nieveen, 2006; Barab & Squire, 2004; Wang & Hannafin, 2005). It is important to note here that, in general, the models presented in these publications stem from the assumption that academic researchers play a key role in the process of designing and researching.

Reasoning from the idea that inquiry is an important activity for education professionals to undertake, we would like to propose the concept of ‘Design As Research’ (DARe) as a design-oriented approach to teacher inquiry. As advocated above, teacher inquiry should be closely connected to the daily practices of teachers and the dynamics of the professional activities they conduct. Over the last few decades, authors have advocated the notion that teaching could be viewed upon as a design profession, and that teachers could be considered designers (e.g., Simon, 1996; Schön, 1983; Laurillard, 2012).

In the traditional design disciplines themselves, a debate has – and still is – taken place on relations between design and research. Especially in the field of architecture this seems to be a long ongoing debate. More specifically, contributors to this debate propose that design should be considered an intellectual enterprise; a form of scholarship (Cross, 2001). The concept of ‘design as research’ (Lawson, 2002; Zimmerman, 2003; Ehn & Löwgren, 2004; cf. ‘research through design,’ Gaver, 2012) is used in this context to argue the value of design as an inquiry exercise.

Travelling further back in time, Nobel laureate Herbert Simon was perhaps one of the most influential authors who reflected extensively on the nature of design, mainly from the field of engineering, and its relation to traditional (mostly natural) sciences. In his work ‘The sciences of the artificial’ (first edition published in 1969; references in this text are made to the third edition which was published in 1996), he describes a ‘designer’ as “[e]veryone [...] who devises courses of action aimed at changing existing situations into preferred ones.” To illustrate that his definition is not limited to the field of engineering, he continues:

The intellectual activity that produces material artifacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a state. [...]. Schools of engineering, as well as schools of architecture, business, education, law, and medicine, are all centrally concerned with the process of design. (Simon, 1996, p. 111)

Note that Simon mentions the specific case of ‘schools of education’ as an example of a professional field concerned with design. More recent, Laurillard (2012) has made efforts to elaborate on this line of thought for the field of education, more specifically for the teaching profession. She states

that “[t]eaching is not a theoretical science that describes and explains some aspect of the natural or social world. It is closer to the kind of science, like engineering, computer science, or architecture, whose imperative it is to make the world a better place” (cf. Lawson, 2002). She thereby supports the position that by nature, teacher inquiry based on a social scientific research paradigm seems to have limited correspondence with the dynamics of daily teaching practice. Waks (2001) stresses this further by pointing out in his analyses of Donald Schön’s view on the matter that in professional practices, practice and knowledge construction are intertwined and not separated:

Schön [...] rejects the idea of reflection as a ‘time out’ from practice for scientific inquiry. For Schön, practitioners (such as architects, engineers, and industrial designers) have their own ‘esoteric’ knowledge codes woven right into their practices. Practice is a knowledge affair. (Waks, 2001, p. 40)

Indeed, it seems plausible to assume that the professional interest teachers have in advancing student learning transcends their interests in understanding student learning per se. This doesn’t mean that we would advocate a depreciation of teachers’ knowledge of student learning. Instead, we propose that constructing knowledge should be an organic part of the teaching profession, and that intrinsically, designing is an adequate way for teachers to use and to expand this knowledge.

## The Design As Research (DARe) approach

In our Design As Research (DARe) approach, all aspects of the teaching practice are seen as an element of design. For example, a didactical intervention like welcoming students at the door of the classroom as a starting point for classroom management is a design element. But an idea for the instruction of a mathematical issue into a lesson plan is also a design. The meaning of the word ‘design’ is stretched beyond the classical meaning, where design mostly refers to a ‘product’ like a lesson or a tool. In our approach, all kinds of decisions that teachers make are seen as ‘design elements’.

In the DARe approach, teachers are seen as designers, who design their actions based on information from practice and their reflection on that. In fact, the DARe approach encourages teachers to apply the model of Clarke

and Hollingsworth (2002) to elaborate issues they encounter in their teaching practice. Reflection and enactment are the connecting activities between steps they take.

In our graduation program student teachers apply the DARE approach to work on a pedagogical issue they encounter in their teaching practice. Student teachers are working on their own dilemma, but they do have meetings in so-called Learning Design Studios. A Learning Design Studio consists of a group of student teachers and a teacher educator. The group-meetings are an important element in the DARE approach. In the meetings, student teachers present their dilemma and their thoughts about the next step they want to take to unravel the dilemma. The other student teachers in the group offer critical peer-feedback. Specific conversation protocols (see for example School Reform Initiative – A Community of Learners) are used to make sure that the conversation between the student teachers is a professional in-depth dialogue. The teacher educator is facilitating the process by posing feedback questions like ‘what did you do, what are your findings?’, ‘what does this mean to you’, ‘what will your next step be? Why? What do you expect?’. The group meetings function as milestone moments, where student teachers critically reflect on their process and decide on next steps.

## **Our experiences with the DARE approach**

When student teachers in our institution have reached the end of their bachelor’s program, they work on their graduation work. In many bachelor’s programs this is a traditional graduation research. Traditional research often starts with formulating a good, refined research question, often based on a theoretical framework. Formulating a good research question takes a lot of time. When we started with our students with the DARE-approach for graduation products, we noticed that the images of traditional educational research dominated. This means that the students will first focus on reading literature and formulating a research question. However, within DARE, this traditional phasing is not necessary.

As first step in DARE, we ask the student teachers to come up with a professional dilemma that is currently going on in their educational practice. To open up this dilemma, we use conversation protocols. For example, we

might use the 'Passions' profiles<sup>2</sup>, in which eight teacher profiles are described. Each participating student teacher chooses the profile that suits his/her beliefs about the teaching profession best and explains this to the others. They also give an example of their teaching practice that relates to the profile. After that, an in-depth conversation takes place about the way the profile affects their teaching. They then reflect on the new insights the discussion gave them. After a dilemma or topic has been defined for the graduation product, we encourage the student teacher to formulate a starting question. This starting question is the first question that the student teacher has in unravelling his dilemma. This is not a stylized, neatly formulated research question as we know it in traditional educational research.

Because DARE is based on an iterative approach, the step after formulating the initial question is not a fixed one. This means that the initial question can lead to all kinds of different actions. For example, trying out something, reading literature, interviewing students or interviewing colleagues. Every action is equivalent, so there is no preferred approach or sequence. Often the steps that the student teacher takes can in one way or another qualify as research steps using research methods.

Because the student teachers are taking more and more steps on their way to unravel the professional dilemma, they are gaining a better understanding of the dilemma. This can cause student teachers to drift further and further from the initial question that they initially formulated. While in much traditional research a research question once formulated is fixed, this approach [is more like reflexive qualitative research] where the question that the student teacher poses in the professional dilemma is continuously in development. Because this deviates greatly from the research traditions known to the student teachers this often results in great uncertainty. It is the task of the supervisors to offer the student teachers something to hold on to and to give them confidence that they are taking meaningful steps in getting to know more and more about their dilemma. In successful DARE approaches, we have regularly seen that the initial question during three quarters of a year developed into other aspects which still related to the professional dilemma.

In our opinion, being able to define a professional dilemma dissected from professional practice, unravelling it by taking different steps, designing

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<sup>2</sup> See 'Passion Profiles Activity' [schoolreforminitiative.org](http://schoolreforminitiative.org)

and trying out materials, is much better suited to the nature of teaching than traditional educational research. This makes it perhaps a more reliable indicator of the student's functioning as an educational professional than completing a traditional bachelor's thesis.

### Hesitation: Action as the first step

When student teachers have formulated a professional dilemma from their practice, they start working with this dilemma. As an example, we take a student teacher in chemistry who is struggling with pupils who cannot form images when chemical reactions take place. Often the student teacher has already (unconsciously) observed pupils in class while working with chemical reactions. Based on these observations, the student teacher has also identified this dilemma in his practice. Because teachers are generally pragmatic by nature, the student teacher often already has ideas about the teaching materials he wants to develop in order to help his pupils. Why should this student teacher first have to do an extensive literature study on this theme when it may not help him much further? It is also possible to encourage the student teacher to design a lesson as a first step and to try this out together with his pupils as a second step. This can be done in smaller pilot-like settings. During the trial, the student teacher collects data on the basis of which adjustments can be formulated for the designed lesson. It can also be interesting to consult literature on this point, to evaluate the designed lesson. The evaluation confronts the student teacher with the shortcomings of his design. This provides information to the student teacher about incorrect assumptions or design principles of the designed lesson. These incorrect assumptions or design principles can be adjusted with insights the student teacher gains from the literature at the next stage of inquiry. When a student teacher incorporates this into a redesign and tests it again, he has developed an understanding of designing a lesson around a particular theme, the first step being action (design).

Designing as a first step often leads to hesitation for both the student teacher and the supervisor. Student teachers and supervisors would like to make the perfect product in one go, although this actually never works. Evidence-based work to base a design on scientific insights also obscures. But why should this necessarily happen beforehand? A design can also be made, tested, adjusted and tested against the literature. Another argument

here is that scientific insights are not always acquired nor appropriate for the target group or context in which the student teacher works.

### Example of a DARE approach 'Distance learning during the corona crisis'

In September of the academic year 2020–2021, student teacher Elise will start her final year of her teacher training. This final year is all about completing her studies and consists of teaching as a prospective teacher in a structure where learning in the workplace is central. During this final year, Elise also works on her graduation assignment which consists of elaborating a practical dilemma with the DARE approach.

The year 2020 has been dominated by the Covid-19 virus. As a result of this virus, the schools in the Netherlands were closed from March to May. During this lockdown, education for secondary school students was provided completely digitally. In September 2020, at the start of the school year, the Covid-19 virus situation seemed reasonably under control, schools were open as normal.

So, at the start of her final year, Elise expected to perform her role as a teacher as she had learned in the previous three years: physically teaching a group of students in a classroom. When the situation around corona deteriorated in October and November (the second wave) the schools were closed again and Elise had to start teaching distance learning. Designing this distance learning resulted in various professional dilemmas with different questions: How do I organize my online lessons effectively? To what extent do I need to alternate activities to keep students' attention? How long can digital activities take to be effective? In addition to these educational issues, there were also pedagogical issues such as: How do I keep in touch with my students during distance learning? How can I support students who are not doing so well? Although Elise felt uncomfortable with the situation at first, she and her supervisor realised that this new challenging situation provided an excellent starting point for her graduation assignment. The above dilemmas and associated questions provided starting points for a quest in which Elise always takes a step to better "grasp" the dilemma. Let's take a closer look at the steps Elise took.

Elise's first digital lesson was designed fairly intuitively. It was a lot like her physical class in the classroom. While conducting the lesson, Elise took

notes about notable things. She also asked the students to complete a short evaluation at the end of the lesson. The completed evaluation was data for Elise to make adjustments in her digital lesson. She gained more insight into working principles of digital lessons. Elise also found a blog by a Flemish pedagogue. In the blog he described the scientific insights of the moment about the social component within distance learning. The pedagogue had also included links to the original studies, which was a great source for Elise to delve further into. Through the interaction of trial and error, evaluation, reading literature, reflection and redesign, Elise gained more and more insight into distance learning in an investigative way. In February, Elise asked her supervisor when the process for the graduation assignment was actually finished. The conclusion of both Elise and her supervisor that the process was never really finished (although there was enough work done to consider the assignment as completed). By constantly collecting new data while trying out lessons, new insights are constantly emerging: professional development is endless.

## Discussion

Our Design as Research (DARe) approach differs from the ten steps of inquiry proposed in chapter 1 because the steps in chapter 1 are shaped by a typical social science research approach. We do use a form of step 1 in the table ‘identify a focus and develop a question’ but that often includes a practical step of ‘design and try out a strategy or task’. We do include an equivalent to step 3 in the table, ‘engage with public (published) knowledge’, but that is not always before the initial design activity. In fact, elements of all ten steps are recognizable, but in the DARe approach, there is no fixed order for steps to take. The DARe approach is more direct, more practical and more informed by professional judgment than the inquiry approach proposed in chapter 1 (in this book). Although we think the practical approach is beneficial, there is a risk that the approach becomes too practical. The ten steps (Pete Boyd & Liz White, 2017, pp. 130–131) of inquiry might be helpful in offering a framework to address ethical and social issues (step 5) and thus enrich the DARe approach.

## Conclusions

In this chapter, we have described our thoughts about teacher inquiry as a professional development strategy. Throughout a teachers career, professional dilemma's concerning teaching practice will continue to occur. In order to find practical solutions for these issues, an inquiry stance is essential. In this chapter, we elaborated our vision on this inquiry stance, suggesting that this stance equals the process of professional growth, as described by Clarke and Hollingsworth (2002). We developed these ideas into the Design As Research (DARe) approach, which we have incorporated into the curriculum of our institute for teacher education. Student teachers in our institute work with this approach. Being able to define a professional dilemma dissected from professional practice, unravel it by taking different steps, designing and trying out materials is much better suited to the nature of teaching than traditional educational research. We hold the opinion that this makes it a more reliable indicator of the student's functioning as an educational professional than completing a traditional bachelor's thesis. We feel encouraged in this opinion by the fact that our approach is very popular amongst experienced teachers. At the moment, we facilitate 20 Learning Design Studios in which groups of about 8 to 10 teachers work on their own professional dilemmas, applying the DARe approach. The approach suits them and helps them to improve their teaching practice.

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