Models and design principles for teacher research

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Teacher research is a way to bridge the gap between theory and teaching practice. Various types of teacher research can be distinguished, including most commonly: action research, self-study, lesson study, design-based research, and scholarship of teaching and learning. All types of teacher research are focused on improving school practice, stimulating professional development and generating knowledge about teaching and learning, although seldom combined in one study. Two design principles to increase the quality of teacher research refer to (1) alignment of research and teaching practice and (2) collaboration between teacher-researchers. These design principles might not only improve the quality of the research work, but also enlarge the significance of outcomes of the teaching practice that is studied. While the immediate context of this review is secondary school, the findings are relevant for all levels of education.

INTRODUCTION

The impact of scholarly research in education on educational practice is limited. Scholars examine problems that teachers in schools perceive as irrelevant, want to publish in peer-reviewed journals instead of disseminating their work in local school contexts, and aim at generalization of insights rather than improving school practice (Broekkamp and Van Hout-Wolters, 2007). One of the promising ways to close this gap between research and practice seems to be research by teachers. Teacher research can be described as teachers' collection and analysis of data about school practice, which is done in a systematic and understandable way (Cochran-Smith and Lytle, 1993). This definition implies that other forms of reflective action by teachers might not been seen as teacher research, such as professional learning communities (Bausmith and Barry, 2011), teacher study groups (Thibodeau, 2008), critical friends groups (Curry, 2008), reflective practice (Osterman and Kottkamp, 2004) and literature circles, book clubs or reading groups (Daniels, 2002).

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Many teaching practices are based on practical wisdom, which can be problematic (Weimer, 2001, 2008). First, practical wisdom of teachers about teaching and learning is seldom connected with theories and concepts that are part of a shared knowledge base on teaching and learning. Second, the wisdom of practice often is not well connected to empirical outcomes. The success of many techniques and approaches (as well as the failure of others) can often be explained in terms of well-known and documented theories, principles and findings. Third, there is seldom any sense of why some strategies, techniques, approaches or practices work in some contexts and not in others. This probably is related to the lack of teachers' systematic inquiry into the effects of their teaching, but may also be influenced by a culture of isolation of teaching that is often endemic in secondary

schools. Teachers who cannot or do not share their knowledge and experiences with their colleagues limit the development of a school's culture of learning (Hodkinson and Hodkinson, 2003).

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Since teachers can sometimes be poorly informed about effective methodologies, they do not grow beyond their own (sometimes ineffective) practices and unexamined experience. Teacher research offers a challenge to traditional ideas about the value chain in education (university-generated theoretical knowledge disseminated via formal teacher training to individual practitioners). Instead, university researchers can work in collaboration with teacher-researchers in an ongoing conversation where practice develops and critically informs educational theory (Admiraal, 2013).

NATURE OF TEACHER RESEARCH

Teacher research in secondary education is characterized in many studies, literature reviews and meta-studies using different terminology, multiple aims and various definitions. The commonality seems to be that teacher research is focused on the improvement of teaching practice, albeit the route towards improvement often differs substantially. Teacher research is understood to be aimed at:

- voicing teacher's perspectives
- learning of the teacher
- improving teaching practice
- designing teaching practice
- evaluating teaching practice
- monitoring teaching practice
- innovating teaching practice
- generating knowledge on teaching.

Literature reviews and meta-analyses of teacher research (Cochran-Smith and Lytle, 2009; Admiraal, Smit, and Zwart, 2013; Anderson and Shattuck, 2012; Davis, Kiely, and Askham, 2009) characterize teacher research as small-scale, qualitative studies focused on describing and understanding teaching practice and evaluation of teaching by perceptions of teachers and students, with conclusions about and implications for the practice of the particular teacher doing the research. Less frequent are quantitative or mix-method studies using pre-test/post-test control group designs and test scores to deduce conclusions about effects of teaching interventions. Finally, teacher research is rarely aimed at generating knowledge about teaching and learning by generalization to other populations, places and points in time on the basis of statistics or valid argumentation; instead, it is mostly focused on maximizing content or depth, although it is important to recognize that such outcomes can also be understood as a quality criterion of educational research (Swanborn, 1996).

MODELS FOR TEACHER RESEARCH

Terminology varies in describing and categorizing teacher research in secondary education. Five commonly used terms are:

- action research
- self-study
- lesson study
- design-based research
- scholarship of teaching and learning.

These five main types will be described below. Other terms used in description of teacher research in secondary education are, for example, practitioner inquiry, narrative inquiry, evidence-based practice and practice-based evidence. The commonality of all these types of teacher research is that teacher research is focused on grounding and improving teaching practice.

ACTION RESEARCH

Action research is teachers' research into their own teaching practice with the aim to understand and improve their pedagogy and the im-

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pact of teaching on students' development within the societal context (compare the work of Wilfred Carr, Stephen Kemmis, Ken Zeichner and Bridget Somekh in, for example, Carr, 2007; Kemmis, 2009, 2010; Somekh and Zeichner, 2009). Kemmis (2009) argues that action research is essentially critical or self-critical: it opens educational practice for discussion. The author distinguishes three types of action research:

1. *technical* action research, which is guided by an interest in improving control over outcomes
2. *practical* action research, which is guided by an interest in educating or enlightening practitioners so they can act more wisely and prudently
3. *critical* action research, which is guided by an interest in emancipating people and groups from irrationality, injustice and harm or suffering.

The first type of action research is mostly done by individual teachers examining their own teaching practice; the other two types are mostly executed collaboratively with other teachers and/or researchers. An example of technical action research on Content-Language Integrated Learning (CLIL) is by Mearns (2012), who reports on her technical action research into her CLIL teaching in a British secondary school. She examined a group of 30 students, aged 13–14, over a six-week period, in order to understand the relationship between her CLIL-teaching method and students' motivation and achievement in the target language (German) and subject domain (personal, social and health education). She grounded her CLIL-teaching method in literature about effective CLIL teaching and second-language acquisition. The findings of this study were mixed. Only a small overall increase in student motivation for lessons in German language was found, as many students struggled with a lack of confidence. With regard to attainment in the target language, the most-able students exceeded their previous achievements significantly, although little improvement or even a decrease was noted in the achievement of the less-able students. The author concludes with a discussion of the role of practitioner research in the academic community and formulates some conclusions about the setup of this kind of research.

Most action research is "technical" action research in Kemmis's terms, although more recently collaborative forms come up under the label of collaborative action research (Lyons and Thompson, 2011) and participatory action research (Kallery, 2011). The former refers to mostly technical action research performed by a team of teachers and the latter to research into the teaching practice performed by a group of teachers and researchers. In participatory action research, teachers often have a limited role in the research process, ranging from only executing a teaching intervention to collecting and analysing data; reporting the results is mainly done by a professional researcher. This means that most reports on participatory action research are often *about* teacher research as opposed to the presentation of research results.

SELF-STUDY

Self-study is traditionally known as research of teacher-educators into their own practice, based on their own teaching experience and expertise, aimed at understanding and improving their own attitudes and behaviours (Pithouse, Mitchell, and Weber, 2009). A somewhat older definition of self-study is often used: "Self-study is the study of one's self, one's actions, one's ideas, as well as the 'not self'" (Hamilton and Pinnegar, 1998, p 236). Self-study implies that a teacher reflects upon herself as if she studies a text and tries to position herself in societal and historical context. LaBoskey (2004) takes a broader view, identifying aspects of self-study that overlap with other types of teacher research:

"Self-study implies that a teacher reflects upon herself as if she studies a text."

1. Self-study is focused on improvement and is based on data that support this improvement.
2. Self-study implies interactions with colleagues, students and literature to ground interpretations.
3. Self-study includes various, mostly qualitative research methods to provide an overview of the development process.
4. Results of self-study are shared with colleagues (implying that self-study has value not only for the particular teacher, but also for her colleagues).

LESSON STUDY

Lesson study originated in Japanese education and refers to collaborative teacher research, in which a team of teachers designs a lesson and then observes, evaluates and redesigns the lesson based on experience, thus initiating a new cycle (Chokshi and Fernandez, 2004; Fernandez and Yoshida, 2004; Lewis, Perry, and Murata, 2006). The teacher team meets after a lesson to discuss whether it should be refined and evaluated again, or whether a new lesson is required. In some cases, a team invites experts to share their knowledge on the subject, pedagogy or curriculum development process in order to bridge the gap between classroom practice and the scholarly world. In contrast to self-study and other forms of professional development, lesson study is focused on teachers' work and student activities rather than the individual development of teachers' skills and understanding. The lessons and the research on the lessons exist as a collective product of the teaching team.

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In general, lesson study is thought to increase teachers' subject matter expertise, improve their teaching practice, expand their observation and reflection skills, strengthen their relationships with colleagues in school, and augment their self-confidence and self-efficacy in teaching (see, for example, Lewis, Perry, and Murata, 2006; Puchner and Tailor, 2006).

DESIGN-BASED RESEARCH

Design-based research, sometimes referred to as design research or developmental research, is generally carried out by a teacher or pair of teachers who design a lesson series based on insight from literature and teaching experience; implement and evaluate this lesson series; and then develop the lessons further on the basis of the evaluation and new insights from the literature. This redesigned lesson series can be a start of a new cycle of design, implementation, evaluation and redesign. In general, the lesson series is innovative: about a new subject, a particular teaching method, advanced assessment procedure or newly developed educational materials (for an overview of characteristics of design-based research, see Kelly, 2003, 2004). In order to analyse data in design-based research in a systematic way, the CIMO logic (Context-Intervention-Mechanisms-Outcomes; Denyer, Tranfield, and Van Aken, 2008) has recently been developed. Using the CIMO logic, teacher-researchers are able to connect the design principles of their lesson series to specific outcomes via what they observe in the classroom.

SCHOLARSHIP OF TEACHING AND LEARNING

Scholarship of teaching and learning (ScoTL), developed originally in the context of higher education teaching, implies that teachers frame and systematically investigate questions related to student learning (the conditions under which it occurs, what it looks like, how to deepen it) and do so with a perspective not only to improving their own classes, but to advancing practice beyond it (Weimer, 2008). ScoTL is more than research on student learning in teachers' own practice; it involves teachers in the scholarly contributions of others on teaching and learning (Healey, 2000; Trigwell, Martin, Benjamin, and Prosser, 2000). Finally, ScoTL includes the communication and dissemination of aspects of practice and theoretical ideas about teaching and learning, being public, shared, peer-reviewed and critiqued. This can be done through, for example, teacher portfolios (Kreber, 2006), mentoring colleagues (Weston McAlpine, 2001) or (peer-reviewed) publications (Richlin, 2001). In sum, in scholarship of teaching and learning, teachers:

"ScoTL includes the communication and dissemination of aspects of practice and theoretical ideas about teaching and learning."

- collect and analyse data about teaching and learning
- link their problem to school practice
- ground their research in literature
- open up their research for peer review
- publish their findings
- share outcomes in school.

So, ScoTL is a form of teacher research that explicitly connects teaching practice to scholarly work, a reciprocal exchange between theory and practice.

DESIGN PRINCIPLES FOR TEACHER RESEARCH

In the studies, literature review and meta-analyses on teacher research mentioned above, many implications have been formulated for the design of teacher research to improve its efficiency and effectiveness. In addition to the often-reported prerequisite conditions of sufficient time and space for teachers to carry out their research, motivational support of colleagues and school leaders, and professional development of formal research skills, we want to emphasize two important design principles of teacher research in schools:

- First, research by teachers is best **closely connected to their teaching practice**. In this way, teacher research aligns with the practical wisdom of teachers about teaching, motivates teachers and their colleagues because of its practical relevance and authenticity, and increases teachers' autonomy in teaching. And this practice should be carefully and meaningfully connected with educational policy, which is all-too-often disconnected from the day-to-day concerns and informed voices of classroom teachers.
- Second, research by teachers is best **when it is collaborative or collective**, enacted together with other teacher-researchers (collaborative) or scholarly researchers (participatory). Collaborative and participatory teacher research offers possibilities for examining more practices, supporting each other, dividing labour, discussing critically both the research process and outcomes, and making efficient use of varying sets of expertise. One powerful way to facilitate collaborative research in teaching is school–university partnerships in which teacher-researchers from schools and pedagogical scholars from universities work together to address a shared research agenda. In the Netherlands, these school–university partnerships are called Academic Professional Development Schools.

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REFERENCES

Admiraal, W. 2013. Academisch docentschap. Naar wetenschappelijk praktijkonderzoek door docenten [Scholarship of Teaching. Towards academic practice-based research by teachers]. Inaugural lecture. Leiden, the Netherlands. Leiden University. Retrieved from https://openaccess.leidenuniv.nl/bitstream/handle/1887/21008/Oratie%20Admiraal.pdf?sequence=2

Admiraal, W, Smit, B, and Zwart, R. 2013. Academisch docentschap in het basis- en voortgezet onderwijs: Aard en betekenis van onderzoek van docenten naar hun onderwijspraktijk [Scholarship of Teaching in primary and secondary education. The character and meaning of teacher research on teaching practice]. Report NWO/PROO 411-11-691. Leiden, the Netherlands. ICLON Leiden University.

Anderson, T, and Shattuck, J. 2012. Design-based research: A decade of progress in education research? *Educational Researcher*. Vol 41(1). Pp 16–25.

Bausmith, J, and Barry, C. 2011. Revisiting professional learning communities to increase college readiness: The importance of pedagogical content knowledge. *Educational Researcher*. Vol 40(4). Pp 175–178.

Broekkamp, H, and Hout-Wolters, BHAM van. 2007. The gap between educational research and practice: A literature review. *Educational Research and Evaluation*. Vol 13(3). Pp 203–220.

Carr, W. 2007. Educational research as a practical science. *International Journal of Research and Method in Education*. Vol 30. Pp 271–286.

Chokshi, S, and Fernandez, C. 2004. Challenges to importing Japanese lesson study: Concerns, misconceptions, and nuances. *Phi Delta Kappan*. Vol 85. Pp 520–525.

Cochran-Smith, M, and Lytle, SL. 1993. *Inside-outside: Teacher research and knowledge*. New York, NY, USA. Teachers College Press.

Cochran-Smith, M, and Lytle, SL. 2009. *Inquiry as Stance: Practitioner Research for the Next Generation*. New York, NY, USA. Teachers College Press.

Curry, MW. 2008. Critical friends groups: The possibilities and limitations embedded in teacher professional communities aimed at instructional improvement and school reform. *Teachers College Record*. Vol 110. Pp 733–774.

Daniels, H. 2002. *Literature circles: Voice and choice in Book Clubs and Reading Groups.* (Second Edition). Portland, ME, USA. Stenhouse.

Davis, M, Kiely, R, and Askham, J. 2009. InSITEs into practitioner research: findings from a research-based ESOL teacher professional development programme. *Studies in the Education of Adults*. Vol 41. Pp 118–137.

Denyer, D, Tranfield, D, and Aken, JE van. 2008. Developing design propositions through research synthesis. *Organization Studies*. Vol 29. Pp 393–413.

Fernandez, C, and Yoshida, M. 2004. *Lesson study: A Japanese approach to improving mathematics teaching and learning*. New York, NY, USA. Routledge.

Hamilton, ML, and Pinnegar, S. 1998. Conclusion: The value and promise of self-study. In ML Hamilton (ed), *Reconceptualizing teaching practice: Self-study in teacher education.* London, UK. Falmer Press. Pp 235–246.

Healey, M. 2000. Developing the scholarship of teaching in higher education: A discipline-based approach. *Higher Education Research & Development*. Vol 19. Pp 169–189.

Hodkinson, P, and Hodkinson, H. 2003. Individuals, communities of practice and the policy context: school-teachers learning in their workplace. *Studies in Continuing Education*. Vol 25. Pp 3–21.

Kallery, M. 2011. Astronomical concepts and events awareness for young children. *International Journal of Science Education*. Vol 33. Pp 341–369.

Kelly, AE. 2003. Theme issue: The role of design in educational research. *Educational Researchers*. Vol 32(1). Pp 3–4.

Kelly, AE. 2004. Design research in education: Yes, but is it methodological? *Journal of the Learning Sciences*. Vol 13. Pp 115–128.

Kemmis, S. 2009. Action research as a practice-based practice. *Educational Action Research*. Vol 17. Pp 463–474.

Kemmis, S. 2010. What is to be done? The place of action research. *Educational Action Research*. Vol 18. Pp 417–427.

Kreber, C. 2006. Developing the scholarship of teaching through transformative learning. *Journal of Scholarship of Teaching and Learning*. Vol 6(1). Pp 88–109.

LaBoskey, VK. 2004. The methodology of self-study and its theoretical underpinnings. In JJ Loughran, ML Hamilton, VK LaBoskey, and T Russell (eds), *International handbook of self-study of teaching and teacher education practices*. Dordrecht, the Netherlands. Kluwer Academic Publishers. Pp 817–869.

Lewis, C, Perry, R, and Murata, A. 2006. How should research contribute to instructional improvement? A case of lesson study. *Educational Researcher*. Vol 35(3). Pp 3–14.

Lyons, W, and Thompson, SA. 2011. Guided reading in inclusive middle years classrooms. *Intervention in School and Clinic*. Vol 47. Pp 158–166.

Mearns, TL. 2012. Using CLIL to enhance pupils' experience of learning and raise attainment in German and health education: a teacher research project. *Language Learning Journal*. Vol 40. Pp 175–192.

Osterman, K, and Kottkamp, R. 2004. *Reflective practice for educators*. Thousand Oaks, CA, USA. Corwin Press.

Pithouse, K, Mitchell, C, and Weber, S. 2009. Self-study in teaching and teacher development: a call to action. *Educational Action Research*. Vol 17. Pp 43–62.

Puchner, LD, and Taylor, AR. 2006. Lesson study, collaboration and teacher efficacy: Stories from two school-based math lesson study groups. *Teaching and Teacher Education*. Vol 22. Pp 922–934.

Richlin, L. 2001. Scholarly teaching and the scholarship of teaching. In C Kreber (ed), *Revisiting scholarship: Perspectives on the scholarship of teaching*. New Directions for Teaching and Learning, No. 86. San Francisco, CA, USA. Jossey-Bass. Pp 57–69.

Somekh, B, and Zeichner, K. 2009. Action research for educational reform: Remodelling action research theories and practices in local contexts. *Educational Action Research*. Vol 17. Pp 5–21.

Swanborn, PG. 1996. A common base for quality control criteria in quantitative and qualitative research. *Quality & Quantity*. Vol 30. Pp 19–35.

Thibodeau, GM. 2008. A content literacy collaboration study group: High school teachers take charge of their professional learning. *Journal of Adolescent and Adult Literacy*. Vol 52(1). Pp 54–64.

Trigwell, K, Martin, E, Benjamin, J, and Prosser, M. 2000. Scholarship of teaching: A model. *Higher Education Research & Development*. Vol 19. Pp 155–168.

Weimer, M. 2001. Learning more from the wisdom of practice. In C Kreber (ed), *Revisiting scholarship: Perspectives on the scholarship of teaching*. New Directions for Teaching and Learning, No. 86. San Francisco, CA, USA. Jossey-Bass. Pp 45–56.

Weimer, M. 2008. Positioning scholarly work on teaching and learning. *International Journal for the Scholarship of Teaching and Learning*. Vol 2(1). Pp 1–6.

Weston, C, and McAlpine, L. 2001. Making explicit the development towards the scholarship of teaching. In C Kreber (ed), *Revisiting scholarship: Perspectives on the scholarship of teaching*. New Directions for Teaching and Learning, No. 86. San Francisco, CA, USA. Jossey-Bass. Pp 89–99.