Cultivating Creativity In Education
Interactions Between Teaching And Learning
Preface

The Radboud Teachers Academy educates academic prospective and in-service teachers for the senior grades of Dutch secondary education. The senior grades of secondary education prepare pupils for studies at a university or a university of applied sciences. At the core of the curriculum is an increasing emphasis on the development of pupils’ higher order thinking skills, creativity, scientific attitude, research and problem solving skills, within and across disciplines. The Academy takes on a broad, yet ambitious view of teaching and learning, in which both students and teachers develop and use their full potential with respect to these learning goals and develop their talents accordingly. The research program of the Academy contributes to this view by systematically expanding knowledge and understanding of how new types of learning can be cultivated. The Radboud Teachers Academy aims to become an expertise center for innovative teaching and learning and as such a valuable source of learning for teachers and schools. Its central position within Radboud University enables the Academy to collaborate with research groups from various faculties as well as a wide array of secondary schools. This stimulates interaction between innovative scientific insights and new developments in schools. Research outcomes will consist of (context specific) conceptual clarifications as well as specific pedagogies, to cultivate creativity in secondary education, in teacher education and in school development.

Background

Particularly in the last few decades, Dutch primary and secondary education has been shifting towards ways of teaching and learning that go beyond mere reproduction of facts. Pupils are increasingly encouraged to think about and reach a meaningful understanding of the world they live in (e.g., Vermunt, 1992; Bransford & Brown, 2000; Iran-Nejad, McKeachie & Berliner, 1990; Vermetten, Vermunt, & Lodewijks, 1999). Pupils are therefore more likely to become knowledgeable sources themselves. While this shift towards meaningful learning is still going on, a new challenge is already emerging. Rapid technological, socio-economic and environmental changes, together with corresponding challenges in today’s society (Ferrari, Cachia, Ala-Mutka & Puni, 2009) and in the lives of pupils in particular (Redecker, 2008; Pédro, 2006), call for a specific educational approach: pupils need to acquire meaningful knowledge, while simultaneously feel stimulated to utilize their knowledge in (online and multimedia) learning situations that allow to (collaboratively) explore, inquire, imagine, create and innovate. The cultivation of intricately connected requirements and integration of knowledge and skills, termed as creativity, is considered to be at the core of this new challenge for all learners (e.g., Ferrari, Cachia, & Puni, 2009; Richards, 2010; Voogt & Pareja Roblin, 2010). This cultivation of creativity goes beyond mere cognitive learning; it involves
imagination, feeling and emotion, critical thinking, open end solutions and space to experiment and cooperate. This type of learning requires specific attitudes from teachers and pupils.

Education that appeals to young people’s abilities and interests is likely to enhance their wellbeing and learning (Deci & Ryan, 2002) and, consequently, better equip them for contributing to the dynamics of modern society. Within this perspective, creativity is not regarded as something reserved for certain individuals, but it is a central part of thinking and acting in new ways, in a world that requires us to do so (Tanggaard, 2014). There is ample evidence that it is possible to develop pupils’ creativity (e.g. Sternberg, 2006). Therefore, policymakers as well as educators claim that education should play a vital role in developing the expertise and creativity that the present dynamic society needs (WRR, 2013; Tanggaard, 2014).

Nevertheless, concrete policy changes regarding the cultivation of creativity in education fall behind so far in the Netherlands (Onderwijsraad, 2008; SLO, 2015; Voogt & Pareja Roblin, 2010). A broader and more extended approach to learning and teaching in which creativity can flourish is far from common practice, particularly in secondary education. Cognitive, convergent and teacher-centered views on learning still seem to be predominant and are accompanied by ever increasing standardized testing (Biesta, 2014). Accordingly, a strong emphasis is placed on measurable learning results of students for the basic school subjects.

The Radboud Teachers Academy shares with Biesta (2014) the view that the qualification function of education (which often has an economic background) should be complemented with a socialization and personification function. The latter two functions refer to the broad development of pupils towards becoming autonomous, responsible, and active participants in our democratic, pluriform society (Biesta, 2014), and in turn call for a more comprehensive view on education. The cultivation of creativity requires, in our view, the committed embracement of the three educational functions together. It is from this perspective that this research program has emerged and has been developed.

**ZOOMING IN ON CREATIVITY IN EDUCATION: TOWARDS A RESEARCH PROGRAM**

**The concept of creativity**

The concept of creativity, although a key topic in current debate on educational innovation, is not a well-defined in scientific research and within the context of education (Plucker, Beghetto, & Dow, 2004). Nonetheless, two main aspects appear to stand out: creativity is about creating something new (original) and useful (worthwhile) (e.g., Mumford, 2003; Plucker et al., 2004). This requires further specification: to whom is it new and worthwhile and what does new and worthwhile mean? As creativity can be regarded as positive as well as negative depending on its context (Biesta, 2014; Craft, 2006), solely describing creativity as ‘something new and useful’ is far too general for educational design purposes. For example, it is necessary for educators to know more about the conditions, indications and possible outcomes of creative processes. It is also necessary to shed more light on their (partly) domain specific nature (e.g. Baer, 1998; Plucker, 1998). One of the central aims of this research program is to gain more insight into the conceptual structure of creativity in the context of education and of (upper) secondary education in particular. In their review study of 90 recent studies on creativity, Plucker et al. (2004) came up with the following definition:
‘Creativity is the interaction among aptitude, process, and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social group’.

This definition will serve as a general working definition and starting point to be further explored, refined, developed, and adjusted to specific contexts or domains. Additionally, four starting points form the basis of the research conducted at the Radboud Teachers Academy.

**Starting points**

**Interaction between teaching and learning – the central role of teachers.** The Radboud Teachers Academy research program aims to contribute to the cultivation of individual and collaborative creativity of pupils and teachers in (the senior grades of) secondary schools. In other words, the program focuses both on creativity within the interaction between teachers and pupils (the process of teaching) and on creativity within pupils’ learning processes and outcomes (the process of learning). This is an ambitious focus, since associated practices are not automatically found in schools nowadays; and if they are, these practices are not felt as everyday routine just yet. However, teachers play a crucial role in cultivating creativity by creating and applying educational innovations in their (domain specific) domain of teaching (e.g., Imants & Oolbekkink, 2009). Therefore, teachers are the main ‘entry points’ for our research program. Teachers’ professional knowledge, skills and space to develop education, in addition to the central position of the school as the context for their learning and expertise, are key elements of the research program.

**Teachers as learners – interaction between teacher and workplace.** A second starting point underlying our research program is that a necessary foundation for the cultivation of pupils’ creativity is the creative learning by teachers themselves. The interaction between pupil and teacher learning is clearly visible in recent models of teacher professional development. On the one hand, these models stress the relation between the learning processes of teachers and, ultimately, the learning results of their students (e.g., Clarke & Hollingsworth, 2002; Imants & Oolbekkink, 2009; Desimone, 2009). On the other hand, these models stress the situated character of teacher learning (e.g., Meirink, Imants, Meijer, & Verloop, 2010; Bronkhorst, Meijer, Koster, & Vermunt, 2014). Teacher learning is situated in contexts that do not allow for a separation between the individual and the environment. Teachers learn from experiences in this context and actively shape these contexts - whether in a creative, innovative, or in a reproductive fashion (Imants, Wubbels, & Vermunt, 2013). Luttenberg, Imants and van Veen (2013) and Luttenberg, van Veen and Imants (2013) show how teachers look for cohesion with, and position themselves towards, specific innovation concepts and characteristics of the school as a workplace. Simultaneously, they attempt to make sense of their work during school-based innovations.

**Teacher identity.** For teachers, starting with the cultivation of pupils’ creativity basically implies a shift from relative certainty and control towards uncertain learning processes and unknown outcomes. It also involves the certainty that their roles as teachers as well as the roles of their pupils will change. It is therefore not far-fetched to state that teachers who know how to cultivate creativity show different accents in their teaching and most likely also in their professional identity. Although much research on teacher learning and professional identity development has been conducted during the last decades (e.g., Beijgaard, Meijer & Verloop, 2004; Meijer, de Graaf, & Meirink, 2011; Bakkenes, Vermunt & Wubbels, 2010,), what typifies teachers who (learn to) focus on the cultivation of creativity is not yet clear, nor do we know how these teachers develop their professional identity. For the purpose of professionalization of teachers, initial teacher training and teacher recruitment policies, it is vital to obtain more insight in the characteristics of this process.
**Domain specific and general creativity.** In the past decades, researchers have debated whether creativity requires a domain specific or a general set of knowledge, skills, aptitudes and propensities. Although some scholars adopted a more moderate position, including both domain specific and general components (e.g., Amabile, 1983), the abundant evidence both in favor of and against the domain specificity of creativity gave rise to intense debate (e.g. Baer, 1998; Plucker, 1998). Currently, the emerging view on creativity is one that leaves room for both perspectives as well as for a fusion between the two. A key insight is that the knowledge, skills and talents underlying creative performance “… a) vary depending on the kind of work one is undertaking, b) are similar across related fields or kinds of creative work and c) become progressively dissimilar as one moves to increasingly disparate fields of endeavor” (Baer, 2010; see also Kaufman & Baer, 2005). This research program includes studies with predominantly domain specific as well as general or mixed perspectives, according to the goal and context of each study or series of studies.

Outcomes of the research program *Cultivating creativity* will add to theories of teacher learning and development and will offer solid ground for useful and effective, partly subject or domain specific practices in teacher education and teacher professional development.

**Research questions**

As stated, the concept of creativity, although a key topic in current debate on educational innovation, is far from well-defined in scientific research. A central aim of the Radboud Teachers’ Academy research program is to gain more insight into the conceptual structure of creativity in the context of (secondary) education. More specifically, we will pay attention to three aspects that, when combined, will help to gain more insight into the cultivation of creativity in education:

- **The conditions** for creativity: what are the ecological, contextual and personal conditions for the development of creativity, higher order thinking and problem solving both in learning and teaching, by students, by teachers and by teacher educators?

- **The indications** for creativity: what are the factors that indicate (the quality of) creativity and how can they be measured?

- **The evaluation** of creativity: what are the results of creativity, creative learning and problem solving in different subject domains?

The program’s central research question is: *How can the development of creativity in education be enhanced?* This central question is specified into three subquestions, which are the point of departure for three integrated lines of research:

1. **Creativity and specific school subject domains:** What is the relation between teachers’ and pupils’ creativity within school subject domains? How can developments in school subject domains be translated into creative teaching and learning that stimulates problem solving and higher order thinking?

The studies in this line of research work towards tested pedagogies that teachers can use to address their pupils’ creative potential and create environments that cultivate their pupils’ subject or domain specific creativity.
2. **Creativity and teachers’ professional identity**: What characterizes the professional identity of teachers who cultivate their pupils’ creativity? How do these teachers develop their professional identity? How can this development be supported and enhanced during teacher education and continuing professional development?

The studies in this line of research work towards tested teacher education pedagogies and pedagogies for stimulating further professional development of experienced teachers.

3. **Creativity and the school context**: How can teaching and learning creativity be implemented in schools, taken into consideration differences within and between schools and teachers? Which role do teachers’ work environment characteristics, and more specifically teachers’ professional space, play in their creative teaching and learning, and in the sustainability of changes towards creative teaching and learning?

The studies in this line of research work towards tested pedagogies of educating student teachers and experienced teachers in collaborative responsibility of teacher education institutes and schools (“Samen opleiden”), and school change that includes a focus on the pedagogies mentioned in line 1 and line 2.

Although these three research lines are described separately, we assume that research leading to outcomes encouraging sustainable change or development in education cannot be done in just one of these lines while neglecting the others. There is ample evidence that studies focusing solely on, for example, the development of materials while disregarding teacher learning or the school context, might lead to temporary results, but in the long term these results fade out. Fading results occur because teachers do not use said materials, because schools cannot address the requirements for implementation and/or because it is unclear how the materials relate to the final exams students are prepared for (e.g., Overman, Vermunt, Meijer, Bulte, & Brekelmans, 2014; Voerman, Meijer, Korthagen, & Simons, 2015). Another example is the attempts that have been made to change teacher roles towards ‘supporting learning’, instead of being mere ‘transmitters of knowledge’. Although many studies have indicated a massive increase in student learning, full implementation has failed because of a lack of teacher support and a lack of facilities in schools. Teachers did not know how to change their teaching nor did they know how the ‘supporting learning’ role related to developments in the subject they were teaching (e.g., Luttenberg et al., 2013a). Although many studies in the research program are rooted in one of the research lines, the other lines are never neglected. This emphasizes the importance of dialogue and interaction between researchers in our research program.

**LINE 1. CREATIVE LEARNING AND SPECIFIC SCHOOL SUBJECT DOMAINS**

The Radboud Teachers Academy research program targets the cultivation of creative learning in the senior grades of secondary education, especially, but not exclusively, in the more scientifically oriented school types, such as pre-university tracks. Pedagogical issues in this area are often of a domain specific nature, since school subject domains are based on the scientific disciplines they prepare students for. Embedded in a university context, the program collaborates with researchers from a range of university faculties (for instance the Faculty of Arts, and the Faculty of Science).

The first line of research therefore concerns the enhancement of teachers’ and pupils’ creative learning (and teaching) in relation to the specific school subject domains. How do teachers respond to the changing contexts of the scientific disciplines associated with their school subjects? What kind of domain specific
creative learning do pupils need in order to bridge the gap between secondary school and university study, and how do teachers design education that encourages this learning? These questions are addressed in collaboration with colleagues from university faculties and from schools.

Adding the school subject domain into the equation enables us to distinguish three different perspectives on creative learning and teaching:

1. The creative learning that is required from pupils in relation to the school subject domains;
2. The creative learning and teaching that is required from teachers in relation to the school subject domains;
3. The creative domain specific teaching that is required from teachers in their relation to their students.

The first perspective is one of the major targets of upper level secondary education. More specifically, students need to develop certain domain specific, higher order thinking processes. The exact nature of these processes and their conceptual structure, which is to a large extent a matter of the scientific domain itself, is the first target of research in this line. This line of research will be executed in close collaboration with faculty researchers.

The second perspective is in fact a prerequisite for the other two: teachers are first and foremost domain experts. The relation between teachers and their domains determines certain epistemic beliefs and preconceptions. This is the second target of research in this line.

The third perspective is the means to stimulate and scaffold the development of creative learning in the first perspective. Teachers need to employ efficient and (to a certain extent) domain specific strategies to foster pupils’ creative learning in the specific domain. Research into this kind of creative teaching is also (and more fundamentally) rooted in the second line of the research program, which will be elaborated upon in the next section. However, most research projects within this second line also have the domain specific means for stimulating and scaffolding creative learning as an object of investigation.

Studies within the first line include (but are not restricted to): cultivating creative learning in literary education, enriching grammar pedagogy to enhance creative thinking about language, integrating modern linguistic insights into language education, enhancing critical thinking in history teaching, expert development in business education and social studies, concept-context approaches in biology, and creative thinking in mathematics and science.

**LINE 2. CREATIVITY AND TEACHERS’ PROFESSIONAL IDENTITY**

This line of research focuses on teachers and their development in the context of cultivating creativity. For teachers, to start with the cultivation of pupils’ creativity basically implies a shift from relative certainty and control towards uncertain learning processes and unknown outcomes. Moreover, it involves the certainty that their roles as teachers as well as those of their pupils will change. It is therefore not far-fetched to state that teachers who know how to cultivate creativity show different accents in their teaching, and most likely also in their professional identity. Teachers need to be aware of the cutting edge of their subject domain, in which answers have not yet been found, they need to have a tolerance for uncertainty that not only addresses managerial and interactional processes in education, but also to the learning (in process as well as content) of both students and teacher. Also, they need to employ ‘agency’ in order to create or use
the space they have in school to experiment with inquiry learning or other creative types of learning for themselves and for their pupils.

Although much research on teacher learning and the development of teachers' professional identity has been conducted during the last decades (e.g., Beijaard et al., 2004; Meijer et al., 2011; Bakkenes et al., 2013), it is not clear what typifies teachers who (learn to) focus on the cultivation of creativity in their students and in themselves. Another virtually unexplored issue that we aim to contribute to is the question how teacher identity and its development can be measured. Research in this second line focuses on how teachers develop professionally when they (learn to) focus more on creative types of learning, and on how such a development can be supported and enhanced during teacher education or professional development activities (Meijer, Oolbekkink, Pillen, & Aardema, 2014).

Research within this line will be largely descriptive at first, aiming to describe how teachers’ identity develops over time and in relation to their actual teaching practice (and student outcomes). What follows are interventions both in teacher education and in schools with beginning and experienced teachers. The purpose of these interventions is that teachers learn to cultivate the creativity of their pupils as well as their own creativity, especially in their teaching. In doing so, more light will be shed on the relation and distinction between the concepts ‘creative teacher’, ‘creative teaching’ and ‘teaching for creativity’.

**Line 3. Creativity and the School Context**

Specific outcomes of teaching and learning creativity are inherently uncertain and can only partly be controlled. The school context should stimulate and guide pupils and teachers to position themselves as creative interpreters and problem solvers. Additionally, the school context should provide conditions and resources in which creative teaching and learning is promoted, fostered, guided and rewarded. Such contexts seem to differ considerably from contexts in which teachers and students are expected to produce high grades on standardized tests and exam results that fit into accountability norms. Moreover, recent theories on learning and teaching that are potentially fruitful in the conceptualization of creativity learning state that learning is an inherently social and contextualized activity (Billett, 2004). For these reasons, teaching and learning creativity can only be understood, promoted, and improved when the context for teaching and learning is part of the research. Related to research in the second line is the assumption that identity and agency are strongly interrelated concepts. Agency is about the relationship between the teacher as a learner and the context in which the teacher is working and learning (Priestley, Biesta, Philippou, & Robinson, 2015). Parallel to the first line it is assumed that collaboration in development teams among teachers, university subject specialists and teacher educators is a promising context for developing productive methods for teaching creativity (Vangrieken, Dochy, Raes & Kyndt, 2015). In relation to both the first and the second line, alignment is assumed to be a central concept in a systems approach of creativity teaching innovations. This approach can be helpful to explore the sustainability of the curricular innovations and aspects of creativity in teachers’ identity (Fullan, 2009). Teacher agency, collaboration (e.g., professional learning communities; Schaap & De Bruijn, 2012), and alignment are three promising concepts for the study of productive and sustainable contexts for creativity teaching (Hargreaves & Fullan, 2012). Alignment requires educational leadership (Imants, 2014). Until recently, developing these contexts for teaching and learning creativity have hardly been subject to research (Tanggaard, 2014). Context ranges from the classroom and the environment for teachers’ work and learning in the school, to the educational leadership in school and the partnership between school and university. We therefore aim to gain insight into stimulating, rewarding and sustainable contexts in classrooms and schools for teaching
and learning creativity by students and teachers, and we aim to contribute to the development of these contexts. A central assumption in this third line of research is that rich working and learning environments for teachers are essential for developing teaching and learning creativity. In such environments teachers are invited and rewarded to develop, perform, and evaluate new contents and methods for student learning. These are labelled expansive environments for learning, to be distinguished from restrictive environments, in literature on workplace learning (Tynjälä, 2013).

Research in this third line will be descriptive in nature at first, taking an ecological stance towards teachers and educational leaders in their authentic context. Additionally, intensive intervention studies (e.g., formative interventions, design based research) will be conducted in order to improve or change current practices. Studies within this line include (but are not restricted to): teachers’ sense making and positioning towards reform, teachers’ workplace learning and professional development, teacher learning in innovative teams, teachers’ enactment of work environments in the context of reform, developing an integrated model for school reform and teachers’ professional development, teacher’s professional space and professional learning communities.

**Final Remarks**

In this program, it is assumed that research contributing to sustainable change in education needs to cover the three lines described above. As a consequence, the Radboud Teachers Academy research program does not only require the use of more traditional research designs, but also topics and designs that ask for creativity. This ambition pertains, among other things, the following:

- A review study will be conducted on the concept of creativity and its development, and what this concept entails and might look like in the context of learning and teaching in schools for pre-university education, including the consequences for research topics and designs in such a context;
- In each study, close collaboration is sought with various research groups in the university faculties on the one hand and with (innovative) schools for secondary education, on the other;
- Methods will be developed to assess creativity and its development, to set up experiments to cultivate creativity, and to design forms for collaborative research with schools and/or teachers in ways that are valid and reliable (and creative) (e.g., Boevé et al., 2015).

The Radboud Teachers Academy ambition asks for novel ways of collaboration in research. The stakes are high in that we wish to contribute to sustainable change in education at the level of students, teachers, and schools. By focusing on the concept of creativity and its cultivation, we set the stage for innovative ways of collaborative research that can contribute to pioneer research in the area of education.

**References**


