

Innovative Pupils!
Documentary Research on Teaching and Learning Approaches for Innovativeness

Claudia Scharf, University of Duisburg-Essen, Germany

Swantje Weis, University of Duisburg-Essen, Germany

Inga Gryl, University of Duisburg-Essen, Germany

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Abstract

The German educational system is replete with claims for participation. The aim of the German primary school subject *Sachunterricht* (Primary Social and Science Education) is to enable pupils to assess, question and change their environment. In this paper we argue that there is a strong connection between participation, critical thinking and *innovativeness*—the ability to participate in innovation processes. We argue that participation and critical thinking can be strengthened by focusing on innovativeness. However, an initial research approach regarding education for innovativeness in *Sachunterricht*, revealed that teaching and learning materials currently used in a textbook for this subject hardly evoke or foster innovativeness. Therefore, we broaden the field of research in this paper to include teaching and learning *approaches*—including teaching materials as well as educational concepts as a whole—, which include, but are not limited to *Sachunterricht* and are not necessarily in current use. This paper presents the results of an initial and explorative documentary research which aims to identify interdisciplinary teaching and learning approaches which evoke or foster innovativeness. Especially those approaches that focus on pupils' autonomous development of ideas or concepts possibly are considered to evoke or foster innovativeness. In the next step, these approaches shall be transferred to *Sachunterricht* for education for innovativeness.

Keywords: innovation, innovativeness, participation, primary education, teaching and learning approaches, *Sachunterricht*, documentary research

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Introduction:

Why Education for Innovativeness?

In this ever-changing world, it is unpredictable what the future holds (e.g. Schnack & Timmermann, 2008). Individuals are challenged by complexities and contradictions (Beck, 2007; see also Weis et al., accepted). So-called innovations are emerging that promise improvement of the way we live (Weis et al. 2017a; see also Weis et al., accepted), and provide new (pseudo) courses of action which can change the world again (Degele, 2002). Consequently, the ever increasing options for taking several courses of action lead to a higher demand for regulation and coordination (Degele, 2002). Therefore, individuals are increasingly challenged to react to (unexpected) changes that they face (Postman & Weingartner, 1973; Gryl, 2013; see also Scharf et al., 2017). In order to cope with this uncertain future and to be able to reflect on complex changing processes, people need to develop a critical mind-set. Furthermore, individuals need to be enabled to (re-)act competently to these processes, with an ability to participate in and shape society according to their own conceptions (ibid.; Weis et al., 2017a, 2017b).

Today's educational goals for primary school are set with this uncertain future in mind, stressing the importance of participation that supposedly enables pupils to handle these challenges (Schnack & Timmermann, 2008; for Germany e.g. KMK, 2007; Schulentwicklung NRW, 2008; MSW 2008; GDSU, 2013; see also Weis, 2016; Weis et al., 2017a; 2017b; Scharf et al., 2017). Aligning with the educational goals claiming to foster participation and therefore especially following a humanistic perspective on education (Humboldt, 1792/93), Weis et al. (2017a) argue that education should include the empowerment of pupils in order to enable them to cope with the outlined challenges. For this, schools not only need to foster defined skills, but especially offer open teaching and learning spaces which allow pupils to question current circumstances and to participate in decision making processes (Weis, 2016; see also Weis et al. 2017a; Postmann & Weingartner, 1973; Gryl, 2013; Scharf et al., 2016). Therefore, pupils should be enabled to learn autonomously and collaboratively, as well as to present their own opinions while respecting the viewpoints of others (Schulentwicklung NRW, 2008; see also MSW, 2008, Weis et al., 2017a; Scharf et al., 2017). According to Gryl (2013), Jekel et al., (2015), Scharf et al. (2016), and Weis et al. (2017a, 2017b), in order to meet new challenges and to shape the world, *innovativeness*—the ability to participate in innovation processes—supports pupils more than just focusing on unspecified participation. However, apart from focusing on participation in education, innovativeness is hardly considered in the German educational system (e.g. MSW 2008; see also Weis et al., 2017b; accepted).

In this contribution we argue that the constitution of the German school subject *Sachunterricht* (Primary Social and Science Education) meets (1) the claim for participation aligning with education policy, (2) the need for pupils' empowerment according to a humanistic ideal of education, as well as (3) the need to stimulate innovativeness within this complex world: *Sachunterricht* offers multidisciplinary teaching and learning approaches covering different disciplines, i.e. social sciences; geography; history; economics; and physical sciences (Weis et al., 2017a). Consequently, the teaching of the subject *Sachunterricht* may evoke or foster

innovativeness (ibid.; see also accepted)¹ as critical thinking and participation is strongly connected to innovativeness.

Previous research regarding innovativeness in education has focused on teaching and learning materials currently used in the subject *Sachunterricht* (Weis, 2016).² As the results reveal, these textbook tasks (Kraft, 2014) are hardly associated with a humanistic ideal of education, but implicitly follow a more neoliberal educational praxis (see also Krautz, 2007):³ The analysed tasks do not tend to foster or evoke innovativeness—neither directly nor indirectly (e.g. by fostering skills or abilities that can be linked to innovativeness) (Weis, 2016; see also Weis et al., 2017a, 2017b). For example, out of 495 tasks only about 14% of the tasks foster critical thinking, e.g. by inviting pupils to reflect on results, to formulate questions/hypothesis, or to compare certain scenarios (ibid). No tasks could be identified that enable pupils to present their own ideas in a creative way. Instead, closed task types are dominant, which provide defined response options (ibid).

Since initial research has shown that materials currently used in *Sachunterricht* neither foster or evoke innovativeness nor meet humanistic educational goals (Weis, 2016; see also Weis et al., 2017a), our present research projects seek more fruitful approaches to finding methods that evoke or foster innovativeness in education (Scharf, forthcoming; Weis, forthcoming; Weis et al., accepted, 2017b). In addition, we attempt to widen the field by extending the research object to include those teaching and learning materials and approaches that are promising in terms of their innovativeness but that have not necessarily been authored for *Sachunterricht* (Scharf, forthcoming). We attempt to achieve this by conducting an initial explorative documentary research (e.g. Mayring, 2002) on interdisciplinary teaching and learning approaches which include valid instruments to evoking or fostering innovativeness in schools. This research aims to find fruitful approaches that can be transferred to *Sachunterricht*. Therefore, in the following section, the model of Innovativeness (Weis et al., 2017b; see also 2017a) will be introduced first as the theoretical framework for the conducted research. Subsequently, the method and the results of the explorative documentary research will be presented.

¹ Fruitful grounds to foster innovativeness are not only limited to *Sachunterricht*, but extend to further educational contexts (the importance of participation is stressed in education policy in general (Weis et al., 2017a) and by several other subjects in particular as outlined above) as well as informal learning contexts that are described as “spaces of the in-between” by Gryl et al. (2017).

² The analysis (Weis, 2016; see also Weis et al., 2017a) is based on a category system developed by Weis (2016), which contains didactical frameworks relevant for the subject (GDSU, 2013; MSW, 2008) as well as for innovativeness (Gryl, 2013; Jekel et al., 2015; Scharf et al., 2016; see also Weis et al., 2017a).

³ In a neoliberal educational praxis education aims primarily to market-readiness (e.g. Ptak, 2010, cited in Gille, 2013; Liessmann, 2006) whereas a reflexive analysis of the world and the options of social resistance and participation (Gille, 2013) fade into the background (Gryl/Naumann, 2016; see also Scharf et al., 2016).

Theoretical Framework:

The Model of Innovativeness

Based on Jekel et al. (2015; see also Gryl, 2013, Scharf et al., 2016), Weis (2016, p. 35, *ibid.*) defines *innovativeness* as “the ability to participate in the innovation process”. Since individuals—in this case pupils—shall not only be able to participate in only one particular innovation process, but in innovation processes in general, this paper broadens the definition of innovativeness to include this plurality. This ability to participate in innovation processes contains three components: reflexivity, creativity and implementivity (Jekel et al., 2015; see also Gryl, 2013; Weis et al., 2017a, 2017b). (1) *Reflexivity* is “the ability to question current circumstances and reflect on (own) actions and point out issues” (Weis et al., 2017b, p. 386/4; see also 2017a; Gryl, 2013; Jekel et al., 2015). (2) *Creativity* means “the ability to develop new ideas, named *inventions*, as solutions for stated issues” (*ibid.*), and (3) *implementivity* is “the ability to convince others of the need to overcome issues through [...] developed solutions” (*ibid.*). These components are needed to participate in innovation processes, meaning to innovate (Weis et al., 2017b).

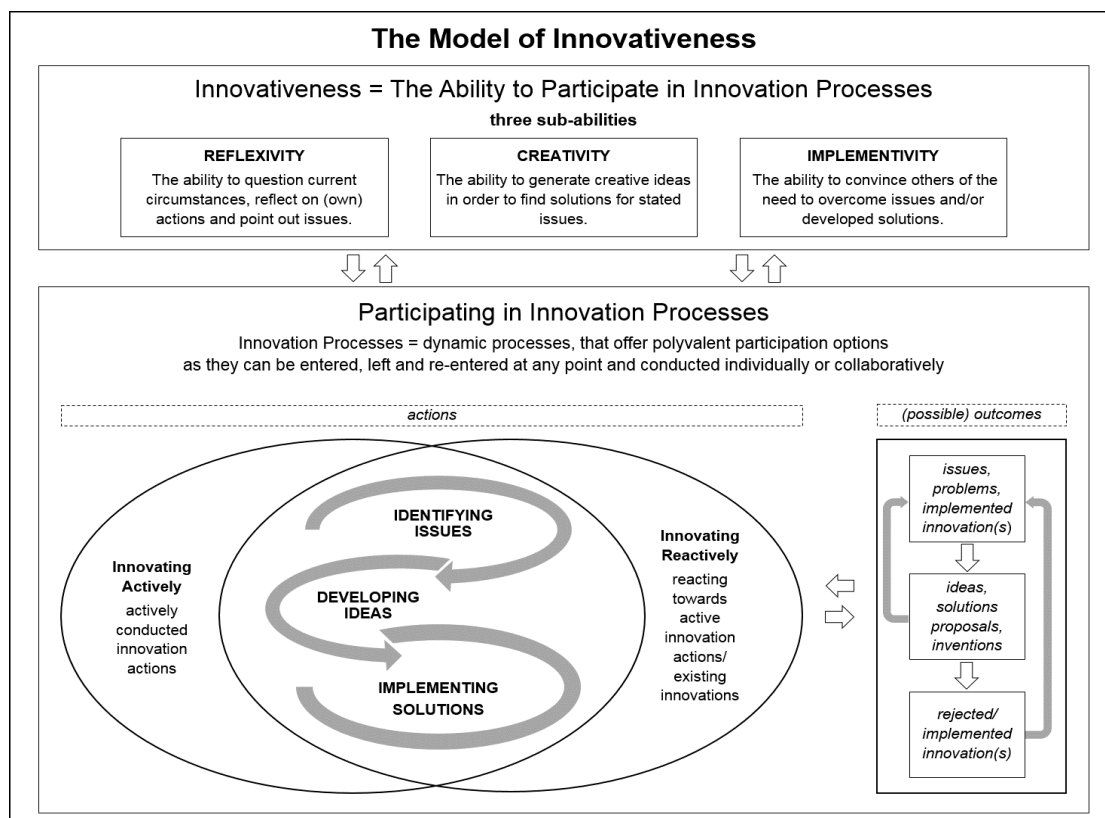


Figure 1: The model of Innovativeness (Weis et al. 2017b, p. 386/5).

Innovation processes contain three phases: *identifying issues*, *developing solutions*, and *implementing solutions* (*ibid.*). Figure 1 illustrates the model of Innovativeness, outlined by Weis et al. (2017b, p. 386/5; see also 2017a), including the relationship between abilities and innovation processes.

The three components are important at any point of this process (*ibid.*) because people need to be creative not only to develop a solution, but also to implement it. Since

innovation processes are dynamic, they “can [potentially] be entered, left and re-entered by [...] participants at any point” (Weis et al., 2017a, p. 213; see also Weis, 2016). In addition, people can participate in innovation processes individually or collaboratively (Weis, 2016). Thus, participating in innovation processes is not inevitably bound to participation in the whole sub-processes (ibid.). Furthermore, one can innovate either *actively*—meaning one takes an active role in the described processes or certain phases of the processes (Scharf et al., 2017, 2016; see also Hartmann & Meyer-Wölfling, 2013; Weis et al., 2017b)—or *reactively* (ibid.). Innovating reactively refers to reactions to issues and (implementations of) solutions (ibid.). Thus, reflexivity plays an important role in the identification of issues as well as in reactively innovating in general. Stated issues and (implementations of) solutions can both be presented by others, and developed by means of intrapersonal communication (West & Turner, 2010). Due to possible rejections of the quality seal named *innovation* (Scharf et al., 2016), innovation processes and within these processes developed inventions do not necessarily lead to innovations (Weis et al., 2016a). New production technologies can fail if they do not fit the cultural habits of use (Degele, 2002): for example, the new production technology of a hybrid corn by farmers in New Mexico in the 1940s was not successful as tortillas made from this corn were not as soft and considered less tasty than before, which lead to the use of the former production method (Volti, 1995, cited in Degele, 2002). Therefore, development and usage of solutions go hand in hand (Degele, 2002), and innovation processes consist not of linear, but alternating variations, as well as selections of designs and construction of issues as Pinch and Bijker (1987) illustrate with the invention of the bicycle (see also Degele, 2002).

The critical and reflexive approach of innovativeness described above mirrors the aims of the humanistic educational ideal (Humboldt, 1792/93) in which education fosters people’s awareness of their responsibility towards themselves and their environment. This ability enables people to have an emancipatory attitude (Heydorn, 2004), and helps to develop political maturity (e.g. Zichy, 2010; see also Scharf et al., 2016; 2017, Weis et al., 2017a).

According to the model of Innovativeness, participating in innovation processes is highly demanding. However, the detailed illustration of the components and sub-processes can indeed be analysed by using a documentary research approach. This in turn can show the possibility of triggering components and/or sub-processes in order to evoke or foster innovativeness, even though innovativeness as a whole is not a topic addressed in the teaching and learning approaches itself.

Documentary Research:

Analysing Interdisciplinary Teaching and Learning Approaches

As the model of Innovativeness is in an early phase of its development, there is hardly any shared knowledge on innovativeness that would allow a quantitative approach (Kelle, 1994). According to him new knowledge neither evolves through generalisation of observations made without a theoretical background (induction), nor through speculative verbalisation of hypotheses (deduction). Instead, he argues for an abductive approach which combines theory and empirical work as a methodology for empirically reasoned theory construction (ibid.). In this context, Kelle and Kluge

(1999) plea for integrating empirical and theoretical work and a flexible analysis model in terms of a theoretical-driven qualitative approach (see also Weis, 2016). Following this, we used a documentary research approach (Mayring, 2002) in a first and explorative search of interdisciplinary teaching and learning approaches that evoke or foster innovativeness. The initial results are presented in this paper.

The main research questions are:

1. *Which teaching and learning approaches exist in schooling environments that foster or evoke innovativeness?*
2. *Which teaching and learning approaches exist in schooling environments that foster or evoke at least one of the three components of innovativeness: reflexivity, creativity, and implementivity?*

In order to answer these questions, we selected those teaching and learning approaches that had the potential for fostering or evoking innovativeness. We assume that pupils may also be innovative before they are exposed to a learning environment that evokes innovativeness and that therefore both scenarios—that of pupils learning to be innovative, and that they strengthen their existing innovativeness—are conceivable. Therefore, we differentiate between teaching and learning approaches that may evoke, and those that may foster pupils' innovativeness.

In accordance with Reimann and Mandl (2006) we define teaching and learning approaches as the construction of a learning environment considering certain didactical and methodological aspects which aim to impart and allow the acquisition of interdisciplinary abilities. Conforming to them and Reich (2005), we focus on constructivist learning theories and therefore constructivist teaching and learning approaches since those foster autonomous learning (*ibid.*). As Reinfried (2007) states, learning is a process which is active, self-regulated, constructive, emotional, social, and situational. Interest-related—and thus autonomous—learning leads to a subjective experience of positive emotions (Wild et al., 2006) which can result in an experience of flow (Csikszentmihályi, 1990). This experience can be characterised by the ability to concentrate on the actual activity; a change of the time perception; and a loss of negative concerns (*ibid.*). Besides, autonomous learning—following constructivist learning approaches—fosters intrinsic motivation (Wild et al., 2006) and fulfils one of the main psychological needs which is to experience autonomy (Deci & Ryan, 1993). Therefore, materials that provide the solution process(es) to given tasks, which to us would lead to avoiding pupils' independent mental construction, deconstruction and reconstruction of the world (Reich, 2006) was not considered in the analysis presented in this paper.

Following a humanistic education ideal (Humboldt, 1792/93), any corporate materials were also excluded from this analysis, as companies aim to convince pupils subversively that their products, methods or services are useful and reasonable (Kamella, 2013).⁴ Due to pragmatic reasons and its explorative character, the research presented in this paper is also restricted to German teaching and learning approaches

⁴ We are aware that materials from school publishing houses are also subject to an economically driven sales agenda. Nevertheless, these providers are more likely to stick to state and public educational goals than lobby materials.

provided for schools (and not for universities, colleges, vocational schools, or adult education centres).

This initial and explorative enquiry leads to three main categories of possibly valuable teaching and learning approaches which represent powerful societal education approaches that may be used for education for innovativeness, particularly in *Sachunterricht: education policy, progressive education, and pupil competitions*.⁵ These will be presented next.

Education Policy

Education policy can be understood as “state measures that aim to reform the education system” (bpb, 2016, tbta). In order to be part of this category, German teaching and learning approaches need to be recommended by a German ministry and/or provided by an institution/association which is funded by the German Federal Government.

This field was picked because education policy-recommended teaching and learning approaches may resonate with the political-educational claims of participation outlined above. Therefore, provided and/or recommended approaches from the *Bundeszentrale für Politische Bildung* (Federal Centre of Political Education) (bpb, n/d a), the *Verbraucherzentrale* (Consumer Advice Centre) (Verbraucherzentrale, 2017) and the *Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen* (Ministry of Education of North Rhine-Westphalia) (MSW, 2017) were analysed for initial research.⁶ We focused on the state of North Rhine-Westphalia because of convenience (we live and work in this state) and because of the obligation of North Rhine-Westphalian standards for schooling in this federal state.⁷ For this analysis, we did a word-search of the databases provided by these institutions, using terms derived from the model of Innovativeness. These were: *Innovativität* (innovativeness), *Innovation* (innovation), *Reflexivität* (reflexivity), *reflektieren* (reflect), *implementieren* (implement), *partizipieren* (participate), *Partizipation* (participation), *Mündigkeit* (maturity), *Problemlösen/Problem lösen* (problem solving), *gestalten* (shape), *erfinden* (invent).⁸ The usage of these search terms allows a broader view on the evoking or fostering of innovativeness by teaching and learning approaches as the limited usage of only the outlined key terms of the model of innovativeness would provide. The results were then examined according to the model of Innovativeness, i.e. constructivist learning approach, focus on reflexivity, creativity, and/or implementivity.

In contrast to the claims for participation made by the German education policy, only a few recommended teaching and learning approaches could be identified that would

⁵ Future analyses may identify further approaches that foster or evoke innovativeness that can be used in *Sachunterricht*.

⁶ As these entities do not involve all German education policy institutions/associations, further research is planned on other educational policy institutions/associations described above, for instance *Bundeszentrale für gesundheitliche Bildung* (Federal Centre for Health Education) (BZgA, n/d), and *Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit* (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) (BMUB, n/d) (Scharf, forthcoming).

⁷ In Germany each federal state has its own, independent educational policy.

⁸ Further analysis will be extended to other word-searches related to the model of Innovativeness, e.g. *Kreativität* (creativity), and *innovieren* (innovate) (Scharf, forthcoming).

evoke or foster innovativeness. Actually, approaches of the *Bundeszentrale für politische Bildung* (bpb, n/d a.) do not seem to be valuable for education for innovativeness at all. The results are presented in table 1.

<u>Education policy source</u>	<u>category</u>	
	(1) civic participation/debating	(2) inventing/shaping
<i>Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen (Ministry of Education of North Rhine-Westphalia) MSW (2017)</i>	“Pupils Develop their Civic Consciousness on the Example of the Conflict of the Commuting Allowance” (Schulentwicklung NRW, 2010, tbta)	“Colourful Shaping, Developing and Collaging of City Pictures” (MSW, 2009, tbta)
	“Debate: Internet as School Subject?” (MSW, 2004, tbta)	“Pupils Invent Tasks of the Right-Angled Triangle” (Gymnasium Hohenlimburg, 2007, tbta)
	“Participation in Municipal Decision Making Processes” (MSW, n/d, tbta)	
<i>Verbraucherzentrale (Consumer Advice Centre) (Verbraucherzentrale, 2017)</i>	“Wikipedia. Shaping Knowledge Together” (Rack et al., 2014)	“Making Activities with Children” (Schön et al., 2016, tbta)
<i>Bundeszentrale für Politische Bildung (Federal Centre of Political Education) (bpb, n/d a)</i>	--	--

Table 1: Possible teaching and learning approaches that evoke or foster innovativeness recommended by education policy (own research).

To pool the teaching and learning approaches which possibly evoke or foster innovativeness recommended by education policy, two categories were established: (1) *civic participation/debating*, and (2) *inventing/shaping*. To qualify for the first category, approaches needed to focus on the pupil’s civic participation and/or debating skills. For example, in one approach of this category, pupils learn how to share their knowledge on Wikipedia (Rack et al., 2014). Civic participation and debating are combined because debating plays a big role in convincing others of one’s own civic interests and because the only example on debating is an educational political topic which indeed is also about civic participation (e.g. if the internet should become a school subject; Schulentwicklung NRW, 2010). To qualify for the second category, approaches needed to ask pupils to invent or shape something new. The approach “Making Activities with Children” (Schön et al., 2016, tbta) for instance provides open learning spaces where pupils can realise their own ideas in workshops (ibid.) (see table 1).

Progressive Education

We decided to consider progressive education as teaching and learning approach that possibly evokes or fosters innovativeness since these education approaches focus on the child’s needs and interests; activity; creativity; and lifeworld (Skiera, 2003) which are in accordance with the model of Innovativeness. According to these progressive approaches, school and civic lives are seen as belonging together (ibid.). Humanisation as well as democratisation of school life lies in the centre of education processes (ibid.). Progressive education is aimed at pupils who are seen as complex and comprehensive individuals, and therefore does not focus only on certain skills

derived from neoliberal standards (ibid.). The didactical-methodological focus on aesthetic learning, interdisciplinarity, participation and pupil's autonomy (ibid.) of this approach resonates with the model of Innovativeness as well. In these types of approaches, our analysis focuses on already established progressive education models, based on Skiera (2003) with respect to the model of Innovativeness (Weis et al., 2017b), which will be presented in the next section.

Montessori School (e.g. Montessori, 1976) seems to foster innovativeness because it offers education within an environment that invites pupils to use provided materials on their own, both individually and collaboratively. Thus, the teacher's role is less focused on teaching in a classical sense, and more on supporting learning processes by arranging a fruitful environment for material usage, and supporting pupils to act autonomously (Skiera, 2003). However, Montessori School does not meet the claim for innovativeness presented in this contribution because of its focus on *Cosmic Theory* and *Cosmic Education*. The former describes in a messianic way the child as the epitome of a prospectively improving world and the latter aims at global responsibility and harmonisation of the world which seems to be reasonable, but is a heavy load for the pupils (ibid.). In addition, Montessori School contains obedience as an important factor to control pupils' deviant behaviour. According to constructivist learning theories (Reich, 2005; Reimann & Mandl, 2006) and the model of Innovativeness (Weis et al., 2017b), we view obedience as restricting innovativeness because creativity from this perspective is fostered by unconventional habits (e.g. Ritter et al., 2012; see also Weis et al., 2017a) and therefore inhibited by obedience (see also Gryl, 2013). As one of the most known progressive education concepts, *Waldorf Education* (e.g. Steiner, 2010 [1907]) also seems to foster innovativeness at first sight, since the role of the teacher is to support pupils in their almost independent acquisition of *fitness for life* (Skiera, 2003). However, a closer look at this teaching and learning concept reveals several problems: Firstly, the underlying theoretical concept consists of the outdated and untrue proven theory of the four humours (different body fluids which influence a person's character) (ibid.), which therefore cannot support education for innovativeness. Secondly, human beings are seen as a mirror of the cosmos, whereby attention to spiritual matters supposedly allows access to higher worlds (ibid.). Such a focus is not compatible with education for innovativeness. Thirdly—, and most importantly, with respect to the model of Innovativeness,—Waldorf Education does not focus on constructivist teaching and learning settings (ibid.).

In contrast, the *Dalton Plan* (e.g. Popp, 1995), the *Jena Plan* (e.g. Petersen, 1937), the *Modern School Movement (Freinet)* (e.g. Boehncke & Hennig, 1980), and the *Alternative School* (e.g. Borchert, 2003; Bundesverband der Freien Alternativschulen, 1992) may provide valuable concepts for education for innovativeness. All of these progressive education concepts have in common that they focus on the pupil's autonomy and responsibility which is in accordance with education for innovativeness. Learning takes place in a constructivist manner where the teacher is the organiser and facilitator supporting the pupils' learning processes. These take place especially in art studios which support autonomous learning and creativity by open learning environments. Table 2 illustrates and compares the key features of these Progressive education concepts, based on Skiera (2003).

	Dalton Plan	Jena Plan	Modern School Movement (Freinet)	Alternative School
Child Anthropology	autonomous unit of society	Needs: among others creative participation in the world. (self-) responsibility	determines its own development	autonomy
Educational principles	freedom, responsibility, cooperation	interdisciplinary learning, emancipatory education	autonomous learning	participation, democracy, systemic thinking, responsibility
Teacher	encouraging, appreciating	organises pupil's learning processes	consultant/tutor, no teacher-centred teaching	not hierarchical, supportive, consulting, organising
Methodological-didactical aspects	among others subject-corner (ateliers), laboratory, conferences, individualised learning	interdisciplinary, project focused education	among others ateliers, atelier library, free presentations, individual working plan	self-responsibility, project-/teamwork, learning reports instead of grades, classroom as atelier

Table 2: Key features of progressive education concepts which might be valuable for education for innovativeness (own research, based on Skiera, 2003, p. 286-287, 309-310, 328-329, 352-353).

Pupils' Competitions

We identified pupils' competitions as potentially valuable instruments to support education for innovativeness as they provide new learning cultures through an activity-oriented setting and project work (Winter, 2015). For the analysis, pupils' competitions were examined that fulfil the criteria of the *Kultusministerkonferenz* (KMK), which is that competitions need to support the development of pupils' individual talents; foster innovative teaching and learning approaches, communication between participants, and school development. In addition, participation needs to take place voluntary; information, judging, implementation, and sponsorship need to be transparent; and not only the results, but also the process of taking part in a pupils' competition needs to be valued (KMK, 2009).

Three of the four KMK's (2009) contest categories provide fruitful teaching and learning scenarios: (1) *Linguistic-literary-artistic competitions*, (2) *mathematical-scientific competitions*, and (3) *social-scientific competitions* (ibid.). From the first category, several competitions might foster innovativeness (see also KMK, 2009):

- "International Film Festival Hannover 'up and coming'" (Bundesweites Schüler- und Videozentrum e.V., 2017, tbta);
- "Theatre Meeting of the Youth" (Berliner Festspiele, n/d a, tbta);
- "Meeting of Young Authors" (Berliner Festspiele, n/d b, tbta);
- "Meeting of the Young Music Scene" (Berliner Festspiele, n/d c, tbta);
- "Federal Competition Youth Makes Music" (Deutscher Musikrat, 2017, tbta);
- "Federal Competition Youth Composes" (Jeunesses Musicales Deutschland, e.V., n/d, tbta);
- "Children go to the Mt. Olympus" (Kulturstiftung der Länder, 2015, tbta);
- "Youth Jazzes" (Deutscher Musikrat, 2016, tbta).

Possibly valuable competitions in category (2) are (see also KMK, 2009):

- “Federal Competition Mathematics” (Bildung & Begabung, 2017, tbta); and
- “Federal Competition Informatics” (BWINF, n/d, tbta).

The named competitions in category (1) demand inventive, unconventionally provocative individual movies, pieces, or texts, in which children/teenagers bring their own topics up for discussion in a creative form. In addition, the choice of genre, topic, and in the case of “Meeting of the Young Music Scene” (Berliner Festspiele, n/d. c, tbta) the choice of language is also open, which provides open learning spaces. In the later stages of the named competitions in the second category, a problem needs to be discussed with a mathematician or information scientist, which may foster innovativeness, especially towards the component implementivity. However, these competitions might foster innovativeness more than they evoke it, since there seems to be no support in innovation processes itself, but innovative results seem to be particularly honoured.

In contrast, the social-scientific competitions in the category (3) outlined by KMK (2009) might evoke innovativeness, as the following selected competitions illustrate: To participate in the “School Competition for Civic Education” (bpb, n/d b, tbta), pupils need to organise a project on their own where they implement children’s rights; solve problems emerging from ideals of beauty; develop possibilities of a cashless society; or create a children’s news programme (ibid.). “The European Competition” (Europäische Bewegung Deutschland e.V., n/d, tbta) asks for an application to the European Cultural Capital (ibid.), and “Youth Incorporates” (Steinbeis Innovationszentrum Unternehmensentwicklung, n/d, tbta) allows participating teenagers to develop and implement a business idea via simulation (ibid.). By taking part in the “School Competition for Development Policy of the Federal President” (Engagement Global, 2015/16, tbta) as well as in the “Competition Promotion Programme Democratic Agency” (Beutel, 2014, tbta), pupils can liberally chose and develop a project on development policy (Engagement Global, 2015/16), or on everyday life in school and social work, which enables the development of their agency towards responsibility (Beutel, 2014). Further competitions which possibly evoke innovativeness, especially those potentially leading to implementing solutions, are “Youth Debates” (Hertie-Stiftung, n/d, tbta) where pupils are challenged to develop/improve their argumentation skills; and the “School Magazine Competition” (Jugendpresse Deutschland e.V., n/d, tbta) which honours pupils’ self-created newspapers (ibid.). Thus, the presented competitions may evoke innovativeness and are thus similar to simulations, which Weis et al. (2017b; accepted) and Weis (forthcoming) consider as a valuable instrument for education for innovativeness.

Conclusion and Outlook:

Towards Teaching and Learning Approaches for Education for Innovativeness

To foster education for innovativeness in *Sachunterricht*, it is important to analyse existing teaching and learning approaches as Weis (2016; see also Weis et al., 2017a) did. The initial research showed that *Sachunterricht*-related material hardly evokes innovativeness (ibid.). In search for material that evokes or fosters innovativeness for the use in *Sachunterricht*, it is important to broaden the research field, and to analyse

interdisciplinary approaches which can be used for this subject. This paper provided a first and explorative step towards a documentary research approach on interdisciplinary teaching and learning approaches that evoke or foster innovativeness, and approaches which evoke or foster at least one of the components of innovativeness. In doing so, the first results identify three main categories—education policy, progressive education, and pupils' competitions—and thereby specific teaching and learning approaches associated with these categories.

The next step will be to take a closer look at the identified approaches by leaning on grounded theory methodology (e.g. Glaser & Strauss, 1967; Strauss & Corbin, 1998). The approaches will then be used as an inspiration for the development of own teaching and learning approaches that evoke or foster innovativeness with a focus on simulations (Weis et al., 2017b; accepted; Weis, forthcoming). Moreover, we aim to expand our research on promising teaching and learning approaches in other German federal states in addition to North Rhine-Westphalia, in other countries and in other teaching and learning contexts in addition to schools (namely university; college; vocational school; and adult education centres) (Scharf, forthcoming). Following that, our assumptions will be tested and evaluated using mixed-methods (i.e. interviews, participant observation, and videography) (ibid.; Weis, forthcoming).

We also aim to further specify the model of Innovativeness (e.g. Weis, forthcoming; Scharf, forthcoming). Therefore, we will focus on the terms *creativity* (e.g. Scharf et al., accepted) and *innovation* (e.g. Gryl et al., forthcoming), and are planning to distinguish innovativeness from problem-solving ability, life skills, creative thinking, critical thinking, and discovery-learning. Moreover, we are focussing on the importance of language and debating abilities (e.g. Council of Europe, 2001), as well as collaborative abilities and innovation networks.

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Contact email: claudia.scharf@uni-due.de