NEW AND EVEN NEWER
FOSTERING INNOVATIVENESS IN PRIMARY EDUCATION

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Abstract

This paper describes the need for the implementation of an education for innovativeness. Innovativeness as ability to participate in innovation processes is a competence closely linked to participation processes in a dynamic, ever-changing society that needs mature citizens that shape the present and the future in accordance with their ideas, interests and social responsibility. This involves questioning current circumstances (reflexivity), developing new ideas (creativity) and bringing those ideas into action (implementivity), which are the three core dimensions of innovativeness. As innovation processes are complex and dynamic, and as a creative idea does not necessarily lead to an innovation, participating in the innovation process can occur in an active, idea-creating manner, and/or in a reactive, innovation-evaluating and implementing orientation as well. An education for innovativeness addresses all these dimensions. This paper outlines, that current educational-political documents in the case of Germany are nominally supportive towards an education for innovativeness by promoting the ability to participate. However, these calls do not meet the standards of innovativeness: Firstly, because the term of innovation is fuzzy and dominated by catch-word usage, and, secondly, because innovation and participation are mostly obligated to a neoliberalist ideal that does not support mature societal changes but a consolidation of a given framework. Widely deepening the rudimentary educational-political calls for participation, this paper, instead, argues for a humanistic perspective on the innovation process in accordance with the humanistic ideal of education, allowing real participation and future- and development-oriented structuring of society. The case of the German subject 'Sachunterricht' (Primary Social and Science Education) illustrates that innovativeness can be taught in school – even in the early years – particularly, when it comes to interdisciplinary thinking and linkages to everyday scenarios. Nevertheless, a schoolbook task analysis regarding the subject 'Sachunterricht' reveals that there is almost no fostering of innovativeness in this given material right now, leaving space and obligation to develop concepts and instruments that foster innovativeness in school.

Keywords: innovativeness, innovation, participation, elementary education, Primary Social and Science Education, schoolbook analysis, task analysis

1 LEGITIMATION – INNOVATIVENESS AS ESSENTIAL OBJECTIVE OF A HUMANISTIC EDUCATION

Nowadays, educational goals have to be justified from a perspective which considers the openness and uncertainty of the future in a changing world (Schnack & Timmermann, 2008). Following this, school needs

to create open learning spaces that do not only offer room to acquire defined skills and competences but (moreover) can enable pupils to actively participate in questioning and shaping current and prospective societies (Weis, 2016). Therefore, this contribution seeks to implement innovativeness in teaching and learning arrangements as instrument to learn and experience participation and to gain maturity. By utilizing a concept of innovativeness, we will be able to transfer the humanistic ideal of teaching and learning as well as general educational standards to the primary education practice.

For this purpose, we firstly distinguish humanism from neoliberalism in education as foundation of our thoughts and will, ongoing from basic approaches and limitations of the promotion of innovativeness in educational policy (focused on the case of Germany) come to a more profound definition of innovativeness by merging innovation theories from different disciplinary perspectives. Following, we will analyze how school subjects such as the German 'Sachunterricht' (Primary Social and Science Education, an interdisciplinary subject from grade one to four) can enable students to innovativeness, and investigate whether this opportunity is considered in the subject's schoolbooks.

1.1 A changing world – Education between neoliberalism and humanism

The modern world is rapidly changing, influenced by accelerated and contradicting information and facing uncertainty about what the future holds. Furthermore, so-called 'innovations' – promising to improve current circumstances – emerge everywhere and influence society in a complex manner. Due to this complexity, pluralism and unclear future, society is and will be constantly challenged to react to (unexpected) changes (Postman & Weingartner, 1973; Gryl, 2013). This requires people from all ages to develop a critical mindset in order to reflect on these dynamic changing processes, to develop the ability of (re-)acting competently, and to participate in societal decision making processes according to the very own understanding of how the world should be changed and shaped in future (ibid.; Scharf, Schmitz & Gryl, 2016).

However, education that leads to competences to handle the current world, can follow highly differing guidelines: The neoliberal claim of being efficient on the one hand and the humanistic ideal of literacy as a grace of humankind on the other hand. These claims form a current substantial contradiction, particularly in education. The understanding of this contrast is an important basis of the approach of innovativeness in education. Neoliberal educational settings aim at competitiveness, economic success and growth (Bellmann, 2005; Faschingeder, Leubolt, Lichtblau, Prausmüller, Schimmerl & Striedinger, 2005). The requirement of so-called 'lifelong learning' may serve as one concrete example of neoliberal practices as it is presented as an instrument for self-optimization but indeed functions as a lifelong compulsion of keeping up with others (perceived as competitors) and being "*fit for the job*" (Tuschling, 2004, p. 157). Following this particular idea of learning throughout their whole life, pressures people to ever improve themselves by learning societally demanded skills (Foucault, 2004; cf. Rouff, 2009; Gryl & Naumann, 2016). People become "companies of themselves" (Rouff, 2009, p. 199, translated by the authors; Foucault, 2004; cf. Gryl & Naumann, 2016) within a given framework of required development. The neoliberal aims are therefore "truly subversive since they undermine our chances of surviving as a viable, democratic society" (Postman & Weingartner, 1973, p. 15). In this sense of education, critical thinking is fairly possible but current systems shall not be raised to question (cf. Liessmann, 2006; Krautz, 2011; Gryl & Naumann, 2016).

In contrast, the main goal of humanistic education is understanding the world, according to the humanistic educational ideal (Humboldt, 1792/93). Here, education is seen as a self-activity without primary valorization (Gryl & Naumann, 2016). Nevertheless, education helps people to become aware of their own responsibility for themselves and their environment. This responsibility enables an emancipatory attitude (Heydorn, 2004) and therefore fosters political maturity (cf. Zichy, 2010). Society does not aim at generating people who can solve known problems, but people who can identify problems, name them, and develop new solutions. If the purpose of education thus is to reveal and impart societal charged relationships in terms of reflexivity (Bünger, 2009), education cannot be exploited (and commercialized) (Gryl & Naumann, 2016).

Bringing together the humanistic ideal of education and the everyday scenario of a changing world, the importance of innovations and an active role in the innovation process is undoubted (Vahs & Brem, 2015). Innovativeness – "the ability to participate in the innovation process" (Weis, 2016, p. 35, translated by the authors) – is key for empowerment and participation according to the humanistic ideal (Weis, 2016; cf. Gryl, 2013; Jekel, Ferber & Stuppacher, 2015; Scharf et al., 2016). This ability does not only contain the capability of yielding innovations – the active innovativeness – but also the critical reaction towards what is presented as an innovation, i.e., by society, and thus the awarding or rejecting of the seal of quality which names the novelty 'innovation' – the reactive innovativeness (Scharf et al., 2016; cf. Hartmann & Meyer-Wölfing, 2003). Therefore, this contribution will discuss in which sense current educational standards claim active and reactive innovativeness within the context of participation.

1.2 Participation – A starting point for innovativeness in educational policy

In the following, the example of German educational policy shall illustrate, how the educational system deals with the challenges of a changing world. In the past, there have been multilayered changes of the educational system in Germany, especially since the publication of the results of the latest PISA report (Largo, 2013); meaning, the educational system has been subject of innovation itself. Overall, one can identify various approaches regarding content and implementation of reforms within the federal German education system, for instance, a wide range of concepts for all-day schools. Whereas not all of these agenda plans point in the same direction, there seems to be a broad – at least nominal – consensus about general educational goals: Education should not only aim at learning facts and specialized competencies (Klieme, Jude, Baumert & Prenzel, 2010) but also at interdisciplinary abilities that help learners to participate actively in their (everyday and/or future) life. Pupils need to learn to question, assess and alter not only their own learning processes but also their whole environment (Weis, 2016).

Aims such as these are stated out by several German departments of education. For instance, the Standing Conference of the Ministers of Education and Cultural Affairs (KMK) and the German UNESCO commission underline the importance of fostering participative performance within the Agenda 21, a program that focuses on participation of all societal groups in the process of sustainable development in schools (KMK, 2007).

Similarly, the overall educational curricula of North Rhine-Westphalia, one of the German federal states, proclaims the development of pupils concerning autonomous decision making and taking action as important educational task to enable them to participate responsibly and to shape their own life (Schulentwicklung NRW, 2008, cf. MSW, 2008). Thus, pupils shall learn especially how to act independently, to learn for themselves as well as in cooperation with others and to present their own view but also to respect the opinions of others (ibid.).

Also the North Rhine-Westphalian curriculum for the subject 'Sachunterricht' correlates with this by pointing out that pupils should learn to exploit, orient and participate responsibly (MSW, 2008). According to the German Association for the Didactics of Primary Social and Science Education (GDSU), the purpose of 'Sachunterricht' is to support pupils "to understand their environment, to orient themselves in it and to participate and act within it" (GDSU, 2013, p. 9, translated by the authors). 'Sachunterricht' is a particularly useful example to illustrate the interaction between educational aims and everyday life, but also other subjects, like social sciences and geography for instance, aim at enabling learners to act and participate in a changing world. In sum and in coherence with Weis (2016), it can be stated that German educational guidelines stress the importance of enabling and empowering pupils for orientation and participation as purpose and aim of education.

This overall claim for participation is again, and as we have outlined above, a starting point for innovation, as participation is an essential aspect and aim of innovation. Albeit, innovation seems to be a broad concept, so we have to define it more precisely in order to differ educational agendas behind, that range from neoliberalism to humanism (in education), and to come to a humanistic idea of participation.

2 THEORETICAL STRUCTURE – FROM A FUZZY TERM TO A PROFOUND FRAMEWORK

As mentioned, 'innovation' is a fuzzy, ambiguous and contextual term, used in different disciplines, and not yet (consistently) defined (Moldaschl, 2010). Furthermore, with its usage, a theoretical background is rarely provided (Nahrstedt, 1988). In order to instrumentalize innovation and innovativeness to empower children, the term needs to be sharpened (Gryl, 2013). Consequently, the following remarks lead from an analysis of the differing meanings of the term to a more profound definition.

2.1 Various disciplinary perspectives – The many faces of the innovation term

Mainly, innovation is described from an economic perspective (Rammert, 2010), and even on a political level, innovation mostly means economic competitiveness (acatech, 2013). Here, innovation is seen as the economic implementation of a new idea, meaning development, implementation and utilization of new approaches, processes, products or procedures that improve the (everyday) life of individuals and groups as well as the conditions for organizations and companies (Maier, Frey, Schulz-Hardt & Brodbeck, 2001). In the neoliberal sense described above, innovation is an instrument to be competitive (John, 2005). For this, innovation must be predictable and plannable to meet the requirements of an economic definition (Godin, 2008; Gryl, 2013). The planning of innovations is part of the so-called innovation management (cf. Braun-Thürmann, 2012). Wehle (1973) names this orientation conservative innovation (Nahrstedt, 1988; cf. Scharf

et al. 2016).

From a social-scientific viewpoint, innovations are not limited to the economic sector. Moreover, innovations emerge out of society as a whole (Rammert, 2010; 2012; Nahrstedt, 1988). The focus of the social-scientific innovation research lies on the relevance of social developments in the innovation process and their influence on society (Howaldt & Jacobsen, 2010). This includes the social conditions, the interrelationship of technical and social innovation (which can be questioned, cf. Rammert, 2010), the institutional context, the interaction of the participants and the organization of the innovation process (Howaldt & Jacobsen, 2010). Besides social innovation, there are other types of innovation. Political innovation, for instance, describes the efficient manner to make politics and techniques of reigning and controlling (Rammert, 2010). Similarly, artistic innovation refers to radical changes in arts (ibid.). However, Rammert (2010) names as reason for the common focus on technology and economy regarding societal, economic and political questions of innovation the easier measurability. In an overall social-scientific sense, innovation means strategies that intentionally improve something in contrast to former solutions (John, 2013). When it comes to innovation as a result of an emancipatory process with a social-critical concept, Wehle (1973) names this approach 'progressive innovation' (in contrast to the described conservative form of innovation) (Nahrstedt, 1988; cf. Scharf et al. 2016).

In a pedagogical context, according to Gröschner (2013, p. 306, translated by the authors), "innovation is an active process of development and change which consists of individually constructed and autonomous learning processes in a reflexive, social realm of experience". This perspective asks how pupils can learn the ability to participate in innovation processes (Gryl, 2013; Jekel et al., 2015; Scharf et al., 2016; Weis, 2016). Neuroscientific research may help to find solutions. For instance, new synapses sprout during the development of new solutions of existing problems (Holm-Hadulla, 2010). To enable this process, known schemes must be broken (Heilman, Nadeau & Beversdorf, 2003; cf. Ritter, Damian, Simonton, van Baaren, Strick & Derks, 2012). In contrast to the economic perspective, in a pedagogical viewpoint, innovation cannot be planned (Eickhorst, 1981; John, 2013). As Gryl (2013) and Jekel et al. (2015) point out, an innovative idea, product or process must be implemented to be deemed as such. It is the society which imparts this change and therefore marks it as an innovation (Scharf et al., 2016; cf. Rammert, 2010). This phenomenon is addressed by the idea of reactive innovation mentioned above.

2.2 Innovativeness – Extending the idea of the ability to participate in educational settings

Even if these approaches differ in some respects, they have in common that 'innovations' are connoted positively and aim at improving present circumstances (Gryl, 2013; Weis, 2016). However, the positive connotation may not be generalized as the assessment of innovation outcomes may vary depending on benefit for, and position and perspective of a single individual. Additionally, innovations may have negative side effects, such as ecological destruction (cf. Gryl, 2013). Apart from this, the innovation process is characterized by certain sub-processes that will be described in the following sections.

As the neuroscientific perspective illuminates, conversant thinking and behavior needs to be broken, in order to develop new ideas (cf. Heilman et al., 2003), i.e., to be innovative. Within this context, reflexivity, which implies questioning the very own thinking and acting regarding the circumstances (Schneider, 2013), can be the driving force for the creation of new ideas, and subsequently for challenging and renewing current social circumstances. Therefore, Gryl (2013) identifies reflexivity as one core dimension of the innovation process.

Furthermore, innovation is described as driven throughout creative ideas, named inventions (cf. ibid.; Jekel et al., 2015). Therefore, creativity, a way of imaginative thinking that neither pursues certain purposes nor focuses on specific solutions (Ulmann, 1968), marks another core dimension of the innovation process (cf. Draeger, 1991; Runco, 2007).

However, inventions as results of the creative process can only turn into innovations by their implementation in society (Maier et al., 2001; Gryl, 2013; Jekel et al., 2015). Therefore, another dimension of the innovation process is the ability to implement creative ideas – the implementivity (ibid.). It requests being able to convince others of the existence of an issue and of implementing a proposed solution approach. Implementivity thus requires the assertiveness (especially when resistance appears against a developed solution) as well as good communication skills, such as presenting ideas and solution approaches convincingly to others, form and articulate logical arguments, and being able to visualize developed solutions competitively (cf. Budke, 2012; Weis, 2016).
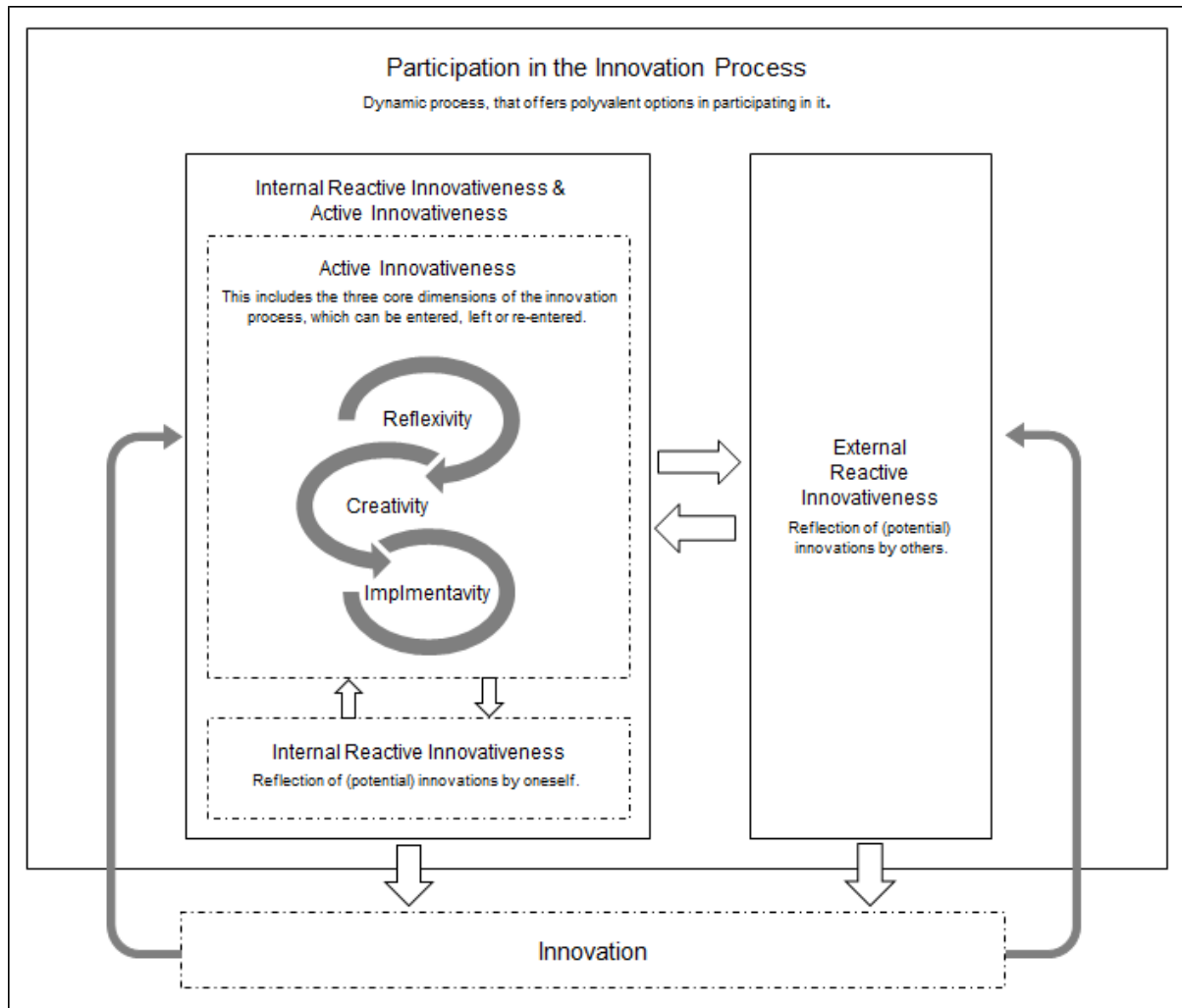
Figure 1: Participation in the innovation process (own research, based on Weis, 2016).

In conclusion, three major dimensions of the innovation process can be named (Gryl, 2013; Jekel et al., 2015): (1) Reflexivity describes the ability to question current circumstances and point out issues, whereas (2) creativity means the ability to generate creative ideas in order to find solutions for the stated issues, and (3) implementivity covers the ability to convince others of the need to overcome issues through developed solutions and putting these ideas into action (ibid.).

Therefore, innovativeness as "the ability to participate in the innovation process" (Weis, 2016, p. 35, translated by the authors), includes a wide range of participation options exceeding reactive innovativeness right up to active innovativeness (Hartmann & Meyer-Wölfing, 2003; Scharf et al., 2016). Whereas the three major dimensions, reflexivity, creativity and implementivity, form active parts of the innovation process, reactive parts include external reactive innovativeness focusing on the reflection of so-called 'innovations' by others as well as internal reactive innovativeness, that monitors own ideas as potential future or implemented innovations (Weis, 2016). Thus, both, being actively involved in the three dimensions of the innovation process and observing innovation processes from outside, can include reactive innovativeness (ibid.).

Several conceivable scenarios of the course of action and the way of participation within the innovation process can be identified. Participation in this process is open and can be entered, re-entered or left by the participants at any point. For instance, when people identify crucial issues but do not follow the innovation process afterwards (e.g., because they do not have the resources needed for creativity), and cut back their participation, still, the innovation process can continue by being driven by others instead, who do have the will and capabilities to solve that problem by generating creative solutions. Furthermore, the innovation process can be deliberately interactive, e.g., when people, who identify problems and develop solutions, look out for external support for a successful implementation. Likewise, the innovation process can be interrupted (deliberately), for instance, when developed solutions for identified issues will be suspended by the

participants before even trying to implement them to become future innovations due to (further) reflecting on the suitability of their solution leading to that conclusion (ibid.).

Figure 1 shows this dynamic and progressive innovation process, explained above, that includes potential shift in the process between the three dimensions as well as forward and backward pulses driven by reactive innovativeness and illustrates as well the polyvalent options in participating in the innovation process.

3 THE CASE OF PRIMARY SOCIAL AND SCIENCE EDUCATION – EXAMINATION OF INNOVATIVENESS

Following the outlining of active and reactive innovativeness, this contribution aims at transferring this concept into teaching and learning arrangements. Regarding this, we can – next to the unceasing call for innovation (cf. Gryl, 2013) – identify increasing interest in implementing the learning of creativity and innovativeness in university education and professional working environments (Schubert, 2009). However, this trend does not align unreservedly with the presented concept of innovativeness since fostering innovativeness within this context is often driven by a normative fundament which does not aim at enabling young people to shape society and participate in it, but rather focuses on enabling workforce to fulfill (compulsory) job requirements (ibid.; Orr, 2016). In contrast, this contribution focuses on enabling people to challenge normative demands instead of learning to fulfill them, and to participate and shape the society by innovativeness.

3.1 Rationale – Reasons for innovativeness in Primary Social and Science Education

This contribution's focus on learning innovativeness in the subject 'Sachunterricht' has several reasons. Firstly, this aligns with the educational claims, which underline that children need to gain not only discipline-specific competences but also transdisciplinary abilities such as participation (GDSU, 2013; MSW, 2008). Secondly, fostering creativity, which is of high importance to the innovation process, since it marks one of the three major dimensions of active innovativeness, is not an inherited ability but instead can be acquired (Thurstone, 1962; Guilford, 1962, both cited in Ulmann, 1968). Due to the potential of creativity in childhood age (Vygotsky, 2004), this contribution seeks to foster creativity in primary education in the context of innovativeness. Furthermore, we proclaim the promotion of innovativeness within the subject 'Sachunterricht,' since it offers a great potential to translate the interdisciplinary-oriented theoretical terms of innovation and innovativeness into (everyday) practice. While primary school subjects usually are determined by discipline-specific knowledge, 'Sachunterricht' is a superb example in terms of multidisciplinary teaching approaches, covering different perspectives derived from disciplines such as social sciences, geography, history, economics, and sciences. Therefore, the subject provides interdisciplinary areas of thinking and acting (Götz, Kahlert, Fölling-Albers, Hartinger, Reeken & Wittkowske, 2015), which give room to stimulate the interdisciplinary concept of innovativeness from different angles, i.e., by linking technical and social perspectives. Finally, not only offering an interdisciplinary field to meet the concept of innovativeness, 'Sachunterricht' moreover also provides "conceptual and methodical tools," as Gryl (2013, p. 20, translated by the authors) describes it for the social and geographical perspective on the example of the analog subjects Geography as well as Geography and Economics ('Geographie und Wirtschaftskunde'), that can initiate innovativeness by revealing alternatives to current normative standards.

Still, the concept of fostering innovativeness in 'Sachunterricht' is to be distinguished from existing moderate constructivist teaching concepts (Weis, 2016), such as problem-based learning and discovery learning because those approaches – even though they challenge pupils to explore actively – leave the definition of learning outcomes to others (i.e., teachers, political norms) but not to learners themselves (cf. Neff, 1977; Foster, 1993; Liebig, 2012).

3.2 Examination – Innovativeness by the use of schoolbook tasks?

A first step to develop the potential to foster an education for innovativeness in 'Sachunterricht,' is the analysis of existing material used to plan and conduct this subject. The comparison of the existing praxis and the systematic theory may identify missing points in the present education and connecting points to link innovativeness-promoting instruments.

Initially, we started with an analysis of schoolbook tasks as schoolbooks represent politically defined educational goals (Weis, 2016), based on societal legitimation and schoolbook tasks in particular which are commonly defined as an important tool to ensure high standards in teaching contexts (cf. Blömeke, Risse, Müller, Eichler & Schulz, 2006; Kaiser & Albers, 2010; Kiper, 2010) and at the same time function as an

efficient teaching tool for classroom management (Thonhauser, 1995).

For the analysis, the characteristics of schoolbook tasks for 'Sachunterricht,' based on theoretical work by Ralle, Prediger, Hammann and Rothgangel (2014), were extracted. This strategy allows a comprehensive and broad categorisation of authentic tasks (Weis, 2016). Thereupon, a category system – derived from conceptual work by Büchter and Leuders (2005) and enriched by viewing authentic schoolbook tasks of 'Sachunterricht' as well as by having a closer look at didactical framework regarding political objectives for (schoolbook) tasks for the subject (cf. GDSU, 2013; MSW, 2008) – was developed, in coordination with the theoretical background of innovativeness. Within this category system, twelve group tasks – which are constituted based on fostering student activities belonging to the similar field of action – can be identified, that capture a total of 35 different task types (Weis, 2016). For instance, among the task groups called "systematization," the six task types (1) "questioning & hypothesizing," (2) "describing," (3) "characterizing," (4) "comparing," (5) "determining correlations" as well as (6) "reflecting results" are summed up (ibid., p. 45ff, translated by the authors).

The category system does not only record task types, which are directly connected to innovativeness, but furthermore, based on the theoretical framework outlined above, includes linkages to the three major constituting dimensions of innovativeness. For instance, within the group of schoolbook tasks "systematization," especially the task types "reflecting results" (ibid., translated by the authors), is closely linked to innovativeness since internal reactive innovativeness requests reflecting on potential innovations by oneself and thereby aligns with reflecting on solutions in general. The type of task "argumentation," belonging to the task groups named "communication" (ibid., translated by the authors), forms another example since the ability to implement potential innovations requires strong argumentation skills to convince others from the developed solution approach and can therefore be related to the dimension implementivity.

Following, the developed category system was applied to the commonly used schoolbook for 'Sachunterricht' in North Rhine-Westfalia (Germany) 'Pusteblume' (Kraft, 2014). This book is empirically proofed the most used one for this subject within the city of Essen, Germany (Weis, 2016). The findings reveal that usual schoolbook tasks for 'Sachunterricht' hardly either initiate learning of innovativeness directly nor foster innovativeness through tasks which can be linked to the three major elements of innovativeness as the examples mentioned above illustrate. Among 495 analysed tasks, only seven invite pupils to reflect on results, whereas only one task fosters argumentation skills. Instead, closed task types with specified action and response options are dominant, which may be attributed to very basic competence development in accordance with a neoliberal education praxis. For instance, even within the group task types "creative work," which includes types task types that foster activities such as building models and visualizing ideas, are only tasks that are completely guided and bossed since they specify exactly what and how to do it. No tasks could be identified that offer open space for children to present their very own ideas in a creative way. The schoolbook tasks in general show a similar pattern, since for the task types "experimentation" as well as "observing" no open tasks could be identified. Only within the field of the task types "gathering information," a few open tasks are determined, still, the majority are closed task, as well (ibid.).

Overall, only within the task groups "systematization," activities are given that can be linked to the three dimensions of innovativeness. For instance, 36 tasks can be identified, that foster formulating questions or hypothesis – for instance, formulating hypothesis on the outcome of experiments, as well as at least 23 tasks, which focus on comparing certain circumstances such as contrasting historical to current documents. Still, compared to the domination of closed task types, these few examples only spot a small segment of tasks that can be associated with fostering innovativeness (ibid.).

Overall, Weis' (2016) category system has proven as a valid measuring instrument and will be used for the evaluation of further teaching material, e.g., worksheets that are online available and, besides schoolbooks, widely used by teachers as her survey has revealed for Essen. Furthermore, the category system is a fruitful basis for the development of innovation-fostering material, paying attention to the different dimensions and the basic competences needed to constitute innovativeness, for a systematic built-up of innovativeness among young learners.

4 CONCLUSION AND OUTLOOK – TOWARDS AN IMPLEMENTATION OF INNOVATIVENESS

This paper has shown how the educational objective and the societal need for participation can be answered by innovativeness as ability to participate in innovation processes that challenge social conditions and improve societies in accordance with subjective ideas and social responsibility. Despite the common call for innovations throughout many fields of society and curriculums with a decidedly alignment for participation –

as the German case has proven – , innovativeness is far from being part of regular education, as Weis' (2016) schoolbook analysis has shown for the case of the particularly appropriate subject 'Sachunterricht.' Rather, teaching innovativeness that does not follow the idea of qualifying for a workforce and being capable to innovate only for the economic sake, but based on a humanistic ideal of education involving maturity, is a desideratum.

Innovativeness, that includes the dimensions of reflexivity, creativity, and implementivity, and approaches the innovation process in an active and in a reactive manner alike, is a complex competence to teach and learn, but at the same time an inevitable basis for the prospective constitution of society. For this, several didactical instruments have to be developed that prepare learners for participation in innovation processes, according to the developed category system, e.g., open-ended tasks, stimuli to change of perspectives, and practice of negotiation. This also requires an innovation-friendly classroom that bethinks of its humanistic background beyond a praxis of seemingly-humanistic catchwords dominated by a neoliberal praxis. Further examination has to be conducted to reveal the existing praxis or non-praxis towards innovation in school besides the orientation on – innovativeness-inadequate – schoolbooks. When implementing the innovativeness-promoting instruments, systematic evaluation for their outcomes is needed.

The subject 'Sachunterricht' is the first choice when teaching innovativeness, due to its interdisciplinary, everyday references, and early start in the education system. Besides, participation and innovation issues are neither limited to the subject 'Sachunterricht' nor to primary education. As several other school subjects emphasize the importance of participation and the purpose of fostering it, the consolidation of the ability to participate – innovativeness – has to be supported within these subjects as well.

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