Reflexivity and Geomedia – Going Beyond Domain-specific Competence Development

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Abstract

The emergence of the geoweb and its consequences for everyday making of geographies, reflexive approaches to geomedia need to become self-evident components of education at school. *Reflexive geomedia competence* and *spatial citizenship* are complementary approaches to fulfill this aim. Although both concepts are theoretically based and tested in various educational environments within the geomedia domain, a consistent concept for teaching such reflexive, critical, and emancipatory approaches to geomedia is still under construction.

By presenting the results of a study on geography teachers, this paper clearly shows that apart from domain-specific training of reflexive working with geomedia the furthering of general reflexivity plays a crucial role for the development of reflexive geomedia competence and spatial citizen competences. Arguing for a consideration of general reflexivity, consequences from this conclusion for teacher education and teaching in schools are discussed.

1 The Geospatial Future Has Already Begun: The Importance of Geomedia Competence for Everyday Action

Geomedia[1] – in short, every media that involves geo-referenced information – is an essential part of everyday life. For instance, mobile devices with GPS and position sensors allow us to attach additional information from the internet to the picture of our surrounding via the display of the smartphone. In case we look for a restaurant, we may not only figure out, where the next one is located, but also how other persons, possibly being costumers, have rated it. We may use a cartographic visualization of the surrounding to identify the geographical positions of those of our "friends" who share their location information with us and can arrange a face-to-face meeting with them in one of the restaurants. Finally, we leave our feedback on the place on a restaurants' rating platform.

This small lifeworld example shows that present options of geomedia usage have gone far beyond the traditional and rather simple idea of map consumption (FISCHER forthcoming). A broad variety of geomedia, mostly free access, simple mapping tools, and the merging of

[1] In the context of this paper, "geomedia" follows the term "Geomedien" set by DÖRING & THIELMANN (2009) and includes all media that contains georeferenced information respectively geodata. Due to media convergence (SCHUEGRAF 2008) geomedia may appear in various multimedia shapes and do not necessarily need to involve geovisualizations such as maps.

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media from different sources on the Internet allows easy consumption and production of geomedia. In fact, the increasing availability of geomedia comes with the web2.0 as geomedia links these social spheres even closer to lived space (see LEFEBVRE 1993). The example shows as well, that the renowned critical cartography phrase about the "power of maps" (WOOD 1993) is even more applicable to the omnipresent geomedia: In respect to social (geographical) theories the consumption and production of geomedia pre-structures our and others action in socially constructed spaces and contributes to the social construction of these spaces as well.[2] Being reflexive towards geomedia and the own usage of geomedia both in consumption and construction means being aware of these construction processes, the pre-setting of rules that control social action, and the fundamental possibility of changing such rules.

The approaches of *reflexive geomedia competence* and *spatial citizenship* both promote such a reflexive praxis. First empirical results around these theoretically rather well-defined concepts give valuable insights useful for the prospective construction of a consistent, practicable strategy for implementation in educational contexts. This paper presents a qualitative study on geography teachers about their basic abilities and ideas for and attitude towards teaching reflexive geomedia competence and spatial citizenship at school. The results help to identify aspects conducive for reflexive approaches to geomedia and hereby show the importance of the supplementary consideration of non-domain-specific factors and competences.

As theoretical basis, chapter 2 briefly presents the concepts of reflexive geomedia competence and spatial citizenship. Chapter 3 summarizes the study's methodology and chapter 4 displays the results. Chapter 5 analyzes aspects supporting reflexive geomedia use emerging from the results and goes deeper into the idea of a general reflexivity as condition of such practice.

2 From Theory to Educational Approaches: Reflexive Geomedia Competence and Spatial Citizenship

Reflexive geomedia competence and spatial citizenship are based on reflection and reflexivity. Reflection means being critical towards a certain matter, reflexivity connotes being critical regarding own thinking and acting with this matter (SIEBERT 1991, SCHNEIDER 2010). Applied to geomedia, reflection and reflexivity can be understood as methodological translations of critical cartography (HARLEY 1989, WOOD 1993, CRAMPTON 2001, MACEACHREN 2004) and critical GIScience (SCHUURMAN 2004, PICKLES 2006)[3] that main-

[2] Theories of PAASI (1986), WERLEN (1993), MASSEY (1998) and LEFEBVRE (1993) describe the social construction of spaces by the attachment of meanings to physical objects. Geomedia may work as "symbolic shapes" (PAASI 1986) that communicate these meanings and naturalize them by exclusion of alternative significations. These meanings define socially accepted action in the resulting constructed spaces.

[3] The main ideas behind these concepts are the following: the deconstruction of geomedia, that bases on Derrida's and Foucault's theories and includes questioning geomedia regarding its hidden discourses (HARLEY 1989); the idea of hypothesis construction, that declare a geomedium not as result, but as starting point of thinking processes (CRAMPTON 2001); the awareness of the limited on-

ly raise the awareness of the constructedness of geomedia. In detail, reflexive geomedia competence and spatial citizenship focus on different lines and thereby work as complementary approaches.

Reflexive geomedia competence (GRYL & KANWISCHER 2011) mainly is based on HARLEY's (1989) concept of the deconstruction of maps, which is orientated on epistemological theories applied to cartography, and is supplemented with ideas from pedagogical psychology (e.g. AEBLI 1980). The main purpose of reflexive geomedia competence is enabling users to a reflexively consume geomedia by identifying the borders of a geomedium's discourse and thereby the authors' unconscious decisions and conscious intentions. Additionally, users should be aware of their own construction process while consuming geomedia: Geomedia are always basis for subjective construction of hypothesis (CRAMPTON 2001). For instance, a tourist map can be easily identified as a product of tourism industry, promoting a certain region and constructing several points of the landscape as points of interest based on traditional and new discourses about what is worth to be seen. The user may reflect what promises, opportunities and limitations the map offers to her/him with regard to her/his own interests and experiences. Reflexive geomedia competence is laid down in a complex competence model (GRYL & KANWISCHER 2011), which may be used as domain-specific instrument to a successive acquiring of this competence. However, within this model reflexive geomedia competence is limited to the consumption process only and hereby to geomedia and the user's *interaction* with it. Reflexive geomedia competence is therefore a concept of media critics rather than a concept enabling emancipatory action in a geospatial society. As it goes into detail, it is a meaningful approach to develop a reflexive praxis with geomedia in certain learning situations, but to refer it to lifeworld contexts it must be integrated into a wider concept, which is represented by spatial citizenship.

Spatial citizenship (JEKEL et al. 2010, GRYL & JEKEL 2012) extends reflexive geomedia competence in several aspects: Firstly, not only the constructedness of geomedia, but also the constructedness of spaces is taken into account. Geomedia therefore communicate, distribute, and naturalize those social constructions. Secondly, the citizenship idea delves into the matter of action in socially constructed spaces and the rules various actions follow. Under the designation of emancipated appropriation of space, citizens shall be able to deconstruct spatial (geomedia) constructions, and either accept their fixation of rules for action or actively attach alternative meanings and rules, communicate them through geomedia and negotiate on them with other citizens. This means, thirdly, that production of geomedia is involved as well. Fourthly, spatial citizenship utilizes the possibilities of the web2.0 to use simple mapping tools for a competitive lay cartography and to distribute and discuss the resulting geomedia democratically in discursive formations that clearly extend the traditional idea of citizenship (see BENNETT et al. 2009). This intricacy in the fields of geocommunication and lifeworld action indicates the complexity of reflexive geomedia approaches beyond the geographic domain. Public participation in spatial planning processes may work as an example and application of spatial citizenship, when existing plans and rules (and rules of already institutionalized methods of involvement as well) are questioned

tology of geomedia respectively geoinformation systems, that reduce the world's complexity to a closed set of objects and the well-defined links between them (SCHUURMAN 2004).

and alternative spatial visions are produced, communicated and negotiated in web2.0-communities with mapping tools (see HENNIG et al. 2011).

Spatial citizenship and reflexive geomedia competence can both be clearly distinguished from the approach of spatial thinking respectively spatial literacy, as in contrast, this concept is reduced to absolute spaces and quantitative approaches and does not take into account the social construction of spaces (for detailed argumentation: GRYL & JEKEL 2012).

In turn, while spatial citizenship describes a comprehensive agenda including the legitimation of reflexive approaches to geomedia for everyday action, reflexive geomedia competence strengthens the methodological aspects and is therefore a reasonable concretization for the deconstruction of geomedia within the spatial citizenship concept. With the partly common theoretical background both concepts can perfectly blend together. This step will be preceded within the SPACIT project (University of Salzburg), in which a competence structure similar as the one known from reflexive geomedia competence (respectively the deconstruction of geomedia) is extended over the whole concept of spatial citizenship, adding the reflexive production of geomedia as well as technical competences within the web2.0 domain (KANWISCHER et al. forthcoming).

By the measure of instructional literature (summarized in SCHULZE et al. 2010, GRYL 2010) and explorative studies (GRYL 2011) reflexive approaches to geomedia like reflexive geomedia competence and spatial citizenship seem to be widely missing in primary and secondary geography education, although geography is traditionally involved in geomedia education (e.g. GERSMEHL 2005). Based on sound theory and lifeworld needs, empirical studies may show the next steps for implementation of such approaches into educational contexts. While the GeoKom-PEP project (Austrian Academy of Science) evaluates spatial citizenship in planning processes conducted by students (HENNIG & VOGLER 2011), this paper's study focuses on teachers as disseminators. The teachers' practice might not only give hints for teacher education, but can also spotlight the learning process to reflexive geomedia approaches in general.

3 Translating Theory into Praxis: The Design of an Empirical Study

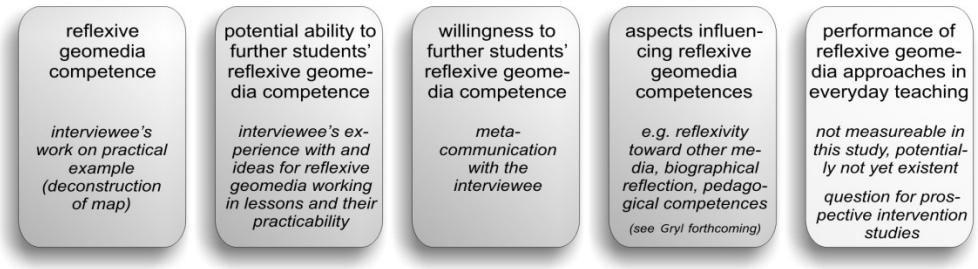

Fig. 1: Fields of interest to be analyzed and methods for their measurement (grey marked fields are included in the interviews)

Referring to the obviously unsatisfactory school pratice that seems to lack of reflexive approaches to geomedia, this study aims to identify teachers' different basic abilities and willingness to further such approaches at school and to identify ideas to further the development of abilities and willingness. The study therefore connects to the need to lay the basis for performance, which is, beside other supporting factors, competence in the field (WINTHER 2007). As performance is low at school, the observation of everyday lessons would be a protocol of deficit but would not give any forward-looking results usable for training and learning toward a state of reflexivity. Problem-centered interviews (FLICK 2009) are a suitable alternative to identify teachers' competences for potential furthering of reflexive approaches to geomedia in educational contexts as a first step to their implementation. Figure 1 displays the different fields of interest and highlights the ones that have been examined.

To ensure theoretical density and significance of the study's outcomes, on the one hand, a broad variety of teachers needed to be examined. As on the other hand the absolute number of interviews was limited to the fact that each interview took between 1.5 and 2.5 hours, theoretical sampling (GLASER & STRAUSS 2009) was used to select the interviewees respectively cases. Theoretical heuristics (BLUMER 1940) and additional criteria emerging from already conducted interviews (analyzed with coding, MAYRING 2008, and objective hermeneutics, OEVERMANN et al. 1987) lead to categories. All of them (e.g. experience in teaching, innovation in teaching, engagement in activities beyond teaching) have potential influence on the degree of reflexivity towards geomedia in class. The cases were differentiated and selected according to maximized and minimized characteristics of these categories. The selection ended with 28 cases, as then no new categories emerged from the field.

The interviews were analyzed according to KELLE's and KLUGE's (1999) typecast, aiming to construct a typology of teachers' ability and willingness to further reflexive geomedia competences and spatial citizenship competences among their students. The analysis included the coding of the interviews with a code scheme constructed from the interviews and influenced by theoretical heuristics, the construction of categories as combination of several codes, the comparison of different characteristics of those categories basing on the interview content and the selection of categories and their characteristics to construct different types, that cover all cases of the study. This process was repeated for several times before a consistent typology came up (KELLE & KLUGE 1999), and was controlled with the comparison of the results with underlying structures identified by objective hermeneutics and with regular validation in collegial discussions.

4 Results: A Link Between Reflexive Geomedia Approaches and General Reflexivity

The results indicate a broad variability between the interviewees. Noticeably, but not surprisingly, is the close link between a teacher's own ability to reflexive use of geomedia and her/his ideas and willingness to teach these competences. In sum, the results show a broad variety between teachers with reflexive geomedia competences and spatial citizenship competences and ideas to teach them and those without such competences and neither ideas nor intensions to further them among their students.

type	characteristics						exemlary quotation
	general reflexivity	reflexive geomedia approaches	reflexive geomedia approaches in school	pedagogical reflexivity	teaching methods	(learning) biography	
reflexive-reflexive teacher	reflection, reflexivity, and meta-communication about both	reflection and reflexivity, understanding geomedia as social constructions with consequences for social action	experiences and/or ideas that include to some extent reflexivity (e.g. empowerment with geomedia, see spatial citizenship)	reflexivity, humanitarian ideal	innovation, activating methods, furthering of understanding, constructivist learning theory	biographical reflexivity, different situations for learning reflexivity and supporting contexts	*"We need geography education, because we (...) conribute to citizenship education. This is obvious. Later a student will read a land-use-plan in his quarter and about changes and he might say: 'I am citizen of this country and I want to know more about this planning process and want to influence it.'"*
reflexive-reflecting teacher	reflection, conditional reflexivity	reflection, understanding geomedia as social constructs, mostly without consideration of consequences	is conditional able, ideas and/or a few experiences focusing on media critics	reflexivity, humanitarian ideal, a few non-reflected uncertainties	innovation, activating methods, conditional furthering of understanding, constructivist learning theory	biographical reflexivity, different situations for learning reflexivity and supporting contexts	*"It is the same with me (...) why didn't I know (...) Questioning things was only possible, when I had obtained more background knowledge, when I had found a special view on literature and maps. With more knowledge I was able to question the things more."*
conditional reflecting teacher	conditional reflection (simplification)	conditional reflection (simplification)	conditional ideas and/or experiences for conditional reflection (analogous to own competences)	occasional reflexivity, uncertainties, interest in students, but limited empathy	between focus on students and focus on teachers, barely maximization of understanding, teaching led in small steps by teacher's questions	rather minor biographical reflexivity, isolated stimulations for reflection	*"I should use a map as example, which is obviously wrong. This map should be really good, meaning really obvious that the students recognize it because they are quite lazy. You have to say: 'You must be more critical' and than you need some more maps, so that they can do it on their own, to find out, what is wrong or not right or manipulated in the maps."*
reflection-avers-teacher	very little reflection (severe simplification), frequent contradictions in general argumentation	very little reflection (only isolated, limited to technical constructions, mostly bound on input)	no ideas, no experiences and often the conviction that those reflexive approaches should not be taught at school	very few reflexivity, negative or underestimating valuation of students, declines responsibility for results of school education	teaching completely led in small steps by teacher's questions, focus on teacher's explanations, students fulfill teacher's expectations, some activating methods among younger but teachers witout reflection	no biographical reflexivity, contradiction between absence of own teaching aims and complaints about limited appreciation of geography as subject	*"Later students may face maps and may unconsciously apply what they have learnt at school [meaning descriptive map rading]. But why should we think about that? I do not switch on the oven and remember the moment I have done it for the first time. I simply know how to do it. I do it unconsciously (...). With that [upside-down worldmaps] we complicate the North-South-problem [meaning the orientation of maps]. North is at top, and this should remain that way, to be honest. I do not need to produce problems artificially. We do not walk upside-down to complicate life artificially."*

Fig. 2: Selected results from the interview study; typology and constituting characteristics (see also GRYL forthcoming)

In detail, the differentiation between reflection of geomedia (as media critics) and reflexivity towards own action with geomedia (as self-reflection) seems unavoidable: Reflexivity is more demanding than reflection, and therefore only one type of teacher in the study is really competent in reflexive geomedia approaches. However, even with this type there is no guarantee that those teachers further such competences in their lessons; at least they are potentially able under certain circumstances that need to be identified in further intervention studies.

In sum, four different types of teachers may be identified regarding their ability and willingness to teach reflexive geomedia approaches (see Fig. 2):

1) The reflexive-reflexive teacher is, based on her/his general reflexivity, competent in reflexive geomedia competences and is potentially able and willing to teach them.
2) The reflexive-reflecting teacher is, based on her/his amount of general reflexivity, competent in reflecting geomedia and partly competent in reflexive approaches regarding her/his own acting with geomedia. She/he is potentially able and willing to teach reflection of geomedia, but not able and only partly willing to teach reflexive approaches.
3) The conditionally reflecting teacher lacks general reflexivity, and her/his reflection of geomedia is simplified[4], while she/he has no ability to a reflexive approach to her/his own acting with geomedia at all. She/he is potentially able and willing to teach reflection of geomedia on a level corresponding to her/his own understanding of this concept.
4) The reflection-avers teacher has nearly no general reflexivity, and is neither competent to reflect geomedia nor to be reflexive regarding her/his own working with geomedia. Based on her/his understanding of reflexive and reflected geomedia approaches she/he refuses to teach them.

In summary, the most obvious correlation is the one between domain specific reflexive geomedia approaches and general reflexivity. Adding the more detailed information from figure 2, it becomes obvious that not only reflexivity related to other media, but also related to general action and pedagogical work is important. Those teachers, who are open-minded towards their students, innovate their teaching methods regularly, question their own role as teacher and reflect upon their learning biography, are generally more open to reflect and being reflexive. Among these teachers media reflection and reflexivity towards their use of media is a matter of course or is easily accepted as such; so they have reflexive geomedia competences or can acquire them quickly, which is not to be seen among those teachers with little general reflexivity. General reflexivity and its manifestation in different spheres seem to be a concomitant or even a condition for reflexive geomedia competence and spatial citizenship competences. This is emphasized by the observation that the main differentiation between the first two types – reflexive teachers – and the last two – conditionally reflecting to reflection-avers teachers – lies in the amount of general reflexivity. While

[4] Conditional reflection expresses oneself in different combination and shapes of the following characteristics (see GRYL forthcoming): only isolated understanding of social constructedness (a lack of the ability to transfer); simplification of social construction by blinding out their consequences while reducing the constructedness to the classical idea of mental maps (GOULD & WHITE 1974); simplification of social construction to dichotomous categories of truth and manipulation (MONMONIER 1996); blinding out social constructedness by understanding geomedia production as optimization process according to the map communication model (ROBINSON 1952); complete blanking of social constructedness by limitation to technical construction only.

reflexive teachers are able to rather complex geomedia reflection, conditionally reflecting to reflection-avers teachers are only able to simplified reflection of geomedia or are not able to do that at all. Smaller differences within reflexivity seem to determine the ability to teach not only reflection of geomedia, but reflexivity towards acting with geomedia as well: Only reflexive-reflexive teachers are potentially able to teach this kind of reflexivity, while reflexive-reflecting teachers have some problems with their own ability to reflexive geomedia work. The importance of general reflexivity for the teachers' competences as well as for their teaching competences concerning reflexive geomedia approaches becomes obviously.

Reasons for the close link might lie in the emancipatory character of reflexivity that allows conscious and autonomous action, whereby the spatial citizenship approach reveals the social and societal dimensions of geomedia communication. Facing the complex, overarching theoretical background of this kind of reflexive geomedia work, it is unlikely that reflexive geomedia competence and spatial citizenship competences appear in their full manifestation without reflexivity in other domains. Developing general reflexivity as a habit is a basis for its comprehensive application on a huge variety of domains, where geomedia is one of them. Additionally, interviewees with high reflexivity were more likely to learn from situations that improved their reflexivity even further than those with a lower reflexivity. The connection between teachers' abilities and their potential abilities to teach is not only explainable with the idea that they have to be competent in what they want to teach: Reflexive teachers report that they have experienced reflexivity as helpful tool for their own self-determined acting they do not want to miss, so that they are convinced that reflexivity must be as inevitable for their students. Additionally, they have experienced the practicability and viability of reflexivity themselves, so that they are confident in teaching it. As they have, due to pedagogical reflexivity (following from a general one), a higher insight in their teaching environments, they have a deeper confidence in the students' abilities to handle a complex concept like reflexivity.

A mutual furthering of reflexive geomedia approaches and general reflexivity can be assumed. The observation, that teachers with a high general reflexivity, who were rather unfamiliar to the concept of reflexive geomedia competences before, can relatively easy develop reflexive geomedia competence and spatial citizenship competences, shows that general reflexivity is a factor that should to be taken into account, when those domain specific reflexive geomedia competences are to be taught. This means that competence development in the field of geomedia must be extended with a more general orientation, going beyond the borders of the domain.

To be more concise, a detailed analysis of the reflexive types in the study helps to identify those aspects that have led to reflexivity as an overarching habit. These aspects may help to develop ideas for teacher education to enable them to further such competences, including domain-specific reflexive geomedia approaches. Furthermore, those aspects may also be transferred to students' learning of reflexive competences and reflexive geomedia competences as well.

5 Consequences for Teacher Education and Teaching: Thinking Beyond the Domain

A main source of the identification of opportunities to develop reflexivity is the in-depth-analysis of the reflexive teachers' learning biographies. The biographies of conditionally reflecting and reflection-avers teachers may additionally point out aspects that are counter-productive for this development. In sum, the development of a general reflexivity seems to be supported through a continuous concurrence of situations that require changes of perspectives, combined with some external stimulation to reflection and reflexivity.

Although a few highly reflexive teachers have developed some of their reflexive approaches to geomedia primarily during the interview, based on their distinct general reflexivity, at least for acquiring an ability to reflect on geomedia a few occasions within the geomedia domain can be identified: Some teachers mention literature from the field of critical cartography that have brought insights, others noticed the necessity to reflect when using different cartographic sources of the same topic. Coming from beyond the geomedia domain, a few teachers applied their highly developed reflexive media competences to geomedia.

Regarding the domain of geography, learning a constructivist theory of geography education (connectable to reflexive epistemological approaches) within teacher education is beneficial as well. Travelling, which is in some countries part of the curriculum of geography teacher education and was mentioned spontaneously by nearly all interviewees, seems to be valuable, when the traveler is engaged to reflect upon the new contexts experienced and her/his position within.

Beyond the geographical domain theoretical and practical lessons on constructivist learning theory can further teachers' pedagogical and possibly general reflexivity. Within the teachers' practical education autonomous working and the chance to develop and test own ideas, collegial counseling and positive criticism seem to be valuable as well. Cooperation and mutual feedback seem to be advantageous, too. A main source of reflexivity is the stimulation to personal development, basing on biographical reflection, as mentioned in teacher training concepts by HERRMANN & EDELSTEIN (2002) and FAUSER (2008). Commitment outside regular school obligations (for instance by providing further education to other teachers) supports reflexive competences, when this commitment needs to be reflected as well (for instance, when a new group of students forces to re-think the own teaching style). Counter-productive are rigid institutional structures that suppress innovation and the general lack of stimulation to reflexivity.

It seems important to combine learning situations that offer changes of perspectives with direct stimulation and methodological training to enable such changes. Theoretical and empirical literature from educational sciences related to reflection and reflexivity may give essential hints and examples (e.g. DEWEY 1938, SCHÖN 1983, GIBBS 1988, SIEBERT 1991). Stimulation can be withdrawn sooner or later, as some teachers in the interviews seem to have needed more stimulation than others (which might also depend on the learning situations). Such learning situations are an important aspect to develop reflexive competences and seem to be, according to the interviews, a basis for developing reflexivity even as habit. However, the shape of instruction has to vary basing on the teachers' abilities and attitude towards reflexivity. While reflexive-reflexive teachers are able to meta-communicate about reflexivity, reflection-avers teachers are more open to practical examples that include re-

flexivity in a much more tacit way, mainly focusing on other aspects such as content or technical competences.

In order to apply reflexivity to working with geomedia, instructed examples seem to be a meaningful addition to a general orientation. In contrast, there is no empirical evidence yet, that the reduction of learning reflexive geomedia competences on geomediated situations can bring the same positive results noticed under a general ability to reflexivity. Therefore, it seems to be a viable way to further reflexive geomedia approaches not only by teaching reflexivity towards geomedia, but, combined with that, a general reflexivity as well. According to the study's results reciprocal advancement can be expected.

When looking at students instead of teachers the main ideas of encouraging reflexive geomedia approaches remain the same: stimulation of reflexivity in situations that require and offer changes of perspectives combined with autonomous working and a specific personal development, adjusted to the learner's current state of reflexivity. The learning situations may be connected to the domain of geomedia, but should not be limited to it, when looking at the positive impact of general reflexivity on the ability to reflexive acting with geomedia as seen in the study.

In sum, the study's results indicate that general reflexivity and its positive impacts on media critics and reflexive approaches to geomedia should be taken into account more than before. With this, the importance of networking between domains in competence development seems crucial. Deepening this collaboration by furthering general reflexivity will have positive outcomes for reflexive work with geomedia as well, which seems unavoidable in the present and future geospatial society.

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