Geomedia and Spaces of the In-between. Geo-referencing, Non-localization, and Glocalization

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Abstract

In this paper, we adapt a broad understanding of the term *media* (after McLuhan) and discuss the term *geomedia*, which we define in a wider sense, focusing not only on localized forms of geomedia, such as digital maps, but also on representations that are loosely linked to the lifeworld, without geometrically and geographically measurable addresses. Furthermore, geomedia, like all media, refer to a communication space which creates spaces of the in-between. In the case of geomedia, these spaces of the in-between are somehow de-linked from geographical spaces and the limitations of the lifeworld. At the same time, geomedia are closely linked to spaces, due both to the lifeworld content to which geomedia refer and to the influence of geomedia on human action. These spaces of the in-between can open up in digital and analogue media, which we regard as inseparably intertwined. This opening up of the in-between presents opportunities for people, including marginalized groups, to get connected and stimulate social actions by sharing interests, exchanging ideas or criticizing social injustices, as well as discussing options for implementing social change. Given the strong connection between communication, participation and being innovative, we argue that geomedia are useful instruments that enable people to acquire innovativeness, which in turn fosters their ability to participate in society.

Keywords:

geomedia, communication, media science, innovativeness, participation

1   Introduction

In recent years, use of the term *geomedia* has increased due to technological developments that required a term which clearly goes beyond paper maps and atlases to take into account the digital perspective and forms of representation from the visual to the auditory (Gryl et al., 2010). The determining criterion of the definition has been the georeferenced character of the processed data: geomedia are 'any media that uses the spatial localization of information' (ibid., p. 3). However, the term might be defined more broadly if we focus closely on the

societal actions that can potentially be performed using such media. Therefore, in defining geomedia, we argue for a focus on human actions rather than on reference to coordinate-fixed, physical-material place. Of course, we do not deny that human action is place-bound, as the body is a physical entity, but the consequences of action clearly reach beyond the limited geometrical scope, as action-theory based social geography (Werlen, 1993), for instance, shows. Human action may also take place, in the form of different types of communication such as information, argumentation and negotiation, in (mostly lifeworld-meaningful) media spaces.

We are aware that many concepts of geomedia already include the idea of relational space, i.e. the attachment of meaning to physical places and the communication of this meaning through geomedia (cf. Gryl et al., 2010; Schulze et al., 2015). We intend to follow this approach and push it further by placing stronger emphasis on the delocalization in geomedia, which might be a paradoxical term, but in our opinion the focus on delocalization is a concept worthy of being thought through. In particular, we will analyse the potential of the action and communication spaces (or non-spaces from a geometrical or classical geographical point of view) of the in-between. These spaces are somehow both linked and de-linked from geographical spaces, which, classically at least, are related to physical matter. The refinement of the definition of geomedia will work as a meta-perspective from which to identify the added value of geomedia spaces of the in-between, particularly for participation processes and potentially for innovation ones. This work is based on theoretical research, bringing together promising resources that might broaden the view.

2   The Paradox of the Localization and Delocalization of Geomedia

This section will illustrate the paradox of the delocalized character of geomedia by presenting examples of what geomedia can be, widening the idea of geomedia beyond geo-referencing and giving an idea of what we mean by the spaces of the in-between.

For ocean liners that cruise in international waters, it is the flag under which the ship sails that are geomedia announcing the country to whose law the ship is subject. Through the use of this flag as a sign (which stands for the complex bureaucracy of registering a ship), the state seems to be extended (at least in some ways) to a small mobile entity on the ocean. In the context of outer space, for example on board the International Space Station, a much broader understanding of the term geomedia has to be applied, as an astronaut who committed a crime would have to be judged according to the law in their country of origin. Thus, astronauts themselves work as geomedia in the constitutionally delocalized place of the spaceship. These two concrete examples help us to focus on other forms of delocalization that are linked to certain (socially constructed/agreed) place-bound meanings, such as virtual spaces.

For instance, action on social media platforms owned by international companies such as Facebook takes place somewhere in the in-between when it comes to the legal status of offensive content like hate speech. A mixture of lifeworld management and virtual online gaming is offered by another example – the local soccer club TC Freisenbruch in the German city of Essen, where, as a reward for funding, online users may participate

democratically in the club's management without ever physically going to one of the club's matches. The lifeworld vs. virtual experience is deliberately pushed further in the case of drone wars. The master of life and death (so to speak, but in reality, solely of death) is delocalized, such that it does not matter too much to the person in control whether they are in Nevada or in Ramstein. (Although, in terms of accountability, it might matter.)

With less material impact, the now outdated platform Second Life seems completely de-linked from physical matter, other than for the hardware and the user's body which interacts with the hardware interface. Nevertheless, Second Life still raises questions of jurisdiction, for example concerning virtual pornography. The extension of the lifeworld into the virtual world is particularly important, as virtual worlds are refuges from the excess of control: Minecraft is one such refuge for youngsters who do not have the power to design their material lifeworld, because wasteland as a playground belongs to a bygone era.

In addition to these examples, we take into account more traditional geomedia that are linked more closely to everyday life, such as navigation systems, online ratings, public mapping projects such as OpenStreetMap, and explicit participation tools like FixMyCity. To cover this broad variety of examples and gain a better understanding of what we mean by 'geomedia', in the following sections we work towards an extended definition of the term.

3 Discussion of existing definitions

The narrower scientific community of the authors of this paper define geomedia as: 'any media that serves the spatial localisation of information. Therewith geomedia includes all representations of space, covering a wide range from verbal description to visualisation' (Gryl et al., 2010, p. 3); 'geo-referencing media technologies […] combine cartographic and media applications and integrate external databases or entire media systems into the map functionality' (Quade & Fegenhauer, 2012, p. 74); 'highly complex systems that do not dis-close their internal spatial ontologies to the average user. They are a fixed set of arcane oper-ations that provide information about space' (ibid., p. 76); or a basis to 'communicate one's own interests […] for an emancipated appropriation of space' (Gryl & Jekel 2012, p. 6). Schulze (2017, p. 11) regards geomedia as 'all forms of web2.0-based, medialized communi-cation of spatial representations that constitute the geoweb with a specific reference to a certain place' (translated by the authors). Hennig and Vogler (2013, p. 359) point out that 'geomedia is accompanied by explanations and multimedia elements in order to clarify the presented content and give context' and provide examples such as 'simple web mapping tools (allowing for collaborative mapping; e.g. Google Maps, Bing Maps, ScribbleMaps, ArcGIS online, OpenStreetMap); PP GIS (public participation geographic information sys-tems) developed to benefit from user generated content (i.e. volunteered geographic infor-mation); specific social media platforms (allowing for discussions between different actors using text, geomedia and multimedia in a combined way); and geoportals (user interface to spatial data infrastructures; INSPIRE, Open Government Data)' (ibid.). These definitions are a promising starting point but still present a few problems, such as an emphasis on georefer-encing and too weak a focus on the communication spaces opened up by the medium.

The term *geomedia* is used by authors from other contexts as well. While Klein's (2008) usage

solely for media utilized in geography education is not relevant for this paper's purpose, several authors provide similar definitions to those given above while using alternative terms such as 'new spatial media' (Elwood & Leszczynski, 2012, p. 544), 'Geoweb or New Spatial Media' (Crampton, 2010, p. 26), and 'locative media' (Wilken, 2012, p. 243). Döring and Thielmann (2009, p. 13) use the actual term *geomedia* and suggest the following definition: 'georeferenced media that re-organize our interaction with space and place socio-technologically […]. Geomedia are global communication media whose usage and utilization are bound to particular physical places' (translated by the authors). Their understanding of the term contributes substantially to a refinement of the term and opens the scope for localization and delocalization at the same time. According to these authors, geomedia mention certain positions on earth, but concerning information usage, geomedia are not bound to any particular place and enable global communication. Geomedia refers to the spaces of the in-between that function as a basis for human (inter)action. However, we do not restrict the range to global communication, although this should be an option, because spatially-related decision making is essential at the local level as well.

Furthermore, Thielmann (2010, p. 5) regards *geomedia* as a 'suitable umbrella term for both areas – locative media and mediated localities […]. This gives due consideration to the now broad differentiation into individual media phenomena to which the prefix *geo* has been attached, be it geoart, geoads, geoweb, geosurveillance […], geocaching, or geotainment' (ibid. 2010, p. 5). This definition, with insights from various other domains, brings in interdisciplinarity, as Thielmann et al. (2010, p. 5) state: '[T]his issue concerns both sides – the spatial turn in media studies and the media turn in geographical studies.' We regard this suggestion as crucial when defining the term *geomedia*. Based on this, the following analysis will divide the term into the *geo* prefix and the *media* stem in an attempt to discover which spaces might open up beyond those that are related to physical, coordinate-tagged addresses.

4   Refining the Definition

Defining the *Geo* in Geomedia

Using more soft and fuzzy forms to communicate a location relation, we can consider geomedia as location-based beyond a certain coordinate-based address. Thus, we can regard many 'lifeworld' phenomena (to use Habermas's 1995 term) as location-bound: as linked to matter, to meaning attached to matter, or to any kind of action performed in relation to matter that is provided with meaning (cf. relational spaces in social geography). Bodies which act and matter which is acted upon are associated with a position in time-space or to multiple locations or areas of reference. For instance, one single act of consuming a product has an influence on several locations (where the product is manufactured, its transport route, etc.). While some aspects might be affected directly, other instances of the same aspects, or similar or different aspects are affected elsewhere without being *touched*. Action also affects phenomena whose locations we are unsure of or do not even know. For example, we can buy a product from Bangladesh without knowing where the state is. Action on the product (e.g. an instruction to ship an order) might take place remotely from the product itself, performed for example by a person sitting at a computer and using the keyboard. Thus, the

meaning attached to matter and the communication about this meaning might be more important than acting on the matter itself, for instance on the art market. Nevertheless, most ideas are linked in many ways to aspects of the lifeworld that are localized or de-localized, as described. Consequently, the number of media not to be regarded as geomedia is relatively low, as most media carry their meanings through a linkage to the lifeworld. Stretching this argument, even fantastic narrations are connected to the lifeworld by their inventor's position in space-time, by sources of inspiration, ideas and emotions that the author draws from the lifeworld, and those that the user of e.g. Minecraft or Second Life also brings to their activities.

The added value of geomedia when carrying information is that it includes a variety of different references to the lifeworld in one representation. This representation is not about producing an imperfect copy of the world with its absolute Euclidean distances, but about representing the network of places that illustrate how the local (close to the user's bodily existence) and the global are linked in the age of glocalization (Robertson, 1998), as formulated in Latour's (2009) ideas of a global network of spaces and places. This approach not only connects elements geometrically, as the ontology of a GIS does, but also associates for instance ideas of locations, the subjective world of experiences and action planning.

Even more than other forms of geomedia, current digital geomedia allow for a new form of action that is not simply based on geomedia but somehow takes place within geomedia themselves, or can at least be channelled through them. For example, volunteered geographic information is the contribution of information to geomedia on the basis of personal action/experiences, and (single-user) interactive maps allow self-directed experience with the content of geomedia. Linked to digital communication spaces, geomedia can always be utilized as spaces of multilateral negotiation endowed with technically enabled freedom. This solution can gather people from distant places in one virtual place for common decision making and action, and therefore enable global learning as well as local to global participation movements. Although it is still narrow in terms of being coordinate-based and offering a fixed form of representation, Public Participation GIS (Ramasubramanian, 2010; Elwood & Mitchell, 2013) provides a well-known and often local-level example of geomedia-supported lifeworld-bound spaces for the interaction of humans who are (other than for using localized computer infrastructure and devices) uncoupled from material spaces.

The concept of relational spaces is always present in the production and consumption of geomedia; the *geo* in geomedia should therefore be defined as any link to the lifeworld that goes beyond a focus on precise coordinates. Additionally, this extended concept takes into account spaces of the in-between that allow the co-presence of people and new forms of action that require minimal initial action in the lifeworld, such as the usage of a keyboard, but have consequences for the lifeworld. For instance, the virtual world comes into effect because new spaces, in some ways de-linked from matter, nevertheless have certain geographical characteristics as they are related to overcoming distances and shrinking space.

We do not need to limit geomedia to digital media, because multilateral communication is possible with analogue media as well, and the digital and the analogue are closely linked. Indeed, digital communication platforms have advantages that are not to be overlooked, as the following section illustrates.

Defining the *Media* in Geomedia

In order to broaden our understanding of geomedia further, this section takes a closer look at the term *media* in geomedia. As described above, media form a category of space that is both linked to and de-linked from material spaces, dealing with meanings that are attached to people, objects, phenomena or processes in the lifeworld. These people and so on are localized through geomedia, and this localization may be of greater or smaller significance.

When talking about media, we are unable distinguish clearly between classical and *new* media, or even between analogue and digital, as they have common functionalities, and mash-ups of analogue and digital media are common. However, we regard digital media, which potentially offer a much broader functionality, as important. To quote McLuhan (1964), '[T]he medium is the message', a statement which underlines the potential of new and digital geomedia communication spaces as basis for action: with their own unique functionalities, digital media clearly go beyond the content of the media themselves. From a geographic educational point of view, Dickel and Jahnke (2012) refer to the contrastive pair *virtuality* and *reality*, without becoming positivistic, clearly illustrating virtuality as an important factor to attach meanings to matter, and reality as a constructivist issue based on materiality, both terms being closely linked. Nevertheless, quoting a geographic perspective might result in a definition of geomedia which is too narrow as it does not include the full potential the term might hold. Therefore, a wide definition of media such as the one suggested by McLuhan (1964) broadens the view to include maps, pictures, tweets and/or people as geomedia.

Additionally, we may talk not only about a single medium like a tweet but also about the system of communication in which the single message is included, for example tweeting, adding an illustrative photograph, directing the tweet to a certain recipient even though the tweet is public, or hashtagging in order to link the tweet to traditional mass media, or re-tweeting. Because of the form of communication more than the information itself, it seems neither necessary nor possible to clearly define a border between a fragment of a medium, a medium as a whole, and a system of media, as interactions happen between these entities as well as on their margins, as explained in the next section.

5   Spaces of the in-Between: Communication and Negotiation

In 1962, McLuhan pointed out that communication media have created a new cultural environment, contracting the world electrically towards a 'Global Village'. Based on McLuhan's thoughts and on Hall's (1966) proxemics approach, Meyrowitz (1985) argued that television had changed society deeply by enabling egalitarian interactions. He criticized former media and communication research for not analysing 'how much social behaviour changes when people are able to communicate *as if* they were in the same place when they are, in fact, in different places' (Meyrowitz, 1985, p. 122; emphasis in the original). When current, actual, interactive digital media are included in the analysis, it can be seen that these tendencies increase exponentially. For all geomedia, and particularly the most recent forms, we can clearly identify spaces of the in-between, which emerge alongside societally-shaped material spaces (in terms of relational geographical spaces). These spaces of the in-between

are dedicated to communication, notably communication freed from certain restrictions of face-to-face communication and traditional formal participation paths in political decision-making.

Hugger (2009) describes an example of such spaces empirically when analysing the identity-building of teenage migrants living in Germany utilizing online communities. These communities are seen as a social environment and assist these teenagers 'to *locate* their national, ethnical, cultural 'placelessness'' (Hugger, 2009, p. 283, translated by the authors; emphasis added) and to come to terms with their "uncertain' affiliation' (ibid.). These online communities constitute a place beyond homogeneous nations, cultures and ethnicities, supporting the everyday making of cultures which are partly socially shaped and partly individual, cultures that go beyond traditional, outdated ideas of cultures as coherent entities (Brumann, 1999). Through the use of geomedia, spaces of the in-between – in this case, transcultural spaces (Hühn et al., 2010) – might emerge in which different cultures not only co-exist but actively construct new forms of identity and community.

Spaces of the in-between are linked to the lifeworld and, at the same time, are partly de-linked from its restrictions. Basically, they provide communication spaces, and more specifically spaces for formation, collaboration and identity-building. In such spaces, a shift of power is possible as fluid communities beyond formal participation processes enable involvement following new processes of participation, i.e. grassroot movements. Spaces of the in-between therefore provide room for individuals to experience participation and thereby enable them to take responsibility for themselves as well as for their current and future environment. Hence, these spaces are flexible and free from classical power-relations based on formal institutions, allowing marginalized groups (for example because of age, class, race or gender) to increase their chance for inclusion (McLuhan, 1992).

De Certeau (1988) describes the strategic practices of the powerful and the tactical practices of the powerless in relation to space. The disempowered temporarily attach meaning to spaces by their own (localized) action, while those in positions of power are able to consolidate their preferred meaning by communicating and enforcing rules that become socially accepted or at least dominating. In spaces of the in-between, the communication and sharing options of the powerless for alternative meanings increase. Following Habermas's (1990) term *publicity*, these spaces can be used to draw increased attention in a competitive struggle for recognition (Braun, 2016). One advantage of the spaces of the in-between as communication spaces is that some expressions of power that occur in face-to-face situations lose importance, because of the absence of non-verbal cues, for example (Kiesler et al., 1984). Their absence leads to content-oriented communication, because stereotypes are less likely to be activated and signals of dominance are minimized, which fosters participative fairness and helps to adjust the balance of relations of power.

Nevertheless, the importance of distinctions between people in dominant forms of web communication such as written expression must not be underestimated as they play a significant role in the classification of people and of power relations between them. It is possible to identify areas where common inequalities present in the lifeworld are reproduced in online communities, such as gender differences in open web mapping (Atteneder et al., 2015). In this respect, spaces of the in-between are closely linked to the lifeworld not simply

in a geographical sense, but also in a social sense. In addition, these spaces may even function as 'echo chambers', where single expressions of opinion are reproduced over and over, while the full variety of opinions and perspectives is excluded from the discourse. Moreover, new forms of power in online spaces challenge the new freedom that the spaces themselves have engendered, and create new restrictions (Hoyer, 2016). Examples of these new forms of power are the use of personal and big data by large companies to maximize their own lifeworld profits; the influence on public information and opinion formation of (fake) news and social bots; the effect on people's lives, well-being and everyday relations created by shitstorms and cyberbullying, which address the bodily and localized being as well. At the same time, the delocalization of the spaces of the in-between – even if we are talking about lifeworld-related geomedia – makes jurisdiction difficult and creates new social spaces of potential injustice and defencelessness.

In sum, spaces of the in-between are a matter of fact in current communication media, and geomedia have emerged as both de-localized and localized, characterized by spaces that are linked to and at the same time de-linked from the lifeworld, spaces that offer fluid options for how we shape living together. In a broad definition of geomedia with a particular focus on digital, web-related forms of geomedia (though not to the exclusion of analogue elements), spaces of the in-between are to be seen as an important aspect of geomedia, allowing the construction, shaping and co-designing of geographical spaces as relational and absolute concepts of space. Despite the challenges and risks, spaces of the in-between have to be regarded as presenting important opportunities to participate in spatial decision making.

6 Application and Outlook

In this section, we draw attention to the potential of the spaces of the in-between for geomedia usage in educational contexts. Our thoughts will be linked to current and upcoming approaches in digital education (Deimann, 2016), such as Open Educational Resources, which decentralize monopolized power that is exercised over educational norms, and create both new standards and new spaces of the in-between.

A good example of the utilization of spaces of the in-between is the open learning platform *The Future of Fashion* (Artis, 2016), which invites students, experts and other interested adults to reflect on consumer action, and to participate virtually in a debate on current developments in a globalized fashion industry from a theoretical perspective as well as by considering experiences taken from their own living environments. The exchanges among participants thus include virtual debate, analogue actions, and their extension into spaces of the in-between in which issues of consumption are addressed and individuals' lifeworld actions might be influenced.

Another virtual platform and app, *Meine Stadtsache*, is explicitly aimed at children and offers them opportunities to map and record their surroundings. Based on their investigations, young learners may question, debate and criticize their lifeworld environments using this digital tool. Children may furthermore use the platform to communicate their critical thoughts to adults and people in charge, such as teachers, parents and/or local politicians, illustrating a close linkage between virtual (digital) communication and analogue actions and

reactions. These spaces of the in-between allow critical thinking and participation, enabling children to reflect on their surroundings and shape their geographical spaces according to how they want to live in the present and in the future.

As these examples illustrate, spaces of the in-between are particularly valuable for placing geographically and socially constructed spaces on a meta-level in order to question the environment we live in, to foster critical thinking, to negotiate the attachment of meaning to spaces, and to encourage adequate action.

Furthermore, we argue that these spaces foster innovativeness – i.e. the ability to participate in innovation processes (Scharf et al., 2017; Weis et al., 2017) – by linking communication spaces with lifeworlds. Spaces of the in-between provide room for pushing forward three components of innovativeness and the corresponding processes: (1) reflexivity, (2) creativity, and (3) implementivity. Reflexivity if fostered by the social character of the spaces of the in-between, bringing together different perspectives that provide new insights. Creativity may be supported by using geomedia and its variety of designs as a starting point for hypothesis generation (MacEachren, 2004), and spaces of the in-between as laboratories for creative group processes. Implementivity describes the ability to convince others of the need to overcome an issue through certain creatively developed solutions (see e.g. Weis et al., 2017). In the case of geomedia, the implementation of ideas is becoming easier insofar as it takes place firstly in spaces of the in-between and within the representation of spaces (geomedia), as the examples of the *Future of Fashion* and *Meine Stadtsache* illustrate.

These three components are all based on a humanistic ideal of education – emancipation and maturity as educational goals – which allows for active questioning of the problems of the spaces of the in-between. To conclude, spaces of the in-between initialize possibilities for participating in innovation processes and therefore enable people to innovate.

7   Conclusion

Based on a broad definition of the term *geomedia*, including a variety of representations but focusing on spaces of the in-between that allow polyvalent forms of digital and analogue negotiation, communication and action for individuals and groups, the aim of this paper was to present new perspectives on geomedia. Although geomedia are ostensibly linked to (geographical) space, despite their delocalization spaces of the in-between are of high importance for geomedia: the delocalization melts distances, shifts power relations, and creates new ways of, and opportunities for, participating in society. Furthermore, such spaces of the in-between have a particular value in providing fruitful conditions for innovation processes.

References

Artis, E. (2016). The future of fashion. *Synergie, 2*, 64-65. https://www.synergie.uni-hamburg.de/de/media/ausgabe02/synergie02.pdf

Atteneder, H., Ferber, N., De Luca, N., & Jekel, T. (2015). Beiträge feministischer Theorien zu einer Education for Spatial Citizenship. *GW-Unterricht, 134*, 14-27

Braun, L. (2016). Zur Bedeutung des Öffentlichkeitsbegriffs für die Medienpädagogik. *Medienimpulse 4*. http://www.medienimpulse.at/articles/view/1011?navi=1

Brumann, C. (1999). Writing for culture. *Current Anthropology, 40*, 1-13.

Crampton, J.W. (2010). *Mapping. A critical introduction to cartography and GIS*. Chichester: Wiley-Blackwell

De Certeau, M. (1988). *Die Kunst des Handelns*. Berlin: Merve.

Deimann, M. (2016). Open Education. *Synergie 2*, 14-19. https://www.synergie.uni-hamburg.de/de/media/ausgabe02/synergie02.pdf

Dickel, M. & Jahnke, H. (2012). Medialität und Virtualität. In Haversath, J.-B. (Ed.), *Geographiedidaktik*. Braunschweig: Westermann, pp. 236-248

Döring, J. & Thielmann, T. (2009). Mediengeographie. In Döring, J. & Thielmann, T. (Eds.), *Mediengeographie*. Bielefeld: Transcript, pp. 9-64

Elwood, S. & Leszczynski, A. (2012). New spatial media, new knowledge politics. *Transactions of the Institute of British Geographers, 38(4)*, 544-559

Elwood, S. & Mitchell, K. (2013). Another politics is possible. *Cartographica, 48(4),* 275-292.

Gryl, I., Jekel, T. (2012). Re-centering geoinformation in secondary education: Toward a spatial citizenship approach. *Cartographica, 47(1)*, 18-28

Gryl, I., Jekel, T. & Donert, K. (2010). GI and spatial citizenship. In Jekel, T., Donert, K., Koller, A. & Vogler, R. (Eds.), *Learning with GI V*. Heidelberg: Wichmann, pp. 2-10

Habermas, J. (1990). *Strukturwandel der Öffentlichkeit: Untersuchungen zu einer Kategorie der bürgerlichen Gesellschaft*. Frankfurt a.M.: Suhrkamp

Habermas, J. (1995). *Theorie des kommunikativen Handelns*. Frankfurt a. M.: Suhrkamp

Hall, E. (1966). *The hidden dimension*. Garden City, New York: Anchor.

Hennig, S. & Vogler, R. (2013). Geomedia Skills – a Required Prerequisite for Public Participaton in Urban Planning? *Proceedings REAL CORP 2013*, 357-366

Hoyer, T. (2016). On the question of how web 2.0 features support critical map reading. *GI Forum 1*, 295-301

Hugger, K.-U. (2009). *Junge Migranten online*. Wiesbaden: Springer.

Hühn, M., Lerp, D., Petzold, K. & Stock, M. (2010). In neuen Dimensionen denken? In idem (Eds.), *Transkulturalität, Transnationalität, Transstaatlichkeit, Translokalität*. Berlin: LIT, pp. 11-46

Jekel, T., Ferber, N., Stuppacher, K. (2015). Innovation vs. innovativeness. *GI_Forum*, 373-381

Kiesler, S., Siegel, J., & McGuire, T. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist 39*, 1123-1134

Klein, U. (2008). *Geomedienkompetenz* (= Kieler Geographische Schriften 118). Kiel: Universität Kiel Geographisches Institut.

Latour, B. (2009). Die Logik der immutable mobiles. In Döring, J. & Thielmann, T. (Eds.), *Mediengeographie*. Bielefeld: Transcript, pp. 111-144

MacEachren, A. M. (2004). *How maps work. Representation, visualization, and design*. New York: Guilford Publications.

McLuhan, M. (1962/2011). *The Gutenberg galaxy*. Toronto: University of Toronto Press

McLuhan, M. (1964). *Understanding media*. New York: MIT Press.

McLuhan, M. (1992). *The Global Village*. New York: Oxford University Press.

Meyrowitz, J. (1985). *No sense of place*. Oxford: Oxford University Press.

Quade, D. & Felgenhauer, T. (2012). 'Some aspects of social theory for the SPACIT competence model. SPACIT project', unpublished working paper

Ramasubramanian, L. (2010). *Geographic information science and public participation*. Berlin: Springer

Robertson, R. (1998). Glokalisierung. In Beck, U. (Ed.), *Perspektiven der Weltgesellschaft*. Frankfurt a.M.: Suhrkamp.

Scharf, C., Weis, S., & Gryl, I. (2017). Innovative Pupils. *The European Conference on Education: Official Conference Proceedings*, 295–313. http://papers.iafor.org/papers/ece2017/ECE2017_36558.pdf

Schulze, U. (in print). *Geoinformationsausbildung in der Hochschule. Kompetenzen, curriculare Anforderungen und empirische Befunde*. Dissertation project. Frankfurt a.M.

Schulze, U., Gryl, I., & Kanwischer, D. (2015). Spatial Citizenship education and digital geomedia. *Journal of Geography in Higher Education 39(3)*, 369-385

Thielmann, T. (2010). Locative media and mediated localities: An introduction to media geography. *Aether – The Journal of Media Geography, 5(A)*, 1-17

Weis, S., Scharf, C., Greifzu, L., & Gryl, I. (2017). Stimulating by simulating. *International Conference on Education: IACB, ICE & ICTE Conference Proceedings, 386/1–386/11*. https://www.cluteinstitute.com/proceedings/

Werlen, B. (1993). *Society, action, and space*. London: Routledge.

Wilken, R. (2012). Locative media: From specialized preoccupation to mainstream fascination. *Convergence. The International Journal of Research into New Media, 18(243)*, 243-247