

Appendix: A Curriculum for Spatial Citizenship Education¹

1 Preface

The following *Curriculum for Spatial Citizenship Education* was developed within the progress of the Comenius Project Spatial Citizenship (SPACIT) in the scope of the Lifelong Learning Programme of the European Union. This curriculum serves as a guiding foundation for creating local curriculum approaches of *Spatial Citizenship* teacher education and training across the European Higher Educational Area (EHEA). Thus, it addresses all stakeholders in the field of teacher education and training at universities and for in-service teacher training, i.e. decision-makers, curriculum planners and developers, teachers and teacher educators, NGOs and civil society organizations interested in education, academics, researchers and professionals.

To provide transparency, comparability, and the transferability of qualifications to the local settings this curriculum framework was developed on the principles and standards of the European educational policy framework of the Bologna Process and, therefore, it is related to the European Credit Transfer System (ECTS). Describing the competences related to *Spatial Citizenship* in the form of competence based learning outcomes this outcome-based curriculum should be applicable at a variety of places, institutions and learners across Europe contributing for lifelong learning. Furthermore, using the learning outcomes approach allows for the creation of various local approaches of *Spatial Citizenship* teacher training of online or blended-learning environments as well as of materials for learning and teaching, which all contributes to a common understanding of the goals of *Spatial Citizenship* education.

On the foundation of the *Curriculum for Spatial Citizenship Education*, the consortium of the SPACIT project hopes to open up new perspectives and opportunities in the field of teacher education and training to face the impacts and challenges of using GM in society.

¹ Research for this curriculum has been funded by the SPACIT Comenius multilateral project of the European Commission and has been coordinated by Uwe SCHULZE, Inga GRYL and Detlef KANWISCHER. This publication reflects the views only of the project team, and the Commission cannot be held responsible for any use, which may be made of the information contained therein.

2 Education for Spatial Citizenship

The rise of digital geo-media (GM) such as digital maps, GPS-based mobile devices, digital globes, Geographic Information Systems (GIS), combined with the opportunities of the Web 2.0 are changing our everyday lives. In particular, this is true for the production and consumption of manifold spatial representations of the world, which, in the end, influences people's spatial perceptions and actions and daily routines. Living with the Digital Earth, GM increasingly becomes the key for social affiliation within communities on different scales emphasizing the place/ region/ nation/ world as a central form of spatial identification. Therefore, the competent use of GM turns out to be a basic cultural technique, providing the tools and methods for location based information processing, communication in- and outside online communities, and social networks. Besides the development of twenty-first century skills, for instance, ICT-literacy, digital competence, critical thinking, and lifelong learning, education for consisting in the GISociety must strongly support the empowerment of people to use GM for participation in individual and collective democratic decision making processes as emancipated 'spatial citizens'.

The *Spatial Citizenship* approach (cf. GRYL & JEKEL 2012) focuses on the role of the 'spatial citizen' and its appropriation of the spatial domain of social life. Concisely, this means learning how to navigate everyday life with respect to the physical world, the meanings attached to the physical objects and environment, and the power relations involved in the production of meaning, including GIS and related instruments to naturalize meaning as well as new forms of collaboration and negotiation of meaning using Web 2.0 applications. Therefore, *Spatial Citizenship* education is concerned with the individuals' knowledge, skills and abilities as well as attitudes of the individual "to access and make sense of (geo-)information in order to participate in democratic processes and make decisions, taking into account the situations and circumstances she encounters on a daily basis" (GRYL & JEKEL 2012, 8).

Spatial Citizenship offers new opportunities for the widening of citizenship education at secondary school and contributes to its extensive acceptance as an essential dimension through which young people become informed and active citizens within society. Thus, it links GM competence and the mature appropriation of space to the citizenship education domain, and, hence, to a number of key concepts such as reflection, reflexivity, communication, participation and negotiation. The re-centring, and subsequent reinterpretation of learning with geo-information (GI) in secondary school has transformative potential due to the embedment of pupils with everyday (geo-)medial practices. Teachers whose goal is to educate their pupils with a *Spatial Citizenship* approach need to be trained to do so.

Against this background, the *Curriculum for Spatial Citizenship Education* provides the basis for teacher education, to make teacher competent in educating students according to the *Spatial Citizenship* approach and to pave the way to implement this approach in schools.

3 Competences and Learning Outcomes for Spatial Citizenship Education

Generally, acquiring knowledge, skills, abilities and attitudes (KSA) for *Spatial Citizenship* means to enable students to use the various types of GM available to express their own

spatial narratives, challenge dominant discourses, contest the dominant meanings and uses of geo-spatial technology, and share alternative perspectives and opinions in their role as emancipated citizens. In this context, *Spatial Citizenship* competence can be represented as a conglomerate of six major competences dimensions.

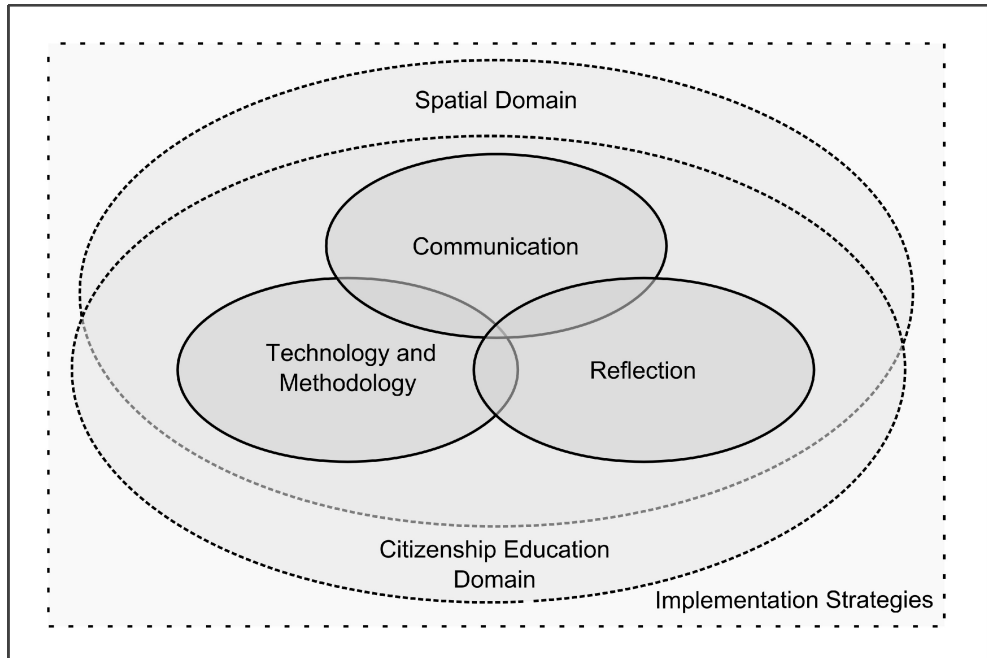


Fig. 1: The Spatial Citizenship Competence Model

The dimensions of ‘Technology and Methodology’, ‘Reflection’, and ‘Communication’ are at the centre of *Spatial Citizenship* (cf. GRYL & JEKEL 2012) and, thus, they are understood as core competences. With a focus on spatial representations and GM, these dimensions are related to the practical application of knowledge and skills as well as attitudes in the field of generic competences, above all instrumental competence (e.g. communication skills, information management skills, problem-solving and decision making) and interpersonal competences (e.g. social interaction, collaboration and teamwork skills). Here, the emphasis is on the reflective/ reflexive use of Web 2.0-based GM for the purpose of self-active as well as collaborative communication for sharing discursive environments.

The competence dimensions of ‘Spatial Domain’ and ‘Citizenship Education Domain’ can be understood as horizontal layers underpinning the *Spatial Citizenship* core competences overall. They are connected to theoretical aspects in respective knowledge areas and, thus, are related to subject-specific knowledge, skills and abilities.

Finally, the field of ‘Implementation Strategies’ of *Spatial Citizenship* functions as a separate but inter-connected dimension necessary to integrate pedagogical and didactical approaches of teaching and learning for *Spatial Citizenship* from the teachers’ perspective. Here, key aspects are related to the creation of reflective and reflexive learning situations

combining various aspects of digital competence and GM use, i.e., critical engagement with GI and geo-spatial representations.

Generally, competence based learning approaches are closely related to the formulation of learning outcomes to describe precisely what a learner is expected to know, understand and be able to demonstrate after completion of learning experience (cf. GONZALEZ & WAGENAAR 2008). Therefore, the formulation of learning outcomes for *Spatial Citizenship* education is based on the revision of Bloom's Taxonomy of Educational Objectives (1956) by ANDERSON & KRATHWOHL et al. (2001) (cf. also KRATHWOHL 2002). This framework provides a two dimensional construct that integrates a hierarchy of cognitive processes of remembering, understanding, applying, analysing, evaluating, and creating as well as four different knowledge dimensions i.e., factual, conceptual, procedural, and metacognitive knowledge. Using a taxonomy table (see table 1) allows for "an analysis of the objectives of a unit or course" and, hence, provides "an indication of the extent to which more complex kinds of knowledge and cognitive processes are involved" (KRATHWOHL 2002, 216).

Tab. 1: Taxonomy table for analysing learning outcomes (adapted from ANDERSON & KRATHWOHL et al. 2001)

Knowledge Dimension	Cognitive Process Dimension					
	<i>Remember</i>	<i>Understand</i>	<i>Apply</i>	<i>Analyse</i>	<i>Evaluate</i>	<i>Create</i>
<i>Factual</i>						
<i>Conceptual</i>						
<i>Procedural</i>						
<i>Metacognitive</i>						

With the focus on teacher education learning outcomes for *Spatial Citizenship* education reflect two distinctive perspectives of application: The first one sees teachers themselves as 'learners' in the field of *Spatial Citizenship*. In this context, learning outcomes have to be understood as comprehensive statements of *Spatial Citizenship* education which describe broadly what a learner (i.e. the teacher) is expected to know, understand and be able to do at the end a particular learning process. In contrast, the second perspective picks up the special needs for teachers 'at their profession' to educate students in the sense of *Spatial Citizenship*, on the basis of appropriate approaches of teaching and learning and creating learning environments that prepares pupils to act as 'spatial citizens'.

To clearly emphasize this dual function of learning outcomes for *Spatial Citizenship* education the following phrase is used: *At the end of the learning process teacher should be able to create a learning environment to enable pupils to....*

4 Approaches of Teaching and Learning for Spatial Citizenship

It has been consensus among the SPACIT project partners that the creation of learning environments for *Spatial Citizenship* teacher education should allow for multiple pathways for achieving learning outcomes. Above all, this results from the idea that the *Spatial Citizenship* curriculum should generally support a demand-orientated use and flexible configuration of learning content in terms of scope and sequence, related to the local conditions

and opportunities of its implementation as well as the certain backgrounds of the learners (i.e. teacher) and their particular (fore-)knowledge and individual abilities as well in the various fields of competence around *Spatial Citizenship*.

Regarding to the goals of *Spatial Citizenship* education of enabling people to competently participate in the public negotiation of individual and collective appropriations of space through the active use of available GM, teaching and learning in the field of *Spatial Citizenship* – for general educational purposes, but in particular for teacher training – cannot result in uniform and input-driven learning processes. On the contrary: The SPACIT consortium makes a plea for learner-centred, active and self-directed learning processes which allows for the various learners to individually construct their knowledge, skills and abilities in the field of *Spatial Citizenship* in order to achieve diverse outcomes on the basis of their particular needs. Since *Spatial Citizenship* deals with mainstream technology and is centred around the use of GI and Communication Technology (Geo-ICT), digital (geo-)media and Web 2.0-based information, teaching and learning for *Spatial Citizenship* needs to integrate those technologies for online and face-to-face learning within suitable blended learning environments. Transforming the context of face-to-face and self-directed learning into formal approaches of instruction, there are number possibilities how learning for *Spatial Citizenship* could take place, e.g. by instructor-led classroom activities, in workshops, through coaching or mentoring (face-to-face); using web learning modules, online resource links, different media format (videos, podcast, animations etc.), workbook and additional materials (self-directed) (cf. DIAMOND 2008).

In this context, the pedagogical and didactical implementation strategies for teaching *Spatial Citizenship* should be based on a constructivist understanding of learning to foster the implementation of the theoretical subjects of *Spatial Citizenship* within real-world contexts, and the daily routines and actions of the learners. Hence, appropriate classroom activities should support active and authentic learning, integrating multiple perspectives and contexts on GM use for communication, participation and negotiation processes in society through situated and cooperative learning environments, i.e. meaningful learning, problem based learning, and resource based learning.

5 Assessment for Spatial Citizenship

In the framework of competence development and orientation at learning outcomes course credits and certificates are not merely assigned for participation, but for gaining certain specific competences. This raises the question for the assessment of a learner's achievement. Concerning *Spatial Citizenship*, assessment legitimizes the certification of teacher training courses, and furthermore it provides help to optimize learning processes both by the learners themselves and by their lecturers. Altogether, assessment furthers the learners' self-efficacy (BANDURA 1997) which is an inevitable basis for the application of competences to everyday situations. Therewith, assessment constitutes a basis for acting in society and for empowerment as designed in the *Spatial Citizenship* competences.

The agents of assessment are: (a) the learners, who reflect their own learning processes; (b) the lecturers, who provide exercises as contribution to assessment and feedback, and instruct with formal instruments of assessment; and (c) the course designers, who produce the instruments of learning and assessment in congruence with the *Spatial Citizenship* curriculum.

Concerning the elements of assessment in *Spatial Citizenship* education, two main approaches, formal and informal assessment (UNESCO 2010), are implemented: Formal assessment is included in the particular learning units as compulsory part of the course work, comprising lecturers' feedback, comparison of tasks' results with sample solutions and other participants' answers, and a portfolio that is kept by learners during the whole course. Informal assessment is not formally connected to the learning environment, but remains primarily in the learners' hands and responsibility. Nevertheless, lecturers and course work in *Spatial Citizenship* encourage for informal assessment because reflecting own competence development is a keystone of maturity and a basis for lifelong learning. The following questions to be provided within a *Spatial Citizenship* learning environment may be named as exemplary starting points for reflection:

Am I a 'spatial citizen'?

With respect to the increased usability of everyday (geo-)media, am I able to handle geo-information appropriately, for instance, for locating my current position with the help of a (online) map or GPS-device, and transmitting the coordinates to a friend for a meeting?

Is there a specific place in my neighbourhood or community which I make use of in a different way as it has been planned or allowed, for instance, by public authorities?

Am I able to draw a map true to scale using digital geo-media to produce alternative spatial visions, for example, of how to use undeveloped areas in my community for recreation and leisure?

What opportunities do I have to participate in decision making processes, for instance on the local or regional level, using discursive online environments within social media or web-based geo-media?

Am I aware that third parties like companies or public bodies can store selected personal data allowing for conclusions about my whereabouts, movements and place-based activities from the past, but also for the future?

Further, formal assessment can be divided into formative and summative assessment (GONZALEZ & WAGENAAR 2008). Formative assessment in *Spatial Citizenship* teacher education and training takes place during the learning process, summative assessment monitors the results of the learning process, for example, after the end of a particular course, in order to evaluate whether a learner meets the specific competences and learning outcomes related to *Spatial Citizenship* or not. Inspired by methods suggested in the Tuning Report (GONZALEZ & WAGENAAR 2008), SPACIT supports formative assessment instruments such as online self-assessment (e.g. quizzes, single- and multiple-choice), lecturer feedback and check questions, and interactive/social tasks (e.g. concept mapping). Regarding summative assessment SPACIT refrains from formal tests and exams as those would not meet the learners' individuality enabled with the multi-path curriculum and the *Spatial Citizenship* concept overall. Instead, a portfolio kept by each learner should be the main assessment tool for *Spatial Citizenship* education as it ensures consciousness and awareness about the own learning results. This is especially important as the teachers' competence application requires much self-initiative that can be motivated by knowing about the own strengths and progresses. Usually, a portfolio shall constantly document and accompany the learning process, including descriptions of the content of a lecture and results of tasks as well as a meta-perspective on the own competence development during the current part of the course (REICH 2012), and is therefore first of all an instrument of formative assessment.

In a *Spatial Citizenship* learning environment a portfolio becomes additionally a tool of summative assessment by analyse it in a process of retrospective reflection, summarizing the lessons learnt and competences acquired, and by this preparing the personal development for everyday application. The portfolio and its final reflection are therefore compulsory parts of the course and condition for certification.

6 Fields of Learning and Learning Outcomes for Spatial Citizenship

The structure of *Spatial Citizenship* learning fields corresponds to the structure of the *Spatial Citizenship Competence Model* (SCHULZE et al. 2013). Hence, there are six separate sections of learning outcomes. For every part of the content, there is a description of the related competence areas and its single components to which, subsequently, particular learning outcomes are formulated. At the beginning of each section, there is set of learning outcomes at a 'meta level' which provide the rationale for each learning field in the context of the *Spatial Citizenship* concept, describing the overarching competences fundamental to all other sub-categories of the particular dimension.

6.1 Technology and Methodology

This learning field targets the utilization of GM concerning its consumption, production and communication processes, while being aware of the semantic field around GM as powerful instruments of everyday social constructions. This includes technological maturity. It also refers to handling geo-spatial data as well as technical GI skills in the field of consumption, analysis, production, presumption, and communication with respect to the increased usability of everyday GM. Altogether, these competences open up the factual spectrum of possibilities, creates awareness of the variety of tools, and support creativity.

Meta level

Learning outcomes at the meta level summarise the overarching competences fundamental to all other sub-categories of the particular learning field.

Recognize and illustrate the digital earth concept and its tools

Explain the conceptual foundations of the GIScience and Technology Domain (GIS&T), especially the domains of geographic information (i.e. space, time, relationships between space and time and properties) and the elements of geographic information (i.e. discrete entities, events and processes, and fields in space in time)

Apply the fundamental principles of cartography and visualization related to data consideration (i.e. source materials for mapping, and data abstraction: classification, selection, and generalization), map design (i.e. map design fundamentals, symbolization, color, typography), and map use and evaluation (e.g. reading, interpretation, analysis, evaluation of maps, impact of uncertainty)

Compare and contrast the potential of different GM for expressing spatially intended ideas, opinions and visions

Debate ways of maintaining and building own geo-information knowledge and skills in the sense of lifelong learning

Geo-media information processing

This area contains the KSA necessary for the mature handling of geo-data within Web 2.0-based GM based on technical as well as methodological GIS&T skills concerning activities as well as processes of consumption, production and prosumption of GM, analysis carried out using GM as well as aspects of technical communication in the form of social networking.

Consumption

Identify sources of public geo-information, e.g. open data on (web-)GIS applications, PPGIS, geo-data browser, databases, metadata catalogues

Exemplify different types of GM in daily life and in society

Use different types of GM in daily life to retrieve knowledge and information

Find one's place and identify a destination while read, orientate and navigate with online maps, virtual globes as well as (web-)GIS applications

Handle general directional and topographic orientation, move across scales, control perspectives and swap themes

Analysis

Execute basic analytical operations which are commonly applied to solve a broad range of spatial problems and to perform GIS-based spatial data analysis, i.e. attribute and spatial query operations, buffers, overlays, geometric measures like distance and lengths, direction, shape, area, and proximity

Apply and organize the various GM tools' functionality appropriately to answer simple questions and fulfill single-step analytical tasks related to spatial phenomena

Evaluate the result of an analytical task carried out

Prosumption

Modify data selection and visualization as part of the options within collaborative GM environments

Set up and change feature labels as well as markings and ratings of places or features of interest within collaborative GM environments

Create comments on alternative spatial scenarios within collaborative GM environments

Production

Demonstrate how to acquire, manage, and present geographic information, i.e. map drawing, handling geo-data within GI-based systems

Carry out basic data capture in daily life using mobile devices (e.g. GPS- or Wi-Fi-based) or map drawing online tools

Contribute one's own geo-data like GPS-recorded tracks, geo-coded photographs or draft proposal maps within collaborative GM environments

Social networking

Explain the basic ideas, elements and functionalities of social networks

List examples of Web 2.0/geoweb-based decision-negotiation instruments

Compare and contrast the options of participating within different collaborative GM environments

Evaluate the benefits of sharing information within certain collaborative GM environments

Demonstrate how to share and contribute (geo-)data and different media formats to others virtually as well as face-to-face

Formulation of statements of learning outcomes are partly adapted from:

- DiBIASE, D., DEMERS, M., JOHNSON, A. B., KEMP, K. K., PLEWE, B. P & WENTZ, E. A. (Eds.) (2006), *The Geographic Information Science and Technology Body of Knowledge* (Washington, Association of American Geographers, First Edition).
- DONERT, K. (2009), *Benchmarking GIS – a Charter for European Education*. In: JEKEL, T., KOLLER, A. & DONERT, K. (Eds.), *Learning with Geoinformation IV*, 2-11 (Heidelberg, Wichmann).
- HERODOT NETWORK (2009), *The Benchmarking Statements for GIS in Geography Education*. In: Jekel, T., Koller, A. & Donert, K. (Eds.), *Learning with Geoinformation IV*, 235-240.
- LINDNER-FALLEY, M. & ZWARTJES, L. (2012), *Learning and Teaching with Digital Earth – Teacher Training and Education in Europe*. In: JEKEL, T., CAR, D., STROBL, J. & GRIESEBNER, G. (Eds.), *GI Forum 2012: Geovisualisation, Society and Learning*, 272-282 Berlin/Offenbach, Wichmann).
- STROBL, J. (2008), “Digital Earth Brainware”. In: *Geoinformatics Paves the Highway to Digital Earth (gi-reports@igf)* (ed. by SCHIEWE, J. & MICHEL, U.), 134-138, Osnabrueck: University of Osnabrueck.

6.2 Reflection

This area relates to the ‘consumption’ aspect of handling GM and involves awareness of the influence of GM on one’s own and people’s everyday action in general. It focuses on the extension of classical map consumption skills: Firstly, GM as social constructions with limited representation of the world need to be deconstructed and meaning to be reflected on critically in order to extend insights and perspectives (HARLEY 1989). Secondly, the user needs to be reflexive towards her/his own GM consumption by being conscious of her/his own hypothesis construction (MACEACHREN 1992). It also includes thinking in alternatives of spatial constructions eventually being represented in GM as well.

Meta level

Learning outcomes at the meta level summarise the overarching competences fundamental to all other sub-categories of the particular learning field.

Discuss why to consume GM in a reflected and reflexive manner

Debate the consequences of geo-information technology applications for everyday practices

Illustrate why GM are representations of the multiplicity of constructed relational spaces

Reflective consumption of geo-media

Reflective consumption of GM describes the KSA fundamental to think about the role and the impact of GM as social constructions with limited representation of the world need to be deconstructed, and meaning to be reflected on critically in order to extend one’s own and others insights and perspectives.

Exemplify why (geo-)media are crucial to the construction of spaces through naturalisation of meanings

Discuss the role of (geo-)media for the communication of construction of spaces

Debate the social impacts of the construction of spaces and communication of construction of spaces through GM

Compare information in GM with pre-existing knowledge and other sources and identify missing/hidden information
Reveal the construction process and political dimension of any GM, i.e. deconstruction
Decide whether to accept constructions of space in GM or to promote alternatives
Construct alternative meanings/ alternative constructions of spaces while consuming GM

Reflective consumption of geo-media

Reflexive consumption of GM contains the KSA the user needs to be reflexive towards her/his own GM consumption by being conscious of her/his own hypothesis construction. This involves awareness of the influence of GM on one's own and people's everyday action in general and also provides the anchor point for thinking about alternatives of spatial constructions potentially being represented in GM as well.

Debate the importance why one has to be aware of internal and external (pre-)conditions of the construction process of space while consuming GM (e.g. kind of medium, one's own interests)
Explain why GM consumption is the starting point for hypothesis construction about space
Illustrate one's own hypothesis construction about space that takes place while consuming GM
Understand one's own hypothesis constructions while thinking in alternative spatial constructions
Illustrate that one's own hypothesis construction is related to social constructions of space

6.3 Communication

Basing this dimension in the tradition of counter mapping (TURNBULL 1998), the Web 2.0 reference opens up new opportunities for GM based communication processes for serving interest representation and challenging societal discourses. Competences in this field are primarily related to the pragmatic as well as strategic abilities to enable the people to express alternative spatial visions and constructions with own visualisations, to argue for and with them, and to negotiate them with others in non-linear ways of communication.

Meta level

Learning outcomes at the meta level summarise the overarching competences fundamental to all other sub-categories of the particular learning field.

Recognize that GM set the stage for the appropriation of space by contextualizing communication
Explain why civic practices require the traditional skills of reading, writing and speaking, but also digital literacy and competent use of the Internet, i.e. digital competence
Compare and contrast ways to convincingly express constructions of meanings and alternative, non-mainstream spatial scenarios

Carry out communicative functions related to the personal and public domain of life and their specific situations (e.g. locations, institutions, persons, objects, texts) on the basis of subjects of discourse of the GM technology and methodology domain, the spatial domain, and the citizenship education domain

Communicative activities and strategies

Strategic communication competence contains the KSA needed to carry out tasks and to perform certain activities/ actions in order to achieve or avoid successfully an intended objective within a (spatial) problem solving as well as a discourse process (e.g. spatial planning). This is understood as to organize and purposefully express and share one's own and others (alternative) spatial visions and constructions within communication processes using spatial and non-spatial visualizations as well as various media like text, pictures, and drawings etc. embedded into discursive GM environments, involving communicative activities of reception, production, interaction, and mediation.

Reception

Break down (i.e. listen and process) a spoken input produced by one or more speakers to receive factual information about (common everyday) spatial related topics and identifying both general messages and specific details

Break down (i.e. read and process) as input written texts produced by one or more writers on a variety of spatial subjects for orientation, information and argument, and to follow instructions or procedures

Deconstruct (i.e. read, interpret and question) spatial visualizations like maps, thematic overlays on GIS interfaces, compilations of various media formats on virtual globes produced by one or more authors to receive geo-spatial information about real-world objects

Production

Produce an oral text which is received by an audience of one or more listeners describing and presenting a variety of spatial subjects, expanding and supporting ideas with subsidiary points and relevant examples

Produce a written text which is received by a readership of one or more readers on a variety of spatial subjects, synthesising and evaluating information and arguments from a number of sources

Produce own spatial narratives with the help of digital GM including a variety of spatial subjects, synthesising and evaluating geo-information from a number of sources

Criticize the success/ results achieved at the end of a GM based communication process against the afore performed activities of production (i.e. planning, executing, evaluating, self-correction)

Interaction

Illustrate the more interactive and dialogue-oriented digital communication process between citizens and public authorities

Exemplify different forms of interaction like spoken interaction (e.g. casual conversation, discussions, negotiation, interviews); written interaction (e.g. correspondence by letter or email, negotiating the text of agreements or communiqués, etc. by reformulating and exchanging drafts, amendments, etc.) or face-to-face interaction (e.g. meetings, talks, discussions)

Discuss why it is important within interactive communication processes to exchange, check and confirm information as well as to explain why something is a problem
Exemplify why it is important to highlight the personal significance of events and experiences related to spatial subjects, account for and sustain views clearly by providing relevant explanations and arguments

Act and argue alternately as speaker and listener with one or more interlocutors so as to construct conjointly, through the negotiation of meaning following the co-operative principle, conversational discourse (i.e. conversation, discussion, debate, negotiation, co-planning and practical goal-oriented co-operation)

Use interaction skills adequately to the involved target group in order to change spatial constructions and meanings respectively

Mediation

List aspects of mediation strategies to cope with the demands of using finite resources to process information and establish equivalent meaning; i.e. planning (e.g. developing background knowledge; preparing a glossary; considering interlocutors' needs); executing (e.g. noting equivalences; bridging gaps); evaluating (e.g. checking congruence of two versions); repairing: (e.g. refining by consulting dictionaries, thesaurus; consulting experts)

Discuss why it is important to act as an intermediary between interlocutors who are unable to understand each other directly (e.g. because of different languages, because of lay and expert knowledge), including spoken interpretation and written translations of spatial representations

Create or participate in discussions with one or more interlocutors in a non-linear way, trying to reach compatible meanings in democratic negotiation acceptable to all participants, using Web 2.0 technology as an option

Socio-linguistic aspects

Socio-linguistic communication describes the KSA needed to appropriately communicate between representatives of different (cultural) communities or institutional groups sticking to social conventions, norm and rules. Above all, this is connected to intercultural competence to be able to reflexively compare one's own position/ membership in a particular community with the one of members of a certain target community, and, hence, to avoid misunderstandings and conflicts.

Social norms

Explain why it is necessary to have knowledge of particular socio-cultural aspects of the own or foreign community or special interest groups, especially related to the field of everyday living; living conditions; interpersonal relations including relations of power and solidarity (e.g. structure of society; relations between gender, generations, public and officials); and values, beliefs and attitudes (e.g. of occupational groups, regional cultures, national identity, foreign countries and peoples, politics, arts, religion)

Debate why it is important to have intercultural awareness to understand the similarities and distinctive differences (relations) between the own 'world of origin' and the 'world of the target community' (e.g. political institution, fluent web communities)

Intercultural aspects

Discuss the necessity to bring the culture of origin and the foreign culture into relation with each other and overcome stereotyped relationships

Use a variety of strategies for contact with those from other culture groups or communities (cultural sensitivity)

Demonstrate the capacity to fulfill the role of cultural intermediary between one's own culture and the foreign culture and to deal effectively with intercultural misunderstanding and conflict situations

Pragmatic aspects

Pragmatic communication aspects contains the KSA necessary for the individual to effectively perform (spatial) communicative functions in an (non-)linear interactive and discursive way, discerning the principles according to which messages are organized, structured and arranged.

Discourse competence

Produce coherent stretches of languages/messages including the knowledge and the capacity to control the ordering of sentences/ pieces of information in terms of topic/focus; given/new; cause/effect (also invertible)

Structure and manage discourse in terms of thematic organisation; coherence and cohesion; logical ordering; style and register; rhetorical effectiveness

Functional and design competence

Arrange messages according to interactional and transactional schemata (i.e. pattern of social interaction such as verbal exchange patterns), for example to: form a working group and establish relations among participants; establish common knowledge of the relevant features of the current situation and arrive at a common reading; establish common agreement on goals and on the action required to meet them; agree roles in carrying out the action; recognise the final achievement of the task; evaluate the transaction, complete the transaction

Formulation of statements of learning outcomes are partly adapted from:

COUNCIL OF EUROPE (2001), Common European Framework of Reference for Languages: Learning, Teaching, Assessment. Cambridge.

6.4 Spatial Domain

The spatial domain refers to relative concepts of space as main cornerstone of *Spatial Citizenship*. This involves the social construction of spaces by the attachment of meaning to physical matter. This physical space is referred to with absolute concepts of space. These also relate to spatial representations and the Spatial Thinking approach (cf. NRC 2006). Mature appropriation of space involves the awareness of relational concepts of space and its consequences for action in spaces.

Meta level

Learning outcomes at the meta level summarise the overarching competences fundamental to all other sub-categories of the particular learning field.

Differentiate between absolute descriptions of location as used in the geo-information domain, and relative descriptions of place and space as used in the social or political domain

Describe the efficacy of GM as instruments to structure action in space by the construction of spaces

Discuss why power relations lead to dominant constructions of space

Explain why social rules are a consequence from production of space

Illustrate the correlation between absolute and social concepts of space

Relative concepts of space

This area contains the KSA that work as a basis to understand and apply the efficacy of GM as instruments to structure action in space by the construction of spaces. It refers to the fundamental principle of the attachment of meanings to physical matter, closely linked to the concept of the construction of spaces that bases on relative concepts of space. This competence area concludes with the concept of the appropriation of spaces that connects the constructions of spaces with societal power relations and social action and in spaces.

Meaning of space

Illustrate the subjective and discursive background of meanings attached to physical matter

Compare and contrast the possible variety of meanings attached to physical matter

Contest dominant meanings attached to space

Construction of space

Discuss the naturalisation of constructions of space through GM

Practice the construction of spaces through the attachment of meanings

Visualize spatial relations, e.g. location, distance, direction, distribution, motion, flow, and interaction through space

Appropriation of space

Contrast dominant spatial constructions in order to appropriate spaces maturely by communicating alternative constructions of space

Translate between social and absolute space to make use of spatial representations in everyday life's for the purpose of communication

Absolute concept of space

This area contains the KSA basing on absolute concepts of space which are crucial for working with GM, and understanding spatial relations. It links to the approach of Spatial Thinking including KSA for tools of representation as well as processes of reasoning. As further aspect of an absolute understanding of spaces this competence refers to

physical matter and its non-determinist influence on spatial structures beyond the attachment of meaning.

Spatial thinking

Exemplify the absolute character of GM

Discuss space and time as principles of ordering phenomena

Recognize concepts of space like general concepts (space, space-time, place, etc.), primitives of identity (object, boundary, shape, etc.) and primitive spatial relations (location, distance, direction, distribution, motion, etc.)

List internal and cognitive tools of representation e.g. figures/ground, shape, size, texture, mental maps

Apply external tools of representation: geometry (i.e. point, line, polygon), graphic (drawing, map etc.), physical (3D model etc.) or linguistic (i.e. language, words)

Demonstrate internal and external processes of reasoning, i.e. extracting spatial structures (object, pattern, area, route etc.), performing spatial transformations (perspective, rotation, scale, dimension etc.), drawing functional inferences (correlation, spatial dependence)

Apply spatial concepts (e.g. distance, distribution) and external spatial representations (e.g. maps, charts), e.g. within planning processes

Physical environment

Distinguish between matter and meaning of objects within the physical environment

Discuss the non-determinist influence of matter for the construction of spaces

Formulation of statements of learning outcomes are partly adapted from:

NRC (National Research Council) (2006), Learning to think spatially. GIS as a support system in the K-12-curriculum. Washington, DC.

GROSSER, K. (2009), Integrating conceptual frameworks from the 2006 NRC report. Available online at: Center for Spatial Studies at the University of California. TeachSpatial.

6.5 Citizenship Education Domain

This dimension refers to emancipatory concepts of citizenship education and the normative background of the approach in democratic negotiation processes and human rights. It pays special attention to the role of fluent institutions and communities, to power relations in society, and participation. It links space and citizenship by implementing the term of the ‘spatial citizen’

Meta level

Learning outcomes at the meta level summarise the overarching competences fundamental to all other sub-categories of the particular learning field.

Exemplify that societal rules are fundamentally negotiable

Discuss her/his own role as emancipated citizen, willing to advocate one's own and collective interests

Rethink societal rules against the background of alternative ones

Show how to challenge dominant discourses while sharing alternative perspectives and opinions in the role as emancipated citizens

Express her/his own world views in the sense of democratically negotiated interests for participation through various types of GM available
Apply principles of Spatial Citizenship to life world environments and spatial problems on the local, regional, national and global scale

Concepts of citizenship

This competence links to the pivotal values for Spatial Citizenship, namely democratic principles and fundamental human rights, as well as to the KSA necessary for participation in society against the background of considering societal rules as fundamentally negotiable. 'Concepts of citizenship' also includes KSA to act as spatial citizen basing on an understanding of the role of institutions and fluent (new media) web communities.

Values and attitudes

Recall democratic principles and fundamental human rights

Practice democracy and human rights as fundamental principles of living together

Apply democratic principles and human rights as basis of negotiation and construction of space

Knowledge and information

Exemplify new ways of communication and discourse production through the Web 2.0

Apply new ways of getting information through the Web 2.0

Debate the relation between discourses and societal rules

Question dominant societal rules and discourses or accept them maturely/consciously

Share alternative discourses with others, also within online environments

Action and participation

Debate the own role as empowered citizen/ actualized citizen

Discuss the importance of GM for participation in the context of the Web 2.0

Contribute ideas and opinions in decision making processes through collaboration using digital GM

Use possibilities of current GM to express, discuss, and negotiate ideas and opinions with others

Make decisions for and against certain spatial constructions while being aware of their consequences

Institution and membership

Contrast the characteristics of spatial versus social communities

Compare and contrast the role of different stakeholders regarding the construction of space and the construction of dominant discourses

Debate the importance of fluent communities (e.g. on the web) as areas of participation

Question institutional rules and dominancy

Illustrate the role and power of political institutions for the construction of space

Navigate in fluent communities, and communicate with political institutions

Formulation of statements of learning outcomes are partly adapted from:

BENNETT, W. L., WELLS, C. & RANK, A. (2009), Young citizens and civic learning: Two paradigms of citizenship in the digital age. *Citizenship Studies*, 13 (2), 105-120.

6.6 Implementation strategies

The following learning outcomes are formulated as overall statements of competence to support effective implementation of *Spatial Citizenship* education into classroom practices. Beyond already existing teaching experiences and pedagogical/ didactical competences from formal teacher education and training the given statements should actively support teachers' competence development in the fields of: (a) the creation of reflective learning situations integrating Geo-ICT and (Web 2.0-based) geo-media and its various resources to support digital literacy and new media competence; (b) teachers' professional growth within the different dimensions of *Spatial Citizenship*, especially to develop innovative technical-pedagogical approaches for active teaching and learning. Against the previous formulation of learning outcomes the given statements below should be read in the following manner: *After completing the Spatial Citizenship learning program teacher should be able to...*

Meta level

Learning outcomes at the meta level summarise the overarching competences fundamental to all other sub-categories of the particular learning field.

*Debate the reasons for teaching Spatial Citizenship in the context of the GISociety
Exemplify the Spatial Citizenship approach in order to connect and integrate its goals
and concepts to the local curriculum*

*Evaluate ways of formal as well as informal learning opportunities related to Spatial
Citizenship education*

*Evaluate her/his competences within the dimensions of Spatial Citizenship and for teach-
ing Spatial Citizenship critically*

Creating learning environments

*This competence area links to the KSA essential to plan and manage learning environ-
ments (pedagogical approach) and to act in classroom situations (didactical approach).
While the first approach refers to a meta level of teaching Spatial Citizenship, including
reflection and evaluation, the second relates to concrete and situational action as teach-
ing professional.*

Planning & Management

*Plan and manage teaching activities and monitor students' specific progresses and gen-
eral performance regarding Spatial Citizenship*

*Create learning environments for teaching and learning Spatial Citizenship using vari-
ous (geo-)media, and implementing affective, emotional and playful elements which
characterize young people's interaction with GM in a real-world context*

*Design appropriate tools for evaluation of learning Spatial Citizenship through diversi-
fied and updated forms of assessment*

*Evaluate and select critically appropriate tools and resources to actively teach Spatial
Citizenship*

Classroom activities

Create learning situations that allow for a critical engagement with geo-information and geo-spatial representations, i.e. triggering reflection and reflexivity by means of Spatial Citizenship

Create out-of-school learning situations (i.e. field work, excursion) that are connected to spatial issues (e.g. current planning processes) and involved stakeholders (e.g. citizen, social services, politics, administration) at the neighbourhood or community-based level

Design innovative and engaging learning materials integrating digital tools and various media resources related to Spatial Citizenship

Personalise learning activities (i.e. methods, content, activities and dynamics) and address students' diverse learning styles and interests in the field of Spatial Citizenship, pursuing students' engagement, success and development

Professional Growth

This learning field outlines to the need of each teacher's efforts to develop her/his own competences in the areas linked to Spatial Citizenship. Related KSA include the abilities and willingness to use digital and online learning tools to frequent related learning environments, and to reflect on her/his own competences and competence development.

Use regularly online learning environments and (new media) technologies as well as participate actively in local and global online communities to exchange ideas and experiences and to get insights for further developments of Spatial Citizenship

Develop independent efforts to pursue continuous professional development in the field of Spatial Citizenship, and keep updating the knowledge of teaching methods as well as approaches of GM/ Geo-ICT integration into classroom activities

Get involved in formal and informal learning opportunities for professional development like training initiatives, workshops related to citizenship education and GM

Be aware of ways of maintaining and building own knowledge and skills related to the dimensions of Spatial Citizenship in the context of lifelong learning

Formulation of statements of learning outcomes are partly adapted from:

PEDRO, N., MATOS, J. F., PEDRO, A. & ABRANTES, P. (2011), Teacher skills and competence development for classrooms of the future. ITEC Deliverable_4.1_Teachers_Competence.

For further information visit the project website at <http://www.spatialcitizenship.org>.

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