Where Do Critical Thinking and Spatial Citizenship Meet? Proposing a Framework of Intersections

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Abstract

Although Spatial Citizenship is rooted deeply in critical theories and is based on ideas of reflexivity, the link to Critical Thinking has not been systematically developed yet. Nevertheless, intersections of both concepts are considered likely due to the closeness of the semantic fields around them. Identifying such overlaps is expected to significantly contribute to advancing the theoretical depth of Spatial Citizenship. Additionally, Critical Thinking – an influential and field-tested approach – may provide valuable insights, particularly with regard to the practical application of the notion of Spatial Citizenship in educational environments. This paper draws on previous research conducted at the CIDTFF (University of Aveiro) and within the framework of the EU-funded SPACIT project. The paper seeks (i) to identify theoretical/conceptual overlaps between both concepts and (ii) to distil key elements of Critical Thinking theory that can usefully complement the concept of Spatial Citizenship and associated educational approaches. The analysis rests on a content analysis of selected journal papers. The resulting intersection framework confirms the closeness of the two concepts, yet also highlights the divergent theoretical and normative foundations.

1   Introduction

During the last years, Spatial Citizenship (SC) and education for SC have garnered much interest among academia and practitioners. SC characterizes the ability and capability to use geomedia in a reflexive way to participate in society. EU-funded projects such as digital-earth.eu and Spatial Citizenship (SPACIT) support the further development of the theoretical foundations of SC as well as its implementation into everyday educational environments. Despite the already complex character of SC, rooted in several domains, there is still room for improvement concerning the refinement and enrichment of both its underlying *theoretical* concepts and its *practical* applications in educational frameworks.

The theoretical concept of Critical Thinking (CT) might be a valuable domain to inspire SC and education for SC. As SC is based on the cross-domain concepts of maturity, reflection and reflexivity as well as on domain-specific approaches, such as an emancipatory citizenship education, Critical Cartography and Critical Geographic Information Science (GIScience), the linkage to critical approaches seems plausible. In addition, CT is an extensively field-tested concept, influential in educational environments (VIEIRA, TENREIRO-VIEIRA &

MARTINS 2011). Since the link between SC and CT has not yet been systematically explored, the identification of specific CT aspects and competences as linkages that can enhance both SC and an education for SC is worthy of investigation.

The aim of this paper is to bring together the two theoretical frameworks of CT and SC through keyword-based literature research and subsequent content analysis. The guiding research questions are: Where do SC and CT theoretically intersect? Which ideas related to the educational value of CT are useful to an education for SC? The results are displayed in a visualisation/concept map illustrating a framework of intersections and potential contributions. This framework lends weight to the argument that CT skills are relevant to an education for SC. In addition, the framework may help advance the theoretical conceptualisation of both frameworks by identifying added value through their intersections.

2   Theoretical Framework

2.1   Education for Spatial Citizenship

SC (cf. JEKEL, GRYL & DONERT 2010; GRYL, JEKEL & DONERT 2010; GRYL & JEKEL 2012; KANWISCHER, SCHULZE & GRYL 2012) is an interdisciplinary approach, rooted mainly in (social) geography and citizenship education, supplemented with influences from neighboring domains. SC refers to the competences everyone should possess as a Spatial Citizen; that is, being able to participate in society through the reflective and reflexive usage of geomedia (such as maps, digital globes and Geographic Information Systems (GIS)) concerning consumption as well as production. SC is strongly linked to the consideration that first of all, geomedia are powerful expressions of constructions of space through the attribution of meaning to physically located matter and they are therefore strongly influential on what is considered 'socially acceptable' action in space (cf. social theory and social geography: PAASI 1986; WERLEN 1993; LEFEBVRE 1993; MASSEY 1998 and Critical Cartography/Critical GIScience: HARLEY 1989; SCHUURMAN 2000; PICKLES 2006; CRAMPTON 2009). Secondly, geomedia become more and more essential instruments for everyday communication, highlighted by the emergence of user-friendly 'lay' tools on the (Geo)web (STROBL, 2008). Consequently, every citizen can produce own spatial narratives, and can communicate and negotiate them with others in fluent web communities (CLOSS STEPHENS & SQUIRE 2012). This links to concepts of emancipated citizenship education (e.g. BENNETT, WELLS & RANK 2009; MITCHELL & ELWOOD 2012) aimed to challenge existing frameworks of rules, referring to an ideological approach that considers power relations and divergent interests in society as driving forces.

2.2   Critical Thinking in education

The 20th century was fruitful on the recognition of thinking processes and abilities as a main goal in education (DEWEY 1933). GLASER (1985) expressly links CT and Citizenship, stating that any democracy needs citizens with the ability to think and contribute to solve social problems and take rational decisions, being an imperative of modern life to ascribe meaning to the world, guarantee global socio-economic development, and live rewarding and ethic personal lives (BARAK, BEN-CHAIM & ZOLLER 2007; DAM & VOLMAN 2004; VIEIRA et al. 2011).

CT is a multifaceted concept that gathers consensus on being reflective and centered on rationality, assessment and problem solving (PIETTE 1996). Defined as good thinking, determined by relevant criteria, by BAILIN (2002), and by PAUL (1993) as the ability to take control and responsibility of our mind, CT finds its most accepted definition in ENNIS (1985: 46) as "a form of rational, reflective thinking, focused on deciding on what to believe or do". For ENNIS, CT includes abilities on a cognitive level (arguing, analysing, judging credibility, inferring and deciding on action), and dispositions on an affective level (critical spirit) (VIEIRA et al. 2011).

The CT teaching strategies must expressly focus on CT skills and allow students to freely express ideas, to question, to be open-minded, to explore and to reflect on action through thought-provoking questions, with adequate time to think (VIEIRA et al. 2011; CARLOS & CACHINHO 2012). HOFREITER, MONROE & STEIN (2007) point the importance of using real-world examples to teach CT skills in context, and to begin with students' core values before moving to information and logic. DAM & VOLMAN (2004) stress that the CT process occurs when students are actively involved in meaningful social practices, through cooperative procedures, communities of practice and 'social' instruction techniques (e.g. discussion, student-led work groups, role playing).

3   Proposing a Framework of Intersections

3.1   Keyword-based research

Fundamental intersections between SC and CT are identified by keyword-based literature research based on overlaps of both concepts. To this end, search engines for scientific papers were browsed for the following combinations: "critical thinking" OR "thinking critically" AND "spatial citizenship" (KA); "critical thinking" OR "thinking critically" AND "spatial" (KB); "critical thinking" OR "thinking critically" AND "citizenship" (KC). As in this paper's context the main interest lies in the contribution of CT to SC, the basic components of SC ("spatial" and "citizenship") are combined separately with "critical thinking", identifying links from CT to spatial theory as well as to citizenship theory and possibly marking alternative approaches to SC. The major and interdisciplinary platform 'Science Direct' and the more pedagogy related platform 'ERIC (Education Resources Information Centre)' have been chosen as search engines due to their relevance across domains. Depending on each platform's user interface, the search was conducted within a paper's abstract, title, and keywords or with an 'all fields' search including the function of a thesaurus.

The research results on the Science Direct search engine are presented: for KA, 1 retrieved article, but 0 selected by title; for KB, from 4 retrieved articles, 2 were selected by title, but 0 selected by abstract reading; for KC, in 6 retrieved articles, 4 were selected by title but 0 by abstract reading. On the ERIC search engine, the research retrieved: for KA 0 articles; for KB 25 articles, 6 selected by title, but 0 from abstract reading; and for KC, from 257 articles, 14 were selected by title and 4 from abstract reading.

The search reveals that the combination of 'critical thinking' and 'spatial citizenship' is almost non-existent, justifying again the purpose of this paper. The only combination (MILSON, KERSKI & DEMIRCI 2011) is to be found in an edited book, including a paper

mentioning SC and another involving CT without linkage between both. While the combination between 'critical thinking' and 'spatial' appears only rarely, linking 'critical thinking' and 'citizenship' is quite common. The latter can be explained with the long tradition of critical approaches in citizenship theory and education (e.g. JOHNSON & MORRIS 2010; DAM & VOLMAN 2004; GLASER 1985).

Following from these results, a limited number of papers is selected for content analysis in order to identify intersections between CT and SC and potential contributions that the first might make to the latter. The selection of papers is organized according to the following steps:

1) The titles of the findings are analysed and with this, the papers grouped as 'potentially significant' for the identification of potential intersections and contributions from CT to SC or as 'unsuitable'. Potential significance is given, when CT is central and related to domains fundamental to SC (cf. KANWISCHER et al. 2012).

2) The abstracts of the papers resulting as potentially significant in step 1) are analyzed and the remaining papers are marked as probably significant for the identification of potential intersections and contributions from CT to SC or as unsuitable.

Apart from this, the selection is limited by the availability of the papers. Thanks to broad licenses hold by the Universities of Aveiro and Landau, this number could be kept low.

Although this method features a certain systematic, it only reveals linkages that 1) are verbatim, or depending on the semantic field provided by a not user-controlled thesaurus and that 2) lie in the two main categories (and domains) constituting SC, space and citizenship. Furthermore, due to the search for keyword intersections, the papers identified are more applied or at least interdisciplinary ones. Therefore, filling this gap, as additional sources for content analysis two main and basic CT references are added (VIEIRA et al. 2011; BARACK et al. 2007).

The selection of SC papers is easily done, as there are only a few papers up to now. As the most fundamental and current ones JEKEL & GRYL (2012), KANWISCHER et al. (2012), QUADE & FELGENHAUER (2012) and GRYL, SCHULZE & KANWISCHER (forthcoming) were selected.

3.2 Content analysis

The content of the selected papers is analysed following MAYRING (2008). Content is selected and organized from each paper according to a category system emerging from the material and according to the research questions as theoretical heuristics. Special attention is paid to synonymy and to a potential multiplicity of meanings of the same wording.

The category system is organized in two dimensions:

- Categorization according to research questions: Category C1: concepts (Where do SC and CT theoretically intersect?), further divided into C1.1: Critical Thinking, C1.2: spatial domain and C1.3 citizenship domain; C2: educational approach (Which ideas related to the educational value of CT are useful to an education for SC?)

- Comparison with SC papers based on content analysis of the following papers: GRYL & JEKEL (2012); KANWISCHER et al. (2012); QUADE & FELGENHAUER (2012); GRYL et al. (forthcoming): intersection with SC (o); extension of SC (+); incongruent with

SC (-). As C2 is, concerning SC, just at the beginning of development, an extended amount of (+) classification is expected.

Table 1: Categorized and organized data from content analysis

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Critical Thinking – BARACK et al. 2007:
[C1: concepts] / [C1.1: Critical Thinking]
- CT "operative example of higher order thinking that can be accounted for due to reliable and validated tests" (p. 355) **(-) measurement not aimed for in SC**
- higher-order thinking skills: "non-algorithmic, complex mode of thinking that often generates multiple solutions" (p. 355), application of multiple criteria, reflection, self-regulation, analysis, evaluation, and synthesis, question-asking, drawing conclusions, problem-solving, and decision-making, metacognition **(o)**
- handling information: identifying the source of information, comparing and reflecting on consistency **(o)** and evaluate credibility **(-) concept of truth-seeking and potential objectivity not compatible**
- maturity **(-) measureable concept not compatible with broader understanding of maturity in SC**
- rational thinking **(+)**
[C1: concepts] / [C1.2: spatial domain]
[C1: concepts] / [C1.3: citizenship domain]
- "preparing students (...) for active and responsible life within our modern society" (p. 355) requires higher-order thinking skills **(-) concept of citizenship only partly compatible**
[C2: educational approach]
- applying concept purposely and persistently **(o)**
- "learning experiences focused around, analysis, evaluation, and synthesis, develop skills in problem solving, inferring, estimating, predicting, generalising, (...) question posing, decision making, and critical and systemic thinking" (p. 355) **(o)** and creative thinking **(+) concept only rudimentary developed in SC**
- real-world problems, open-ended class discussions, inquiry-oriented experiments **(+) potential ideas for SC**

Critical Thinking 2 – VIEIRA et al. 2011:
[C1: concepts] / [C1.1: Critical Thinking]
- "reflective practical activity, for which the objective is a belief, or a sensible action" (p. 47) (= five key terms: practice, reflective, sensible, belief and action) **(o)**
- "conscientious activity, directed towards a goal, which did not arise by chance or without a reason" (p. 47) **(o)**
- normative concept: "good thinking" (p. 48, quoting BAILIN 2002), based on criteria: accuracy of the data, control of variables, and validity of inferences **(o)** and credibility of the sources **(-)**
- "look for a clear proposition of the topic or thesis; look for reasons; try to be well informed; use and mention credible sources; take into account the situation from a global perspective; try not to deviate from the core of the issue; bear in mind the original and/or basic concern" (p. 48) **(o) and (-) due to differing idea of objectivity**
- abilities: "elementary clarification, basic support, inference, elaborated clarification, and strategies and tactics [clarification = analysis of aims and argumentation]" (o)
- emphasis on rationality **(+)**
- "basic ability and an imperative of modern life which should focus on ascribing meaning to the world" **(+) another, more existentialist concept of meaning than in SC**
[C1: concepts] / [C1.2: spatial domain]
[C1: concepts] / [C1.3: citizenship domain]
- emphasis on CT due to complexity, growing interdependence of modern life **(o)**
[C2: educational approach]
- "explicit, systematic and promoted within the context of different subjects at all levels of education" (p. 44) **(o)**
- "react critically to an essay or evidence presented in a text; assess the quality of reading or of discourse; build an argument; write an essay based on previous reading or participate in class" (p. 45); "participate in discussions; writing positional articles, and analyze journal papers about controversial socio-scientific issues" (p. 51) **(o) concerning geomedia**
- "students should be asked to: generate relevant knowledge, using credible sources; state an informed position; construct valid arguments and counterarguments based on accurate evidence; analyze arguments

and counterarguments; and ask and answer questions that clarify or challenge" (p. 51) **(-) differing idea of objectivity and credibility**

- "encourages students to express their ideas, explore, take risks, to share successes and failures and questioning each other" (p. 52) **(+) concerning extension of emotional and social aspects of SC**
- "students to be given time to think, to experiment for themselves and to be stimulated to discuss and to reflect on action through thought-provoking questions" (p. 52) **(+) practical ideas for stimulation**

Intersection 1 – JOHNSON & MORRIS 2010:
[C1: concepts] / [C1.1: Critical Thinking]
- distinction between CT and critical pedagogy with specific foci **(+) differentiation and systematisation**
- complex review of theories around CT, linking to a.o. metacognition, critical literacy **(+)**
- differentiation between moralistic and ideologic perspective on CT **(+) differentiation useful, (o) while both considered implicitly SC**
- adding feelings/habits and deepening the idea of knowledge concerning CT **(+) extendable in SC**
- from consumption to production of meaning **(o)**
[C1: concepts] / [C1.2: spatial domain]
[C1: concepts] / [C1.3: citizenship domain]
- differing congruent types of citizens regarding different tasks of citizenship including critical/ emancipated approach **(+) extendable; (o) while congruent objectives**
- concept to distinguish between civics and citizenship **(+)**
[C2: educational approach]
- competence framework for Critical Citizenship **(+) details and variety of theoretical sources**
- collectivism and a community of enquiry (p. 82, quoting Fisher 2008) **(+) extendable**
- "inclusion of non-mainstream literature, history and ideas that create new knowledge and understanding in contrast to dominant discourses" (p. 87, quoting DEJAEGHERE & TUDBALL 2007) **(o) concerning geomedia**

Intersection 2 – GIBSON, RIMMINGTON & LANDWEHR-BROWN 2008:
[C1: concepts] / [C1.1: Critical Thinking]
- at this: CT as one competence among others, defined as "disciplined and self-directed. It encompasses logic and reasoning skills such as: comparing, classifying, determining cause and effect, patterning, deductive and inductive reasoning, predicting, sequencing, planning, hypothesizing, and critiquing" (p. 17, quoting MARZANO & POLLOCK 2001), focusing on evaluation of third-hand information **(o) application; (+) definition of tasks/skills**
- reflection is more experienced-based, CT more information-based → rationality **(+)**
- connection to reflection (core-concept of SC) and metacognition: CT "requires the practice of reflection and metacognition in order to make one's thinking more precise, defensible, and unambiguous to others" (p. 17) **(o)**
- important role of communication competence **(o)**
- further competences (a.o.): ability to change perspectives, resist simplifications **(o)**
[C1: concepts] / [C1.2: spatial domain]
- spatial justice **(o)**
[C1: concepts] / [C1.3: citizenship domain]
- focal point on experience of cultural differences (rather classic usage of term) **(-)**
- participation in globalized world **(o)**
- competence: to know about power **(o)**
[C2: educational approach]
- starting at an elite education (gifted learners) **(-)**
- including technological approach for intercultural communication and collaboration / role of technology to make own experiences **(o)**
- "dialogic co-construction of meanings" (p. 12) and "co-reflective activity" (p. 15) **valuable detail extension (+)**
- authentic goal of learning situation **(o)**

Intersection 3 – DAM & VOLMAN 2004:
[C1: concepts] / [C1.1: Critical Thinking]
- CT and reflective thinking: "focused on deciding what to believe or do" (p. 362, quoting ENNIS 1991) **(o)**

- "formulating hypotheses, alternative ways of viewing a problem, questions, possible solutions, and plans for investigating something" (p. 362, zit. Ennis 1991) **(o)**
- "analyzing arguments, judging credibility of sources, identifying the focus of the issue, and answering and asking clarifying and/or challenging questions" (p. 362, quoting Ennis 1991) **(o) and (-) for concept of credibility**
- attitudes/dispositions: "be prepared to determine and maintain focus on the conclusion or question, willing to take the whole situation into account, prepared to seek for reasons, to being well informed, willing to look for alternatives, and withholding judgement when evidence and reasons are insuficient" (p. 362, quoting ENNIS 1991) **(o) and (+) systematization useful**
- concept of rationality **(+)**

[C1: concepts] / [C1.2: spatial domain]
- "Students should be taught to read the world" (p. 364, quoting FREIRE & MACEDO 1987) **(o)**

[C1: concepts] / [C1.3: citizenship domain]
- participate critically in communities and social practices **(o)**
- "nowadays people are not expected to 'know their place' but to 'determine their own position'" (p. 360) **(o)**
- "making choices and knowing why you are making that choice, respecting the choices and opinions of others, communicating about these, thereby forming their own opinion, and making it known" (p. 360) (o) and **(+) strengthen social competence in SC, which is basically included in normative background**

[C2: educational approach]
- active and interactive, problem-based learning with real-life, meaningful situations orientated to participation in communities of learning and communities of practice **(o)**
- learning environment with "heuristic, ill-defined, messy and complex problems" (p. 370) **(+)**
- "learning contexts must be chosen which students can make sense of and hence have a feeling of responsibility to participate critically in the practice in question" (p. 375) (o) cooperative learning in a non-competitive climate **(+) lines for potential practical application of SC education**

Intersection 4 – HOFREITER et al. 2007:
[C1: concepts] / [C1.1: Critical Thinking]
- "Reasonable, reflective thinking that is focused on deciding what to believe or do" (p. 150, quoting Ennis, 1987) **(o)**
- CT is "also affected by emotion and morality, which are not addressed in traditional" (p. 156) CT **(+)**
- skills: "Interpretation (understand information); analysis (identify the main arguments presented); evaluation (judge whether this argument is credible and valid based on the logic and evidence given); inference (decide what to believe or do based on solid logic, and to understand the consequences of this decision); explanation (communicate the process of reasoning to others)" (p. 150) **(o) and (-) for concepts of subjectivity and interest in SC**
- "inquisitiveness (concern to become and remained well-informed); truth-seeking (willingness to face one's own biases and reconsider views); CT self-confidence (trust in one's ability to reason); open-mindedness (flexibility in considering alternative viewpoints); systematicity (systematic thinking that follows a linear process); analyticity (willingness to pick apart your own and others' logic); cognitive maturity (being persistent in seeking the truth)" (p. 150, quoting FACIONE 1998) **(-) interfering concepts of truth/objectivity**
- "Prepare citizens to understand and evaluate complex arguments about current issues" (p. 150) **(o)**
- focus on logical reasoning **(+)**

[C1: concepts] / [C1.2: spatial domain]
[C1: concepts] / [C1.3: citizenship domain]
- CT comprises "skills and dispositions that can help citizens make sense of their world and participate in a democratic dialogue" (p. 150) **(+) more existentialist concept of sense than in SC**

[Category 2: Educational approach]
- teach CT explicitly and with a meta-perspective and legitimation on the concept **(o)**
- open self-reflection of instructors **(o) and (+) concerning openness**
- use real-world examples to teach CT skills in context **(o)**
- "begin with students' core values, then move to information and logic" (p. 155) **(+)**
- allowing students to practice, with evaluation as a crucial component **(+) ideas for practical application of SC**

3.3 Intersection framework
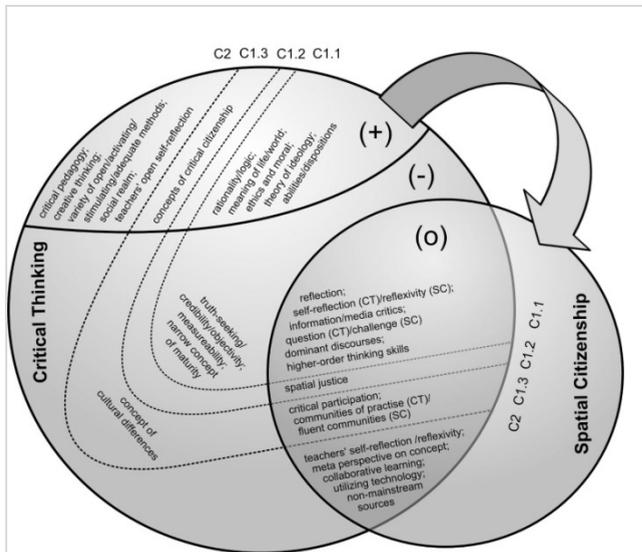
Fig. 1: CT and SC: a diagram of intersections and potential contributions (own diagram)

The concept map (Figure 1) summarizes the main results of all analyzed papers in keywords and answers the research questions by illustrating the intersections between CT and SC (o) as overlaps and the potential contributions from CT to SC (+). The category of non-congruence of both concepts emerged from content analysis and will be especially useful if potential contributions from CT are to be implemented into the SC approach. Although the field of potential contributions is compatible with SC, it is not completely free from linkages to non-congruent aspects. This (-) field indicates where special prudence is needed when enriching SC with aspects from CT in order to avoid conflicts between theoretical concepts, and to maintain consistency within SC. For instance, the concept of maturity plays a crucial role in SC, meaning the ability to challenge potentially all socially constructed rules and advocating one's interests (while upholding justice through democratic negotiation), while BARAK et al. (2007: 364) define maturity as a measurable variable: "Directing class discussions related to a concept/phenomenon or a problem – encouraging students to ask questions and present their own solutions." To quote another example, as fundamentally constructivist approach SC is not compatible with positivist formulations of 'truth-seeking' as to be found in several CT sources.

In sum, the above visualisation lends weight to the assumed closeness of both concepts (CT and SC) and corresponding educational approaches. Intersections, as illustrated, are to be identified in all categories including the domain-specific categories of 'spatial domain' and 'citizenship domain'. Apart from that, common principles in education such as meta-perspective and teachers' reflexivity can be noticed. As the study included differing papers and therefore approaches of CT, the visualisation summarises the maximum of closeness of CT and SC, excluding incongruent aspects which are not present over all CT papers, and

focusing on overlaps. This allows a stronger focus on real potential contributions, accounting for this paper's aim.

However, even in the intersection area predominantly congruent aspects operate under differing names. In the intersection area (+), for instance, in C1.1 the cross-domain concepts of reflection and reflexivity appear, but the latter one is termed 'self-reflection' in CT, while the term of reflexivity is utilized under similar meaning in SC. The C2-terms 'community of practice' in CT and 'fluent communities' in SC principally share a common ground and are both situated within the citizenship domain related to practical application, both describing that the concepts of CT and SC are not reduced to fixed entities, but work in persistently reviving communities constructed by the attribution of meaning.

Naturally, full congruence is never, even in the intersection area, given, as each aspect is rooted and utilised within its theoretical/conceptual framework. For instance, the use of new technology within SC is a core aspect, while in CT it is one method among others respectively a possible method at the intersection of CT and citizenship (cf. GIBSON et al. 2008). Within the category C1.2, the spatial domain, 'spatial justice' is also a common concept, but with differences in detail and in the theoretical basis. While in CT it is directed towards intercultural justice in a world citizenship (cf. GIBSON et al. 2008), in SC it is connected to the mature appropriation of space, enabling citizens to produce and communicate alternative rules extending the degrees of freedom for action in space.

In conclusion, while taking account of the closeness of the concepts, the research question for intersections between CT and SC must be answered with precise distinctions concerning the theoretical backgrounds, which are partly fuzzy and not always unfolded in full detail within each paper. Answering the second research question for contributions to SC education, there are several useful aspects that are so far only rudimentary developed in SC because this concept is just at the beginning of being transferred to practical learning environments. Altogether, the closeness of CT and SC in the educational realm becomes particularly obvious when considering that the content analysis did not identify any aspects that are incongruent with SC. Additionally, there are potentially valuable contributions from the conceptual field that could help to prepare and improve a SC education, such as the CT principles of rationality and logical thinking. Parts of the concept are consolidations of ideas basically initiated within SC, such as a focus on moral and ethical aspects, as present in CT, while others are theoretical concepts and terms useful for the refining and/or labelling of aspects already implicitly anchored in SC. Complex approaches, like Critical Citizenship by JOHNSON & MORRIS (2010) and its diversified theoretical background will need intensive theoretical work to be utilised for SC but promises worthwhile contributions, probably also with impulses for SC education.

4　　Conclusions and further Development

The presented framework in Figure 1 corroborates the hypotheses 1) that CT and SC share a common ground, and 2) that CT competences are relevant to an education for SC. Nevertheless, the transfer of aspects and ideas must take place considering the complexity of the underlying theoretical frameworks. Substantial concepts potentially valuable such as rationality, Critical Citizenship and Critical Pedagogy will have to be analyzed in more detail, paying attention to hidden incompatibilities to SC, and going beyond the obviously

incongruent aspects marked in the visualisation. In sum, aspects displayed in the visualisation as potential contributions require further investigation both in theory and in practical applications and evaluation in learning environments.

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