

Harnessing digital community mapping for the development of primary and secondary students' civic competences: a case study.

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Abstract. In this study, we examine a pedagogical activity centered around the collaborative construction of a digital community map, involving students from 4th to 7th grade. Our primary focus is to explore how engaging students in meaningful activities related to their local environment can facilitate the development of civic and social competences. Furthermore, we propose a methodology for analyzing the digital artifacts created by students, with the goal of examining the connection between the discursive actions carried out through the artifacts and different types of social and civic competences. The analysis enables us to discuss four distinct categories of artifacts: Task-oriented, Reflexive/descriptive, Critical/problematizing, and Transformative/agentive. Each category encompasses artifacts that embody a specific set of discursive actions and corresponds to different competences. We claim that identifying the discursive actions that the students perform by means of the artifacts can help teachers to assess the students' competences during this type of pedagogical activities.

Keywords: community mapping, civic competences, triological learning

1 Introduction

In the National guidelines for the school curriculum released in 2018, the Scientific Committee appointed by the Italian Ministry of Education stated that all learning should contribute to building the tools of citizenship and nurturing social and civic competences. This statement reveals the emphasis that recent policies have put on the development of social and civic competences. At the same time, scholars in the field of learning and education have been paying a growing attention to the civic participation of young people [1], and to the emergence of social movements as important sites for learning [2]. Nevertheless, while the Italian ministry offered a detailed description of the cultural competences associated to disciplinary learning since 2012, social and civic competences have been discussed in a more general way within the national policy documents. Therefore, the transition from a content based-curriculum aimed principally at the acquisition of disciplinary knowledge to a competence based curriculum oriented specifically at the development of social and civic competences is still a challenging task for teachers.

Some authors have claimed that place-based learning can be one of the approaches able to support the development of civic and social competences and can provide

opportunities for the enactment of active citizenship by children in different contexts [3, 4]. Place-based learning can be defined as an approach to schooling where the local environment becomes the integrating element in students' education. This integrating function of the local environment is expected to facilitate the connections between students, their life worlds, their experiences in different settings and formal education [5]. The potential of this approach for civic education is enhanced by the fact that students' emerging sense of place and sense of belonging have been considered as important aspects for youth conceptions of citizenship [6, 7].

Within the broad field of place-based learning approaches, in this article, we focus on community mapping (CM, also known as participatory mapping, or local mapping). CM consists of a collective exploration and representation of local knowledge, of visions held by community members, and of the relationships between spatial, physical, personal, and cultural elements of place [8]. Several authors argued that creating and sharing community maps can promote civic awareness by enabling students to explore local issues that matter to the community and can help students cultivate a deeper sense of place [9]. Therefore, integrating community mapping into the curriculum is expected to offer opportunities for students to develop a sense of contribution in their communities, and at the same time allows them to learn important concepts, skills, and technologies [10]. An important aspect of educational projects involving community mapping is that the students can engage in "authentic intellectual work" that has meaning beyond the classroom [11].

In the present study, we examine a pedagogical activity based on the collaborative construction of a digital community map by 4th to 7th grade students. In particular, we discuss how such learning activity might offer opportunities for learning processes that address the need to develop civic and social competences and provide an analysis of the artifacts that the students developed during the project. The analysis is aimed at examining the relationship between the discursive actions performed through the digital artifacts and different types of social and civic competences.

2 Background and literature

During the last few decades, also thanks to technological development of GPS and online maps, we have witnessed a growing use of geospatial mapping in a wide range of contexts, including both formal education and informal learning projects involving either adults or children [12, 13]. As discussed by Literat [14], when used with adult populations, participatory mapping has been employed extensively with indigenous communities in an effort to protect the resources of the local community [15], and as a means to mediate local conflicts regarding land use and resource ownership [16]. In addition, several participatory mapping projects have been implemented by means of geospatial tools to address immediate, real-world concerns including social problems such as prostitution and social perceptions of crime and safety [17, 18, 19].

In research with children and youth, some accounts of participatory mapping have mainly focused on the development of spatial cognition in young children [14]. Accordingly, several research projects involving child-generated maps were aimed at determining children's spatial awareness and their ability to produce and interpret maps. In addition, previous research has adopted community mapping as a pedagogical approach for environmental education, showing how different "ways of knowing" nature are enacted by the students through this kind of activity [8]. Finally, a growing number of authors have adopted community mapping as a vehicle for students to develop a range of knowledge, skills, and dispositions that are central for the development of citizenship competences [20]. For example, scholars have discussed how the use of mapping can contribute to promote an understanding of

local history [21], to develop knowledge concerning how racial inclusion and exclusion are spatially expressed in narratives [22], to acquire a deeper sense of place [23, 24] and to nurture dispositions for civic awareness and action [25].

Some projects of community mapping with children involved the sharing of the projects' results with city officials and other stakeholders to encourage changes in governance and participation. The social processes emerging through this interaction with stakeholders are expected to give the students a rare opportunity to publicly articulate themselves in relation to a wider world and might contribute to enhance their sense of efficacy [20]. This literature provides grounds for discussing the emancipatory role of mapping in young peoples' lives and the way it affects their political formation [26].

The literature briefly discussed above allows to conclude that community mapping projects can be considered as extremely relevant for the development of a curriculum aimed at developing social and civic competences. Accordingly, in this study we aim to analyze and discuss how the discursive actions enacted through the artifacts can provide insights on the social and civic competences enacted during the activity.

In the following sections we present the aims of the study and the research context. Afterwards, we discuss the methods adopted for the analysis, present our findings and discuss the results of the study.

3 Aims and research questions

Our main focus is on examining the various types of discursive actions manifested through the artifacts generated by the students and how each type of artifact can be linked to specific competences. We begin with the premise that language functions as a means of social action [27]. In this context, language encompasses not only spoken or written texts but also extends to all semiotic modalities, encompassing multimodal digital artifacts that incorporate written texts, audio recordings, visual representations, and more. The research questions can be summarized as follows:

1. What kind of discursive actions do the students perform by means of the digital artifacts produced during the project?
2. How can social and civic competences be examined through the analysis of the artifacts that the students produced during the project?

4 Context and participants

This study involved about 400 students aged 9 to 12 and participating in a project on active and responsible citizenship carried out in two small towns in the South of Italy. The project was designed based on the principles of dialogical learning [28, 29] and involved the co-construction of digital objects and the negotiation of meanings concerning right and duties. In particular, the dialogical object of the project was a collective community map collaboratively constructed by the students, with the continuous advice of teachers and professional educators. The final map contained only the places that were considered significant by the students, thus emphasizing the "authentic" nature of the pedagogical activity [30].

In addition to face-to-face classes, when possible and necessary, the students interacted within the online platform Google Classroom, as a tool to facilitate communication between participants and help them in the construction of the shared artifacts. Google Classroom was chosen in agreement with the teachers because it was already adopted by the school and all the students were familiar with its features. The

learning activities were based on the principles of blended learning [31], but the design of the activities varied to a significant degree based on needs and restrictions caused by the pandemic [32] at time requiring to carry all the activities exclusively online. The teachers and expert educators who implemented this project participated both to face-to-face and online meetings with the students, providing continuous support for the students' activities.

During the project's first phase, the focus was on discussing which were the places that the students considered meaningful, including both places having a positive and a negative connotation. This served not only to provide an initial overview of places considered significant by the students, but also to initiate a process of reflection on the meanings that children associated to different places. In each classroom, the participants introduced themselves and briefly talked about the places that they perceived as most significant. In this way, a list of relevant places was created with the contribution of all the students. The list was partly created on the Jamboard integrated into "Google Classroom". Whenever feasible, synchronous interaction was arranged for this activity. However, to foster inclusive learning processes [33], the learning environment was arranged flexibly and in each classroom the teachers and the educators adapted the design and took decisions on the tools to be used based on the emerging needs¹. Through collective discussion in both the online and offline setting, the participants were able to comment and provide their own personal opinions.

After the initial plenary discussion within each participating classroom, the interaction among the students was organized through the composition of collaborative groups, each of which engaged in the construction of a digital artifact that should be attached to the collective map. The main task assigned to the students in this phase was to create a digital artifact that would represent to the larger community their own understanding of civic rights and duties associated to a place of their choice. The task design was inspired by the approach of knowledge building [34, 35] and knowledge creation [36, 37], which emphasize the collaborative and creative work of students who are expected to actively engage in the creation and progressive refinement of artifacts. The teachers and the educators provided advice and technical support, helping the students to decide which tool would be used for the creation of each artifact. Some groups used some of the tools integrated in Google classroom (eg. Google Docs, Google Slides), while other groups decided to use different tools (for example, external tools for the creation of interactive slideshows). In order to facilitate group work, each member of the group was assigned a role (e.g. secretary, spokesperson, coordinator).²

Later, with the help of the teachers and the educators, the collective digital map was created and each artifact made by the students was embedded into the description of the places included in the map. Thus, starting from the artifacts created within the group, a collective map was generated, representing the final artifact. The map - created by means of the MyMaps application (<https://www.google.com/intl/it/maps/about/mymaps/>) - represents all the places that the students decided to include. The meanings associated to each place were communicated through the collective artifacts, which might include images, videos,

¹ For example, the teachers and educators could adopt different arrangements of technological tools in case of technical problems during the meetings. In addition, considering that some of the students joining from home often encountered connectivity issues and that several classroom included students with Special Education Needs, the discussion was often continued asynchronously using the Forum.

² The students also received a written description of each role. For example, in the case of the spokesperson: "The spokesperson will present the team's final product to the entire classroom, utilizing the document prepared by the secretary".

songs, texts and interactive content. The activity also included elements of gamification [38]³. The project, in addition to the classroom activities with the students, also involved the presentation of the map to the local community and the negotiation of further actions. In particular, the project leaders agreed with the municipality that this map might constitute the starting point for further activities that would involve the children in the life of the larger community.

5 Methods

The study adopts a “multi-voiced research practice” [39] based on the iterative dialogic interpretation of the students discursive practices involving the collaboration between researchers and educators working on the project. The qualitative methodological approach was inspired by ethnography [40] and characterized by the progressive, non-linear development of theory and by the continuous interaction of theory and data throughout the process [41]. The main data used for the present study are the digital artifacts created by the students. In order to reach a more nuanced interpretation, several types of data were used as secondary datasets: 1) video-recordings of a sample of activities taking place in the classroom; 2) forum posts created by teachers and students during the online activities; 3) a survey administered at the end of the project; 4) interviews to teachers and educators involved in the project.

In particular, the data analysis involved the iterative qualitative coding of the artifacts that allowed to examine the discursive actions inscribed in the students’ artifacts and the competences that could be inferred from each artifact. The analysis involved the following steps:

1. Preliminary exploration of the whole dataset by 1 researcher and the project coordinator
2. coding of the students’ artifacts, also involving the consultation of secondary data when needed to enhance interpretation of the students’ intended meanings
3. Meetings/interviews with teachers and educators to enrich the researchers’ interpretations

During the preliminary analysis of the dataset, the category system used for coding the artifacts was developed in interaction with the data, rather than exclusively based on a specific theoretical approach. The aim initially was to examine how the students used language to communicate their perspectives on rights and duties associated to the chosen places. As mentioned above, the researchers did not consider only written texts but extended the analysis to all semiotic modalities, encompassing multimodal digital artifacts that incorporate written texts, audio recordings, visual representations, and more. After a few iterations of coding and discussion, the researchers identified four ways in which the students used discourse within each artifact. Some isomorphy was noted between the codes developed by the researchers and the categories of the taxonomy of learning outcomes developed by Collins and Biggs [42]. See Table 1 for a summary of the final coding system, including both the identified discursive actions and the corresponding categories of the SOLO taxonomy. The Structure of the Observed Learning Outcome (SOLO) taxonomy is a conceptual instrument used specifically for classifying learning outcomes in terms of their complexity, thus allowing to examine the quality of the students’ work rather than the quantity of knowledge acquired. In this sense, the taxonomy is expected to describe

³ For example, by completing a task, each group gained points, and a certain number of points was necessary to gain the right to publish the artifact in the collective map.

the levels of understanding and competence that learners can achieve when mastering a topic or concept.

According to the solo taxonomy, a basic levels of skills can be associated to the ability of students to follow simple procedures, identify and name objects that are expected to be known by the students at the end of a learning activity. At this level, learners can identify or recall isolated pieces of information related to the topic, but they cannot connect them together. For example, a student might be able to identify the branches of the local government or name non-governmental organizations operating in his region of residence, but the explanation of the role of each branch and organization, as well as their interactions with each other is limited.

A higher level of complexity is reached when the students are able not only to name but also to describe the knowledge content of the learning activity, to combine different relevant aspects of such content and perform serial skills that go beyond the simple application of procedures. This level indicates that learners can identify and connect several pieces of information related to the topic, but they do not have a holistic understanding of how they fit together. For example, a student at this level can explain the purpose and function of each branch of government and ONG, but their understanding of the relationship between them and the impact of important issues related to their functioning is limited.

The third level of skills is defined by the authors as relational, since involve the integration of acquired knowledge into a structure, which allows the students not only to describe but also to analyze, criticize and develop meaningful arguments based on the acquired knowledge. At this level, learners can demonstrate a deep understanding of the topic by connecting different pieces of information and creating a coherent and organized framework for the knowledge. For example, a student's analysis might demonstrate a deep understanding of the complex relationship between ONGs and branches of government and their ability to work together to satisfy the needs of the local community.

The most complex level of competence involves even more complex activities such as generating new knowledge, making hypothesis, developing theories and reflecting on the topic at hand. This level represents the highest level of understanding and indicates that learners can apply their knowledge to new and unfamiliar situations. Learners at this level can use their knowledge to create new ideas or solve problems that go beyond what they have learned during the learning activity, demonstrating that they fully master the topic at hand. A student demonstrating to reach this level in the context of an educational activity on civic and social competences might be able to apply their understanding of democratic principles to analyze and solve complex societal issues, such as social justice or economic equality. For example, they might propose a policy that promotes equity and justice in their local community based on their knowledge of democratic principles.

Table 1. Correspondence between the final codes applied to artifacts, the SOLO taxonomy categories, and the observed discursive practices

Artifact Codes	SOLO taxonomy	Discursive actions embedded in the artifacts
Task oriented	Unistructural: Follow simple procedures, identify or recall isolated pieces of information related to the topic, without connecting them together.	Discourse oriented at the accomplishment of the task, respecting the formal requirements communicated by the teachers: naming places, adding a picture or a sentence to express a meaning associated to the place.
Reflexive/descriptive	Multistructural: Identify and connect several pieces of	Discourse principally based on the description of places and simple

Critical/problematizing	<p>information related to the topic, without a holistic understanding of how they fit together; enacts serial skills beyond the simple application of procedures.</p> <p>Relational: a deep understanding of the topic, connection of different pieces of information and creation of a coherent and organized framework for knowledge, goes beyond description, displays critical thinking and argumentation.</p>	<p>storytelling, with the inclusion of isolated reflective insights on rights and duties: describing places, stating issues related to rights and duties, occasional reflection on their implications.</p> <p>Discourse connected with societal issues relevant for the local community: critical analysis of the rights and duties associated to the chosen places, discussion of why/how expected rights or duties are not fulfilled/enacted in the described places, reference to local history and public discussions.</p>
Transformative/agentive	<p>Extended abstract: use of knowledge to create new ideas or solve problems that go beyond what is learned during a learning activity, demonstrate full mastery of the topic at hand.</p>	<p>Discourse oriented at proposing societal change: suggestion of improvements to enhance the satisfaction of expected rights or the enactment of civic duties associated to the chosen place; complex argumentative discourse to find solutions for societal problems.</p>

Thus, before the last iteration of the coding, the researchers merged the codes emerging from the analysis with the categories of the SOLO taxonomy, adapting their definition to the specific nature of the task tackled by the students in the project. In this way, we have developed the final coding scheme based on the categories described in Table 1.

In the following section, we will use an example of each type of students' artifact to discuss how they could be used as means for categorizing different types of discursive actions embedded in the artifacts produced by the students and for evaluating civic and social competences in the context of this type of project. In the discussion and conclusions section we will briefly discuss the implication of this study for competence based education oriented specifically at the development of social and civic competences.

6 Findings

The first category that we included in our codebook was used to categorize all the artifacts that were constituted only of a picture and/or a brief text relevant for the topic of the educational activity. Figure 1 contains an example of the artifacts associated to this category. As it is possible to see in Figure 1, the students have identified the chosen place on the map, visible on the top of the figure, recalled its name "Campetto di Pudicino", and wrote a brief description underneath.

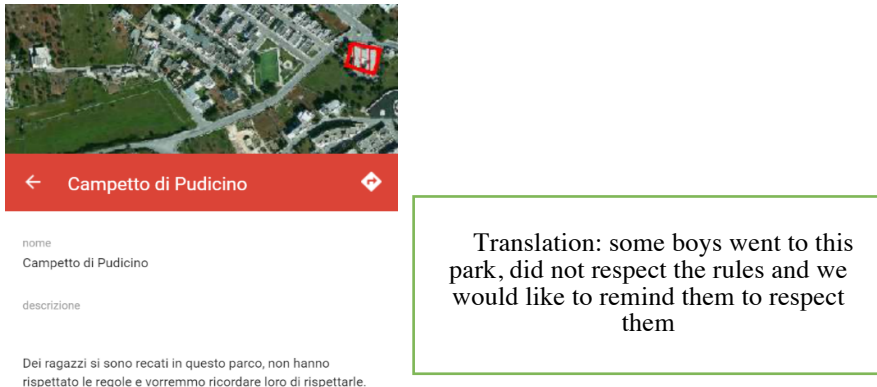


Fig. 1. Artifact produced by a group of 5^a grade students (on the left), translation of the text written by the students (on the right)

The text written by the students is quite generic, it seems to refer to an episode in which they have witnessed an infraction of some non-specified rules and the claim that they wish to remind the authors of the infraction that rules should be respected. Although very simple, this artifact implies that the students have followed the correct procedure to produce the artifact and that they engaged in some “unistructural” sense making activities concerning right and duties. More in general, in this category, the students’ discourse is mainly oriented at respecting the formal requirements of the task, thus we have categorized the corresponding discursive action as “task oriented”.

The second category was used to categorize descriptive representations of places through which the students combined a series of ideas and thoughts relevant for the topic at hand. Figure 2 contains an example of the artifacts associated to this category. In this artifact, the students have chosen a song representing their sensemaking and included a link allowing the reader to listen to the song. The picture at the top of Figure 2 shows a snapshot from the video of the song. The students wrote a more detailed description if compared with the previous group, combining different elements and ideas related to the topic at hand.

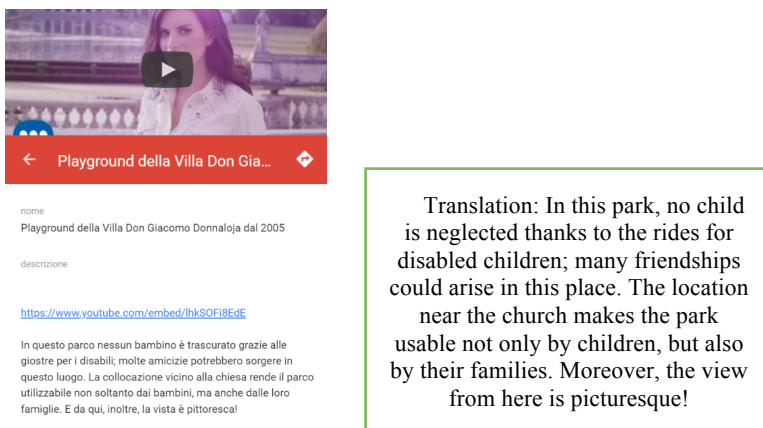


Fig. 2. Artifact produced by a group of 6^a grade students (on the left), translation of the text written by the students (on the right)

The text written by the students addresses the rights of disable children to play thanks to the presence of accessible playground equipment and the potential for social relations possible in this place. In addition, the text contains a reflective sentence in which the students state that the location of the park near the Church facilitates the usage of the park by families. Finally, the children note that the view from that place is picturesque. Thus, in this artifact, the students have combined different notions, ideas and reflections raised during the collaborative activity. In this case, the students do not seem to use discourse principally to respect the formal requirements of the task. Rather, the students describe the contents of their meaning making, at times by means of narrative discourse, and/or briefly state issues related to rights and duties, occasional reflection on their implications. Accordingly, since the students used the language principally to describe places and/or to reflect on rights and duties associated to them, we categorized the discursive action as “descriptive/reflective”.

The third category of artifacts includes textual, visual or interactive content demonstrating that the students engaged in critical thinking and propose convincing arguments to justify their ideas concerning civic rights and duties. These artifacts are fundamentally more complex than the ones discussed above. For example, one group of 7th grade students prepared a 5 pages text to critically discuss the degraded state of the municipal community garden of the town (“Villa Comunale Giuseppe Garibaldi”). Firstly, the students discuss the results of their historical research, through which they develop a nuanced understanding of the significance of that place for the town. For example, the students recall that the area where the garden is located during the 19th century was labelled “Three Elms dump”; they reflect on the fact that 1968 was a year of socio-cultural change and that in line with the spirit of the time, some citizens asked the major to use the lower part of the garden (called sottovilla) as an outdoor dancing hall. Some renovations were made to transform that space into the venue for important events, hosting events of live music with important musicians and singers. The garden is described as an important place for the social life of the small city in that historical period. Afterwards, the students also discuss in detail how, since the 1970, the place underwent an alternation of periods of positive development and periods of neglect. They also critically discuss how public funds were potentially misused in 2017. Indeed, some funds were allocated to the maintenance and renovation of the garden, but there is no proof that the planned work was actually carried out, since the place is still not accessible to the public. At the end of the document, the students also critically reflect on the current state of the garden, connecting their reflections on what they have learned concerning its history (Excerpt 1).

Excerpt 1. The municipal garden in 2021

In conclusion, we can deduce that to this day (MAY 2021), the glorious and memorable green area of the Sottovilla remains inaccessible and inactive. Only now we still need to document the environmental degradation and the vandalism damage. We can imagine that we will find it full of waste and weeds of all kinds since there has not even been regular maintenance. We have returned to the origins when that site was called "Three Elms dump".

Excerpt 1, contains the concluding remark of the students, who try to guess the current state of the garden and imagine that, after all the events narrated and critically discussed in their text, it returned to its origin, when it was called the “Three Elms Dump”. This artifact shows a high degree of critical thinking. The students analyze the historical facts that they traced, try to explain the causes of the events and argue for the need to find out more information concerning the current situation. In general, in the artifacts belonging to this category, the students have used discourse mainly to discuss societal problems relevant for the local community, thus we have labeled the

discursive action “Critical/problematising”. Nevertheless, in this category, the creation of new knowledge, the generation of insight for action, which is at the core of the fourth category of the present analysis, is limited.

In order to discuss the last type of artifacts we identified, we briefly discuss an interactive slide presentation created by a group of 6th grade students. The slide presentation is titled “Change game: let’s (re)build our environment” and it consists of 17 interactive slides. Figure 3 includes a sample of four slides extracted from the presentation. On the slide titled “La lista delle nostre priorità”, the students describe the priorities that they think are most crucial for addressing the environmental crisis. The slide “Alberobello smart and green” contains a representation of a trullo – a typical building of the city – with interactive elements that allow to visualize principles for the environmentally sound management of processes. For example, the text visible in the picture translates as follows: “Use of local products and implementation of waste management services according to the principles of circular economy”. The last slide in the figure contains three of the ideas of change discussed within the group, namely a virtual tourist guide, an application allowing to book both a parking place and a table at a restaurant, and a smart bin able to communicate with the waste management company in real time to ensure it can be emptied when needed and optimize garbage collection.



Fig. 3. Contents extracted from the artifact titled “Change game: let’s (re)build our environment”.

This artifact demonstrates that not only the students have been reflecting on the environmental crisis, on the causes of climate change and on its possible implications for human life, but they have also set objectives and priorities, and developed ideas for change starting from their own habits and their local community. The three ideas contained in the slide “Le nostre idee” (“Our ideas”), are well grounded in local discussions on the needs for community development. For example, one of the problems often encountered in this small touristic town, which was discussed at times within several groups during the project, is that finding a free parking slot might not be easy and cars might keep moving around for extended periods of time.

In addition, a problem perceived by the students is that when the town is crowded with tourists, the rubbish bins are not timely emptied, so that often garbage falls on the street or people gets the habit of throwing it out of the bins. In sum, in this category, the students’ discourse is oriented at proposing societal change and usually

contains complex argumentative discourse to find solutions for societal problems. Accordingly, we used the label “transformative/agentive” for the discursive actions accomplished through these artifacts. In the SOLO taxonomy, these kinds of actions are associated with the highest level of competence, in which the students demonstrate that they use knowledge to create new ideas or solve problems that go beyond what is learned during a learning activity, demonstrating full mastery of the topic at hand.

7 Discussion and conclusions

The analysis of the artifacts discussed above allows to discuss four different types of discursive actions that were enacted by the groups of students when creating the artifacts to be included in the map. The artifacts belonging to the first category (Task oriented/unistructural artifacts) seem to reflect the fact that some groups of students based their engagement on a “task-completion goal” [43]). The students engaged in the activity mainly to be minimally compliant with the teachers requests and to get the task done as quickly as possible. Observations communicated by the educators also connected this kind of artifacts to difficulties that some groups have encountered when trying to create a shared understanding of the task or to the disengagement of some of the teachers during some phases of the project.

The artifacts belonging to the second category (Descriptive), instead, seem to be related to the didactic contract [44] evoked by the task in the students’ perception. The didactic contract consists of the the norms and the reciprocal expectations established in the classroom micro-cultures and activated when students address a school task. This concept is relevant for this study because, based on the shared interpretations made by the researchers and the educators, the interpretation of the task by the students seemed to be implicitly influenced by the expectation associated to school tasks, which typically involve combining different pieces of knowledge and creating texts that allow the teachers to assess the students’ knowledge, their ability to create connections and to accurately describe some phenomena. In addition, some of the artifacts in this category might reflect the fact that especially younger students could face challenges when trying to collectively engage in critical thinking and propose innovative solutions to complex problems. Indeed, in the dataset it is possible to observe a tendency of higher level of complexity in the artifacts created by 6th and 7th grade students, who more frequently submitted artifacts that were included in the third or fourth category (although there are significant exceptions).

The third category (Critical/problematising) seems to reflect the fact that several groups of students engaged in intensive information seeking and collaborative sensemaking to address social and civic issues that they considered important for themselves and their communities. These groups, critically examined different sources of knowledge, and authentically attempted to reach a comprehensive understanding of the societal issues connected to the place they had chosen. The artifacts belonging to the last category (Transformative/agentive), instead, not necessarily display the same level of critical thinking observed in the previous type of artifacts, but these groups of students discursively attempted at sketching solutions and imagining possibilities for transforming the places that were significant for them.

We believe that these categories lend themselves well for reaching a deeper understanding of how different kind of discursive actions can be associated to different competences that are crucial for civic participation and active citizenship. Our argument is not that a valid assessment of the students’ competences can be

based exclusively on the categorization of the artifacts included in the map, but that the qualitative analysis of these artifacts allow to infer the discursive actions that the students perform (e.g. describing, reflecting, problematizing, displaying agency, generating new knowledge), and that each of these actions can be connected to a specific set of competences. Therefore, we argue that the categories we developed in this study, partially informed by the SOLO taxonomy, can be easily adapted for the examination of learning in the contexts of open ended collaborative activities that allow the students to develop different types of knowledge artifacts. In addition, it can be considered by teachers as an aid for the evaluation of the students civic competences based on the systematic analysis of discursive actions.

The main difference between our categorization and the SOLO taxonomy is that our categories are not rigidly organized in terms of growing levels of competence. Even though the first two categories tend to be linked to artifacts displaying simpler discursive actions, and thus might imply a lower level of competences, we believe that the profound reflections communicated in the document on the municipal garden, in our perspective do not display necessarily a lower level of competence if compared with some of the artifacts that were coded using the last category.

To conclude, we emphasize that the community mapping activity provided the students significant opportunities to develop civic and social competences, even though not all of the students engaged in the activity in the same way. The fact that the children's maps were shared with the local community, also offered opportunities of "cultural brokerage", that is, they could potentially facilitate the exchange of meanings both within the learning community and beyond its boundaries [45]. In this sense, these projects can go beyond the acquisition of knowledge, competence and skills by the students, contributing to set up opportunities for meaningful intergenerational exchanges within the larger community for local development projects.

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