# A SOCIOMATERIAL PERSPECTIVE FOR LEARNING
## -Exploring atelier activities-

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Neuchâtel, le 18 janvier 2019

Le doyen
Pierre Alain Mariaux

**ABSTRACT**

This dissertation study develops a sociomaterial understanding of learning based on the idea that learning is not simply as an individualistic, human-centered mental activity, but as enacted in relations and forms of connections among humans and nonhumans, parts, and systems. According to that, I present how I created and analyzed seven third spaces (ateliers) wherein I consider the sociomaterial entanglement through which learning takes shape. This study draws upon four research studies. The first attempts to investigate participants' agency by adopting a sociomaterial perspective in order to consider the actions among the participants, the discourses, and the materials not as separate but as intertwined parts. The second and the third research studies present the students' active involvement in a design of two ateliers in collaboration with a cultural association. In the second research study , we investigate the net of students' positioning construction to more closely examine its relationship with materials, others, and culture, taking into account the temporal dimension in which it is embedded. In the third research study, we consider atelier activity as a resource that permits students to create learning connections, to show how content, knowledge, and materials from one context (university) are made relevant by students in another context (out of university), and vice versa, by developing a new expertise as a boundary crosser. The forth research study is more focused on how the ludic dimension offered by the atelier activity promotes new forms of collaboration between parents and the teacher. All these studies contribute to A) consider learning as a process ,not merely one that is individual, but between different actors (human and non-human) and the multiple activity systems involved; B) a rethink of our role as an educational researcher and teacher; C) the redesign of pedagogical practices, by promoting actors' engagement and responsibility, and the taking up of new challenges by future educational teachers and researchers; and D) consideration of the pedagogical implications for future learning practices.

**Key words**: sociomaterial perspective, third spaces, pedagogical practices

**RESUMÉ**

Cette thèse développe une compréhension sociomatérielle de l'apprentissage en s'appuyant sur l'idée que ce dernier n'est pas simplement une activité individuelle et centrée sur l'humain, mais qu'il tient aussi compte des relations entre humains et non-humains, parties et systèmes. Dans ce sens, nous avons créé et analysé sept tiers lieux (ateliers). La thèse est composée de quatre études. La première analyse l'agentivité des participants dans une perspective sociomatérielle, en considérant les actions entre participants, discours et matériaux non pas comme parties séparées mais étroitement liées. Les deuxièmes et troisièmes études s'intéressent à la participation active des étudiants pendant la conception de deux ateliers menés en collaboration avec une association culturelle. L'étude 2 analyse le réseau qui contribue à la construction du positionnement des étudiants, et plus précisément sa relation avec les matériaux, les autres et la culture, tout en tenant compte de la dimension temporelle dans laquelle ce réseau est intégré. L'étude 3 considère quant à elle l'activité de l'atelier comme une ressource qui permet aux étudiants de créer des liens d'apprentissage : les contenus, les savoirs et les matériaux ont été adaptés d'un contexte (l'université) à une autre (en dehors de l'université) par les étudiants qui ont développé une nouvelle expertise *transfrontalière*. Enfin, l'étude 4 montre comment les dimensions ludiques offertes par les activités en atelier peuvent promouvoir de nouvelles formes de collaboration entre parents et enseignants. L'ensemble de ces études contribuent à: A) considérer l'apprentissage comme un processus non seulement individuel mais aussi entre différents acteurs (humain et non-humains) et les multiples systèmes d'activité impliqués; B) repenser le rôle du chercheur et de l'enseignant ; C) redéfinir les pratiques pédagogiques en promouvant l'engagement des acteurs et leur responsabilité tout en proposant de nouveaux défis pour les futurs enseignants et chercheurs; D) considérer les implications pédagogiques pour les pratiques d'apprentissage à venir.

**Mots clés** : perspective sociomatérielle ; pratiques pédagogiques ; tiers lieux

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**ACKNOWLEDGMENTS**

*You think you meet people by chance, but when you look back on your life you realize there was nothing random going on at all*– Jerome Bruner

This sentence expresses at best my feeling today. This dissertation was far for an individual and solitary work on the contrary many people contribute to my personal and academic growth during my doctoral studies.

Firstly, I would like to express my sincere gratitude to my advisor Prof. Antonio Iannaccone for his expert advice, open-mindedness and friendly guidance. Thank for all the coffee break conversations we have had. Thank you to allow me to grow as scholar during my Ph.D study and related research.

I would like also to thank the rest of my thesis committee: Prof. Marcelo Giglio from the University of Teaching Education of Bienne, Dr. Nathalie Muller Murza from the University of Lausanne and Prof. Kristiina Kumpulainen, from the University of Helsinki, Thank you for your brilliant suggestions and insightful comments that improve the quality of my work.

I am also profoundly grateful to the co-authors of the articles: Prof. ass Laure Kloetzer, Prof. Francesco Arcidiacono, Prof. Beatrice M. Ligorio. Thank you so much for your contribution. I look forward to future opportunities to collaborate and learn from you in the future. I also thank all the reviewers for their valuable comments.

During these years, I had the change to visit several communities who have been crucial for me. I want to thank people in Hebrew University of Jerusalem in particular Prof. Baruch Schwarz for the intellectual exchanges. As well as the Prof. Kristina Kumpulainen's research group in the University of Helsinki. In particular, I want to thank Antti Rajala for the stimulating discussions and the warm hospitality. Your supportive attitude is always a great inspiration for me.

Many thanks go also to the people of CUPSYNET network, EDSE doctoral program and STUDIO seminars with whom I have shared many theoretical and methodological discussions that contribute significantly to advance my work.

I extend my sincere thanks to the following people for encouraging my work in various ways: Barbara Rogoff, Christiane Moro, Kyoko Murakami, Vittoria Cesari Lusso, Christiane Giglio-Droz. Many thanks also to the members of IPE who shared these crucial years with me: Anne-Nelly Perret-Clermont, Tania Zittoun, Gail Womersley, Joséphine Convertini, Flavia Cangia, Fabienne Gfeller, Martina Cabra, Marie-France Allaz, Romain Boissonnade, Piera Gabola, Hana Hawlina, Stéphanie Breux, Constance de Saint Laurent, Teuta Mehmeti, Déborah Levitan, Leonie Lietchi. In particular, I am deeply grateful to Marianne Lovis. I would like also to thank all the associations, children, students and parents who have participated in this work.

A sincere THANK YOU to my friends near and far. You knew how to make me feel at home during these years. I am honoured to have you in my life. I will thank you each of you personally over these lines.

Least but not last, would like to express my deepest gratitude to my parents and sister to be always at my side in a way that only a family can be. I thank also my parents-in law for their valuable support.

A François, insostituibile e paziente presenza al mio fianco, con il quale continuo a *guardare i miei sogni arrivare leggeri* e ad Alessio che dall'alto dei suoi due anni ci sta insegnando l'arte della meraviglia dedico questo lavoro e la vita che verrà.

# 1. INTRODUCTION

## 1.1 Overview

Standard theories of learning are focused on processes wherein a subject acquires some identifiable knowledge within the confines of textbooks and classrooms in which people are unable to use their daily experiences as support for what they do (Saljo, 2003). The problem as underlined by Engeström (1991) is that "students do not come to school as empty vessels (…) they live in a multi-layered world of texts in which textbooks are only a visible tip of an iceberg" (p. 254). He argued that it was necessary to move away from an encapsulation of school learning, in order to take into account, the networks of learning that "transcend the institutional boundaries of the school and turn the school into a collective instrument" (p. 257). In this dissertation, I argue in favor of this alternative approach of learning practice. In doing so, I align myself with these studies, which see learning not as something that takes place only in formal education, but that considers the micro-culture of praxis (Bruner, 1996, p. 132) in which learning is embedded.

As I will show in my work, various providers of learning outside university (schools, local associations, family) offer different learning challenges to seek and bring information, knowledge, and practices across contexts. These multiple contexts demand we prepare ourselves, as researchers, teachers, and learners, to develop new expertise, in addition to that required for traditional classroom-based teaching.

Based on the idea that learning is achieved through relations, I discuss the potential offered by a sociomaterial perspective and activity theory in preparing to face this challenge and in designing new pedagogic practices. I adopt a sociomaterial perspective that challenges our understanding of learning as solely social or material, in which objects and subjects interact as separate entities, in order to examine how they act together, and "insist upon attending to the material that is enmeshed with the social, technical and human" (Fenwick, Edwards, & Sawchuk, 2011, p. 3). This perspective

decenters the individualized human as the strict focal point for education when examining the dynamic process of materialization – including material and discursive practices – through which things emerge and act in what are indeterminate entanglements of local everyday practice (Fenwick, 2015).

I then consider the whole activity system in which this network is embedded. Fenwick et al. (2011) identified the following key contributions of activity theory to a sociomaterial perspective. First, activity theory highlights "the sociomaterial interactions particularly among artefacts, systems objects and patterns, individual or group perspectives and the histories through which these dynamics emerged" (p. 9). Second, it analyses the ongoing dynamic interactions of people and artifacts with an expansive view of learning (Engeström, 1987, 2001). Third, it examines the relations among material artifacts as well as perspectives and rules enmeshed in the system. Fourth, it focuses on action as a "dimension of assemblage not only on the relationship between physical and mental action" (Fenwick et al., 2011, p. 166).

I used a pedagogical material device (an atelier) to put these contributions into practice. I discuss how I created and analyzed these ateliers, wherein I consider the sociomaterial entanglement through which learning takes shape. My argument draws upon four research studies, each of which corresponds to a published or submitted article. Firstly, I investigate the enactment between the actions, the discourses, and the materials of ateliers' participants. Secondly, we analyzed the net of students' positioning construction to more closely examine its relationship with materials, others, and culture, taking into account the temporal dimension in which it is embedded. Thirdly, we consider atelier activity as a resource that permits students to create learning connections, to show how content, knowledge, and materials from one context (university) are made relevant by students in another context (out of university), and vice versa, by developing a new expertise as a boundary crosser. Finally, we show how interactions that emerge during the atelier activity create opportunities for all the actors involved to rethink their roles.

All these studies contribute to: A) advance my understanding of learning as a process, not merely one that is individual, but between different actors (human and non-human) and the multiple activity systems involved; B) a rethink of my role as an educational researcher and teacher; C) the redesign of pedagogical practices, by promoting actors' engagement and responsibility, and the taking up of new challenges by future educational teachers and researchers; and D) consideration of the pedagogical implications for future learning practices.

### 1.2 Dissertation outline

In Chapter 2, I introduce the theoretical framework adopted in my dissertation. The chapter is divided into two parts. In the first part, I trace the roots of the sociomaterial perspective; in the second part, I introduce contributions of the activity theory. Chapter 3 presents the research questions. The atelier design is illustrated in Chapter 4, in which the influences and characteristics of the atelier are considered, and an overview is provided of the different set up and data collection involved in the four research studies, the latter of which are presented in Chapter 5. In Chapter 6, I refer to my research experience to illustrate the implications and the challenges that emerged from my work. The concluding chapter provides an overview of the main results, and the implications for future educational research and teaching practice, with suggestions for future research openings.

### 1.3 List of original articles

- Cattaruzza, E. (2018). Exploring children's agency in a designed atelier: a socio-material perspective. *Psihologija*, 1–15
- Cattaruzza, E., Ligorio, M. B., Iannaccone, A. (submitted). Sociomateriality as partner in the polyphony of students' positioning. *Learning, Culture and Social Interaction.*
- Cattaruzza, E., Iannaccone, A., & Kloetzer, L. (submitted). Learning movements that emerge in a highly educational boundary zone. *Dialogic Pedagogy.* – This article received the Best Student Paper Award (SIG17&25, in Cambridge in August 2018)
- Cattaruzza, E., Iannaccone, A., & Arcidiacono, F. (In press). Provoking social changes in a family-school space of activity*. Psychology & Society* (special issue)

## 2. THEORETICAL FRAMEWORK

This chapter is divided into two parts. In the first part, after presenting the growing interest for material culture in the interdisciplinary field, this chapter focuses on how material culture and material objects are considered in human developmental and educational studies in order to introduce the sociomaterial perspective adopted in this dissertation. In the second section, I introduce the development of the activity theory based on three generations. In particular, I focus on the third generation, underlining its contribution to my work.

### 2.1 Roots of the sociomaterial perspective

Hicks and Beaudry (2010) ask for a "material cultural turn" in humanities and social sciences (p. 2). In phenomenological studies, as Harman (2010) underlined, when Husserl urges a return to the things themselves, he is referring to the things as present in consciousness (p. 18). Heidegger (1962/1953), in turn, introduces a distinction between two ways of approaching the world: the present-at-hand (*Vorhandenheit*) and the ready-to-hand (*Zuhandenheit*). For Heidegger, "present-at-hand" refers to how things are given to us in mere perception, without any reference to their usefulness. When something is given as present-at-hand, they are viewed as merely theoretical. In contrast, "ready-to-hand" things are given "in-order-to" accomplish something else. Heidegger's favorite example is the hammer. Moro (2014, 2016) underlined the unprecedented reversal proposed by Heidegger in comparison to Kant. She argued that Kant considers the objects as substance and as support of proprieties: "Heidegger's advantage is to immerse us into the object's world and its pragmata" (Moro, 2016, p. 594). The advantage of engaging with Heidegger's views is that he provides new insight on the issue of materiality by making us aware of the conventional use of things (Moro, 2015).

In the archeological field, the work of Miller (1987, 2005) has been pivotal in material culture. This research was initially based on an ethno-archeological analysis of the role

of artifacts as categories in an Indian village. The work shifted toward the industrialized West, with a study of mass consumption (1987). A rich debate appeared in *Archaeological Dialogues*, further corroborating this line of investigation about materiality. The debate started with an article by Tim Ingold, entitled "Materials against materiality" (2007), in which he directs attention from the materiality of objects to the proprieties of materials. To underline this point, he introduces his argument with a wet stone experiment:

> "Before you begin to read this article, please go outside and find a largish stone, though not so big that it cannot be easily lifted and carried indoors. Bring it in, and immerse it in a pail of water or under a running tap. Then place it before you on your desk (…). Take a good look at it." (p. 1).

It seems clear that he wanted to remind us of the need to engage directly with the very things we want to understand and to appreciate their constant transformation.

In the same issue, Tilley (2007), with his contribution "Materiality in materials", pushes Ingold's argument further by proposing that: "to consider the materiality of stone is to consider its social significance, the stone as meaningful, as implicated in social acts and events and the stories of people's lives, in both the past and the present" (p. 13). Withmore (2007) advances on this by employing the example of a basic association between an archeologist and a pick, to demonstrate that "an archeologist with a pick is different from an archeologist without a pick just as the pick is different within the hands of the archeologist" (p. 552). The interesting point is that the author considers not the human in himself or the tool, but the combined action: all interlocutors, actors, and actants are on the same footing. He published a manifesto of symmetrical archeology to underline the importance of the topic:

> "a symmetrical archaeology attends, not to how 'individuals' get on in the world, but rather to how a distributed collective, an entanglement of humans and things,

> negotiates a complex web of interactions with a diversity of other entities (whether materials, things or our fellow creatures)" (p. 547).

Mauss' (2000/1923–1924) comparative study of the relationship between a person and things in the form of Maori gifts, in which an anthropological perspective was adopted, brought new life to the debates. For Mauss, a gift contains within itself a part of its giver. In a chapter entitled "The social life of things", Appadurai (1986) examined the ways in which objects acquire a social life. This study evokes the Statherian ideas of distributed personhood (Strathern, 1988), according to which, "Melanesians see objects as the detached parts of people circulating through the social body in complex ways" (Gosden & Marshall, 1999, p. 173). In line with that, the sociocultural anthropologist Gell (1998) points out that "artworks, and by extension other items of material culture, could be used to extend or distribute human social agency" (p. 6). Gell feels, as relayed by Gosden and Marshall (1999), that "objects can be seen as social actors in that they construct and influence the field of social action in ways which would not occur if they did not exist" (p. 173). Accordingly, DeBeer (2010) uses the examples of viewing a flowering rose or looking at a Monet to illustrate the power of things to transform not only our physical appearance but also our inner life.

In this sense, the actor-network theory (ANT) shows how entities that we commonly work with are in fact assemblages of a myriad of items connected with other human and non-human things (Latour, 1994, 2005). The ANT was particularly provocative by arguing that human and non-human entities should not be treated as detached or separated entities, a priori (Callon and Latour 1992; Latour 1993). Even if Latour (2007) argues that "objects are not the medium but the mediators, at the same level as the other actors" [1] (p. 56), he maintains, as Hetherington and Wegerif (2018) underlined, the human/non-human binary that Barad (2007) seeks to overcome with her concept of intra-activity. Sørensen's (2009) work considered the ANT in relation to materiality in education. Her research into spatiality reclaims the symmetrical approach, in order to

[1] Translated from the original French version "or les objets ne sont pas des moyens mais des mediateurs au meme titre que tous les autres actants".

reveal "the emerging relational formations in which human and nonhuman components may take part, and the components that do take part contribute to performing these spatial formations" (p. 75), by evidencing "a blindness toward the question of how educational practice is affected by materials" (p. 2).

In line with her work, Moro (2015) considered whether material culture is still terra incognita for psychology today, by highlighting that the crucial role of material culture and material objects in human developmental and educational processes has been long-neglected (Moro, 2016; see also Iannaccone, 2017). I identified three research fields that tried to address to this research gap. They are not exhaustive, but they aim to trace the roots of the sociomaterial perspective adopted in this dissertation. These are described below.

*Three research fields in educational and developmental research*

The first research field focuses on the relationship between the material environment and learning practices. In line with that, Lawn and Grosvenor (2005) analyzed the relevance of the material cultures of schooling to unpack "the ways in which class and school routines bound together objects and actions" (p. 13). Martin (2006) and Baucal (2012) analyzed the impact of the classroom environment. This was attempted by: examining the relationship between the physical setting and the behavior of the teacher and students (Martin, 2006) and studying how students' learning is scaffolded by the design of the classroom (Baucal, 2012).

In 2008, Stanford University launched a pedagogical environment called Fab Lab "to allow everyday people to solve their own problems by producing (rather than purchasing or outsourcing) the tools they need" (Halverson & Sheridan, 2014, p. 499). This was inscribed in the growing culture of hands-on making, creating, designing, and innovating that was started in North America in 2005 by the creator of the maker movement.

As Halverson and Sheridan (2014) underlined, bringing the maker movement into education conversation has the potential to transform how we understand what counts as learning, as a learner, and as a learning environment. In accordance with that, the educational makerspaces run by FUSE studios are learning environments organized around a set of challenging sequences to promote students' interest and engagement in science, technology, engineering, and mathematics learning (Jona et al., 2015). In a typical constructionist learning environment, as the FUSE studios are, there is rarely a fixed curriculum. "Children use technology to build projects and teachers act as facilitators of the process" (Blikstein, 2013, p. 5). More recently, Kumpulainen and colleagues (Kumpulainen, Mikkola, Rajala, & Kaartinen, 2017) have developed a range of approaches from makerspace practices, "in which individuals can work on creative design projects that are personally and/or collectively meaningful" (p. 14).

The research of Ishiguro (2016) and Kontopodis (2016) focused on children's feeding environment. Ishiguro studied how the nursery teacher revised the children's environment to assist their eating and to inform them of the social expectations, in a day-care center in Japan. In a series of ethnographic analyses conducted in nursery schools, Kontopodis (2016) analyzed how specific arrangements of foods and other things educate young children to eat in moderation, to change their ethnic dietary habits, and to become *modern citizens*.

In the training profession, work by Rémery and Filliettaz (2017) analyzed how the relationship between tutor and trainees is organized according to interactions between the environment and the patient.

The second field of research concerns the crucial role of the object in the pre-linguist period. The naturalist view of the object was predominant in studies of infant cognitive development in mainstream psychology. This view implies, as Rodriguez (2007) underlined, that children relate to objects in a spontaneous manner, without taking into account any actions upon the object or any adult–baby joint interaction.

For Piaget (1936/1977, 1937/1977), the center of knowledge of an object is the learning subject. He was interested in the logical description of an action as a demonstration of intelligence before language. In his view, the object is considered only for its physical and logical characteristics. As Sinha (2009) states, "the object that the infant and young child encounters in Piaget's world is a curiously abstract thing, lacking semiotic and functional value, any object being substitutable for any other object" (p. 177). In such a conception, the objects are dispossessed of their social and cultural characteristics. In Vygotsky's work (1997), the objects become cultural entities. He distinguishes two types of activity: mediating activity and mediated activity (Vigotsky, 1978). He quoted Hegel to define mediating activity as "causing objects to act and react on each other in accordance with their own nature, in this way, without any direct interference in the process, carries out reason's own intentions" (p. 54). In contrast, regarding mediated activity, he highlights that "This analysis provides a sound basis for assigning the use of signs to the category of mediated activity, for the essence of sign use consists in man's affecting behavior through signs" (p. 54). In his perspective, tools and signs are both mediators, but they orient human behavior in different ways (Moro, Schneuwly & Brossard, 1997). Drawing on Marx (1977), he stated that:

> "the tool serves for convening man's activity to the object of his activity, it is directed outward, it must result in one change or another in the object (…)"

In contrast to this external object orientation, he argued that "The sign changes nothing in the object of the psychological operation, it is a means of psychological action on behavior, one's own or another's" (Vygotsky, 1997, p. 62).

As underlined by Gillespie and Zittoun (2010), this fundamental distinction characterized the two main sub-traditions of research in cultural psychology: the activity tradition (Engeström, 1987) and the semiotic mediation tradition (Valsiner, 2007, p. 31–32). The first is more oriented on tools and emphasizes material mediators, while semiotic mediation emphasizes the semiotic mediators as a central tenet to

advance our understanding of culture as source and resource of psychological development (Moro & Muller Mirza, 2014).

The pragmatist approach highlights the importance of considering both sign and tools in order to understand the use of resources that can transcend both the culture-agency antinomy (Cornish & Gillespie, 2009; Gillespie & Zittoun, 2010) and the only verbal thinking (Moro & Rodriguez, 2005). In line with that, Moro and Rodriguez (1998) introduced a pragmatic and semiotic approach to objects, which enlarged the Vygotskian semiotic mediation hypothesis to encompass the pre-linguist period. They considered the functional permanence of the object related to "their everyday uses, social meaning and cultural functions whose acquisition by children takes place in educational contexts" (Rodriguez & Moro, 2008, p. 94). In order to move away from a dualistic perspective that separates the subject–subject interaction from subject–object interactions, they analyzed data based on the simultaneous cooperation of three poles, the baby (7–13 months), the object, and others, in order to understand the communication and thinking functioning in their simultaneity (Moro & Rodriguez, 1997).

We can distinguish two phases of their studies (Moro, 2016). The first phase studied the relationship between the material culture of human words and psychological development. They analyzed a series of everyday observations regarding the appropriation of an object's uses in the triadic interaction of child–object–adult, in order to illustrate that the semiotic mediation of psychological functioning is not exclusively due to the advent of language. The second phase (Dimitrova & Moro, 2013; Dimitrova, Moro, & Mohr, 2015) investigated the role of material objects that belong to material culture in a wider and deeper conception of the psyche, related to our culture-inclusive perspective of early psychological development.

> "By reconsidering material culture and material objects in a pragmatic and semiotic view, object pragmatics research restores the complexity of the relation of the subject to the worlds to other people and to herself and helps to better

> understand how progressively the human world, material objects and material culture since the very beginning, allow to reconnect material culture to psychological development"(Moro, 2016, p. 599).

Iannaccone's research (Iannaccone, Savarese, & Manzi, 2018) similarly considers material objects as activators of linguistic practices and as active agents of interpersonal exchanges.

The third field of research investigates the relationship between materials and teachers' practices. Kontopodis and Perret-Clermont (2016) put forward the notion of sociomaterial orderings, which refers to semiotic and material relations, and to the interrelations between materiality and sociality (Kontopodis, 2012; Latour, 2005; Law & Mol, 1995), in order to show how "teaching, learning and development take place on various levels and across a wide range of interrelated socio-material orderings" (p. 9). The role of educational material tools in teacher–student interactions was also investigated by Chaiklin (2002), who recommended the use of graphic representation in addition to verbal instruction. Taisson-Perdicakis (2013) showed, through longitudinal research, how the basic abilities related to materiality constitute a resource in teaching/learning to read. In line with this, studies by Hultman and Lenz Taguchi (2010), and Muller Mirza (2016), have analyzed the role of photographic images in the semiotization process. Recently, Hetherington and Wegerif (2018) identified a lack of explicit consideration by teachers of the interaction between the material nature of practice and classroom dialogue, by suggesting adopting a material-dialogic perspective.

*Conclusion: Tracing the sociomaterial approach*

The studies described above do not explicitly break drown the binary distinction between humans and non-humans; on the contrary, they assume that human subjects are different or separate from the material. By adopting a sociomaterial perspective, I explore an alternative view that considers their relationships rather than their separate parts (Barad, 2007).

Barad and colleagues' (Barad & Nelson, 1996) notion of "intra-actions" marked a profound conceptual shift. It contrasted with the usual notion of interaction that presumes the prior existence of independent entities or relata: "intra-actions include the larger material arrangement (i.e. the set of material practices) that effects an agential cut between subject and object" (Barad, 2007, p. 140). These works contributed to the emergence of a sociomaterial perspective in education, according to which all learning practices are both inherently material and social or sociomaterial (Orliwoski & Scott, 2008).

Two shared understandings of these sociomaterial perspectives can be identified. First, "a focus on materials as dynamic and enmeshed with human activity in everyday practice" (Fenwick, 2015, p. 86). Second, consideration of all sociomaterial objects as heterogeneous assemblages of natural, technical, and cognitive elements. In this sense, "teaching is not simply about the relationships between humans, but it is also about the networks of humans and things through which teaching and learning are translated and enacted" (Fenwick et al., 2011, p. 7).

Based on Barad's research (2007) on material-discursive process, Hetherington and Wegerif (2018) showed a lack of explicit consideration by teachers of the interaction between materials in a science classroom and classroom dialogue. They suggest, as I have mentioned above, an alternative view of a dialogic approach to relationships with materials, in order to investigate the role of the material-dialogic relationship in learning that emerges in science classrooms.

The decentration of the subjects that emerge makes the notion of agency a problematic term. In this light, a key contribution of the sociomaterial approach is "to liberate agency from its conceptual confines as a human-generated force. Instead, agency, as well as knowledge, is understood as *enacted* in the emergence and interactions" (Fenwick & Edwards, 2013, p. 61). In this sense, as Barad argues (2007), agency is not an attribute, but the ongoing reconfigurations of the world (p. 141). When agency is recognized as a distributed effect produced in material webs of human and non-human assemblages,

Bennet (2010) suggests that a more responsible, ecological politics is possible (Fenwick, 2015). Stetsenko (2017) affirmed that to shift away from the Cartesian conception of agency requires the conceptualization of agency as "at the intersection of social-collective and individual psychological planes of collaborative practices" (p. 225). In this dissertation, I analyze the heterogeneous network in which agency is embedded.

## 2.2 Development of the activity theory

Based on Marx and Engel's works, there are two main ideas underlying the activity theory. First, it involves deep contextualization and orienting to understand local practices (Engeström, 1999). Activity cannot be understood or analyzed outside the context in which it occurs. Hence, it is important to take into account not only the kinds of activities that people engage in, but to also consider: who is engaging in that activity, what their goals and intentions are, what objects or products result from the activity, the rules and norms that circumscribe that activity, and the larger community in which the activity occurs. Second, the mind does not exist prior to and without activities, but develops as a component part of human interaction with the world (Kaptelinin & Cole, 2002):

> "structure and development of human psychological processes emerge through culturally mediated, historically developing, practical activity" (Cole, 1996, p. 108).

Engeström (2001, 2016) presents the development of activity theory based on three generations.[2] The first starts with Vygotsky's unit of analysis: the triangular unity of

[2] Sawchuk and Stetsenko (2008) underlined how the three generational divisions proposed by Engeström do not fully capture shifts in the "deeply seated foundational grounds of CHAT [cultural historical activity theory] that took place over its history" (p. 342). They underlined the contrast between the initial revolutionary CHAT, represented by the troika, which implied the radical idea that there is no knowledge, human nature, or person that can be said to exist prior to and separate from the transformative process of engagement with the world, and the CHAT canonical traditions, wherein, in their view, "the notion of transformative collaborative practice ceased to be regarded" (p. 344).

subject, objects, and mediating artifacts (Vygotsky, 1978/1935; Wertsch, 1985). As Engeström (2016) affirms, "the crucial insight of this unit is the discovery of the dialectic between object and mediating artefact" (p. 107). The second generation is linked to Leont'ev's (1975) introduction of division of labor into the basic units of analysis. The importance of this second generation of activity theory was, as Daniels (2001) highlights, the focus on interrelations between the subject and their community. The third generation builds on the idea of multiple interacting activity systems that mutually interact (Engeström, 1987, 1999a, 1999b).

*First generation*

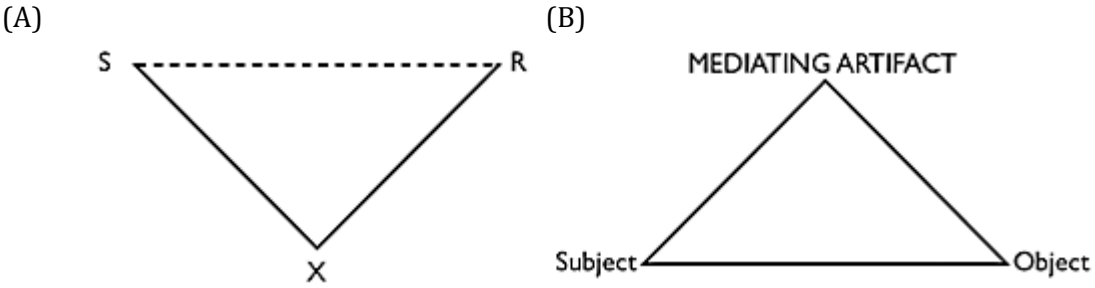
In the first generation, the unit of analysis was mediated action.Vygotsky's (1978/1935) concept of mediation, as Daniels (2001) underlines, "opens the way for the development of a non-deterministic account in which mediators serve as the means by which the individual acts upon and is acted upon by social, cultural and historical factors" (p. 14).

Vygotsky suggested three major classes of mediators: material tools, psychological tools, and other human beings (Kozulin, 1998).

> "Because this auxiliary stimulus possesses the specific function of reverse action, it transfers the psychological operation to higher and qualitatively new forms and permits humans, by the aid of extrinsic stimuli, to control their behavior from the outside" (Vygotsky, 1978/1935, p. 40).

The basic structure of human cognition that results from tool mediation has traditionally been pictured as a triangle, as in Fig. 2-1.

*Figure 2-1: Vygotsky's model of a mediated act and (B) its common reformulation* [3]




As Engeström (1999c) underlined, the mediating artifact auxiliary stimulus allows the "serious study of artifacts as integral and inseparable components of human functioning" (p. 29). Vygotsky affirms the importance of psychological tools as cultural artifacts. From Vygotsky's perspective, the use of psychological tools: a) introduces several new functions connected with the use of a given tool and with its control; and b) abolishes or makes unnecessary several natural processes, whose work is accomplished by the tool (Daniels, 2001, 2008).

To quote Vygotsky (1960/1981):

> "mastery of a psychological tool and through it mastery of a natural psychological function always raises the particular function to a higher level, increases and widens its activity, and recreates its structure and mechanism" (p. 142).

Psychological tools, as argued by Kozulin (1998), are introduced in the learning process in two different contexts (p. 160):

[3] Engeström, 2001, p. 134.

1) The context of learning content: where psychological tools provide the necessary cognitive component essential for the comprehension of material and the development of thinking associated with this material; and
2) Special cognitive education programs: of which the main goal is to make psychological tools available for students who, for a variety of reasons, may lack them.

The limitation of the first generation was that the unit of analysis remained individually focused. This was overcome with the subsequent generations.

*Second generation*

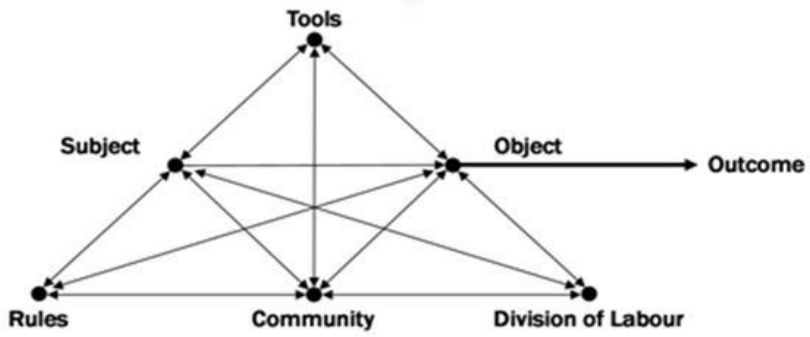
Leont'ev (1975, 1981) developed a distinction between activity and action, which was underdeveloped by Vygotsky. According to Leont'ev, several interrelated levels of analysis can be identified in the theory of activity (Wertsch, 1985). Associated with each level is a specific type of unit. At the first, most global level, there is the activity. Leont'ev defined an activity as "the non-additive, molar unit of life for the material, corporeal subject (…) the real function of this unit is to orient the subject in the world of objects" (Leont'ev, 1981, p. 46). As Leont'ev (1975) points out, there are two ways to use this term (Wertsch, 1979, 1985). He speaks of the activities of an activity (deyatel'nost') to describe one level of analysis. He uses the generic term "activity" in relation to his general theory (teoriya deyatel'nosti). The second level is focused on goal-directed action (deistvie). According to him, "one or the same action can be instrumental in realizing different activities" (Leont'ev, 1981, p. 61). In this sense, as Wertsch (1979) underlined, "the goal directed action of moving from one point to another could be executed while participating in different activities such as play, work or instruction" (p. 204). The third level of analysis concerns the operation associated with the concrete conditions under which the action is carried out. We can summarize the three level of analysis as follows (Wertsch, 1979):

1) Activity-motive

2) Action-goal
3) Operation-condition

As Hardman underlined (2007) when discussing the hierarchical levels of human functioning, Leontiev's theory does not go far enough to illustrate how individual actions are transformed into shared, collective objects through interactions with community members, or indeed how division of labor impacts on individual actions in a collective activity. Engeström's (1987) conceptualization of an activity system moves the theory forward by situating it more fully in context and focusing on the collective nature of all activity. As we can see in Fig. 2-2, the relations between subject and community are mediated, on the one hand, by "tools" and, on the other hand, by "rules". Communities, in turn, imply a "division of labor," reflecting the continuously negotiated distribution of tasks, powers, and responsibilities among the participants of the activity system.

*Figure 2-2: The basic mediational triangle expanded*[4]




*Third generation: expansive theory*

[4] Engeström, 1987, p. 78

The third generation builds on Davydov's theory of learning activity (1990). Like Galperin, Davydov argued that curriculum content must be knowledge-oriented, but schools also need to develop to a rather great extent social and communicative competences. Davydov's research (1990) promoted a new design of school subjects by developing a dialectical method of ascending from the abstract to the concrete (Davydov, 1990, 2008). According to him, learning activity proceeds via this ascension. He identified six learning actions constitutive of theoretical generalization (Davydov, 2008, pp. 125–126):

1) Transforming the conditions of the task in order to reveal the universal relationship of the object under study
2) Modeling the identified relationship in material, graphic, or literal form
3) Transforming the model of the relationship in order to study its properties in "pure form"
4) Constructing a system of particular tasks that are solvable by a general method
5) Monitoring and assessing performance of the preceding actions
6) Evaluating the assimilation of the general method that results from solving the given learning task.

Davydov's work has been developed further by Hedegaard (2002), who developed a double-move approach aimed at "integrating the children's everyday concept with subject matter concepts" (p. 79). "The double move approach gives a more prominent position to children's personal knowledge and interest, as well as more attention to children's family and community background. It also gives a way to address the goal of working with subject matter knowledge, structured in models of core conceptual relations" (Chaiklin & Hedegaard, 2013, p. 37). More recently, Stetsenko & Vianna (2009) argued that the active appropriation of cultural tools

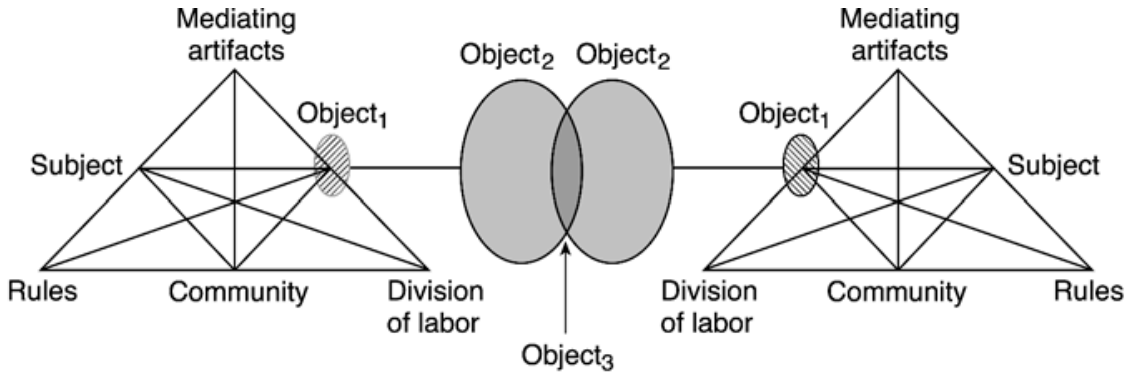
> "opened ways for effectively synthesizing top-down (teacher-centered) and bottom-up (child-centered) approaches by fostering active participation of

children in the construction of knowledge through exploration and inquiry into established sociocultural practices and relevant cultural tools introduced by teachers" (p. 51).

Davydov and colleagues' works were school-based, and this is the limitation underlined by Engeström (1999b). According to him, in Davydov's theory the locus of learning activity remains within the confines of the classroom. This probably explains, as he underlined, why none of the six learning actions included a critical questioning and rejection, or implied a construction of novel practices: "Transformations in collective activity systems and institutions were not integrated in his theoretical framework" (Tuomi-Gröhn & Engeström, 2003, p. 30). On the contrary, Engeström's (2016) theory of expansive learning focuses on learning processes in which the subject of learning is transformed from an individual to a collective activity system. The object of expansive learning activity is the entire activity system in which the learners are engaged. The third generation of activity theory adopts, as its unit of analysis, multiple activity systems that mutually interact.

In Fig. 3, as Engeström (2001) explained (p. 56), the object moves from an initial state of unreflected, situationally given raw material (object 1), to a collectively meaningful object (object 2), and to a potentially shared or jointly constructed object (object 3).

*Figure 2-3: Two interacting activity systems as the basis for the third generation*[5]




[5]Engeström, 2001, p. 136

In its current shape, the activity theory may be summarized with the help of the following five principles (Engeström, 1987, p. 174):

The first principle is that a collective, artifact-mediated and object-oriented activity system, seen in its network relations to other activity systems, is taken as the prime unit of analysis. Goal-directed individual and group actions, as well as automatic operations, are relatively independent but subordinate units of analysis, eventually understandable only when interpreted against the background of entire activity systems. Activity systems realize and reproduce themselves by generating actions and operations.

The second principle is the multivoicedness of activity systems. An activity system is always a community of multiple points of view, traditions, and interests. The division of labor in an activity creates various positions for the participants; the participants carry their own diverse histories, and the activity system itself carries multiple layers and strands of history engraved in its artifacts, rules, and conventions. The multivoicedness is multiplied in networks of interacting activity systems. It is a source of trouble and a source of innovation, demanding actions of translation and negotiation.

The third principle is historicity. Activity systems take shape and get transformed over lengthy periods of time. Their problems and potentials can only be understood against their own history. History itself needs to be studied as a local history of the activity and its objects, and as a history of the theoretical ideas and tools that have shaped the activity. Thus, medical work needs to be analyzed against the history of its local organization, and against the more global history of the medical concepts, procedures, and tools employed and accumulated in the local activity.

The fourth principle is the significant role of contradictions as sources of change and development. Contradictions are not the same as problems or conflicts. Contradictions are historically accumulating structural tensions within and between activity systems. The primary contradiction of activities in capitalism is between the use value and

exchange value of commodities. This primary contradiction pervades all elements of our activity systems. Activities are open systems. When an activity system adopts a new element from the outside (e.g. a modern technology or a new object), it often leads to an aggravated secondary contradiction where some old element (e.g. the rules or the division of labor) collides with the new one. Such contradictions generate disturbances and conflicts, but also innovative attempts to change the activity.

The fifth principle proclaims the possibility of expansive transformations in activity systems. Activity systems move through relatively long cycles of qualitative transformations. As the contradictions of an activity system are aggravated, some individual participants begin to question and deviate from its established norms. In some cases, this escalates into collaborative envisioning and a deliberate collective change of effort. An expansive transformation is accomplished when the object and motive of the activity are conceptualized to embrace a radically wider horizon of possibilities than in the previous mode of the activity. A full cycle of expansive transformation may be understood as a collective journey through the zone of proximal development of the activity.

*Expansive learning as multivoicedness and boundary crossing*

As Daniels (2008) underlined, the third generation of activity theory aims to develop conceptual tools to understand dialogues, multiple perspectives, and networks of interacting activity systems. Accordingly, for the second principle presented above, Engeström draws on Bakhtin's (1986) ideas of multivoicedness in order to move beyond the limitation of previous generations, which focused on a single activity system, to examine the activity system as a nexus of multiple points of view, traditions, and interests. Wertsch (1998) also considers multivoicedness as an important dimension of the sociohistorical context for communication, as it helps to explain how speakers understand or fail to understand each other. This multivoicedness, in Engeström's view, exponentially increases the networks of interacting activity systems.

In these multiple networks, the master–novice relationship becomes problematic because roles and skills are different in the various contexts; this issue demands a horizontal expertise that permits more dialogical and collaborative problem-solving based approaches (Konkola, Tuomi-Gröhn, Lambert, & Ludvigsen, 2007). A central feature of this kind of expertise may be characterized as the boundary crossing between activity systems "where practitioners must move across boundaries to seek and give help, to find information and tools wherever they happen to be available" (Engeström, Engeström, & Karkkainen, 1995, p. 332).

To understand this process, Lambert (2003) examined boundary crossing in the field of vocational teacher education in health care and social welfare. She introduced a special educational situation called learning studios to promote innovative learning as an interaction process that crossed boundaries over three activity systems (teacher education, institutes of health care and social welfare, health care and asocial welfare service delivery organization).

The idea of developmental transfer as an outcome of boundary crossing in an expansive learning process has been developed further by Tuomi-Gröhn and Engeström (2003), and Konkola et al. (2007). In these studies, this process is multi-directional and multifaceted, involving transitions between activity systems such as school and work.

> "What is transferred is not packages of knowledge and skills that remain intact; instead, the very process of such transfer involves active interpreting, modifying and reconstructing the skills and knowledge to be transferred" (Tuomi-Gröhn, Engeström, & Young, 2003 p. 4).

Konkola (2001), in turn, introduced the concept of a boundary zone to refer to the territory where participants from different activity systems meet. Promoting learning and developmental transfer at the boundary zone has fostered the emergence of a new kind of activity called a "boundary-zone activity".

> "In boundary-zone activity the subject is no longer an individual student performing his or her learning tasks separately from the practitioners and their work challenges, but a team consisting of one or more teachers, students and practitioners. This team has a shared task: to develop work practices by benefiting from each participant's theoretical and practical expertise and with the help of a network of the necessary activity systems" (Konkola et al., 2007, p. 224).

Boundary zones allow practitioners to express multiple alternatives, and through these debates create a new negotiated model of activity (Engeström, Pasanen, Toiviainen, & Haavisto, 2005), as I will show in research study 3.

*Conclusion*

The theoretical ground presented in this chapter is crucial to support my dissertation. I build on a sociomaterial perspective to structure atelier activity in which the subject is no longer considered an individual participant performing his or her learning tasks separately from the others and materials, and instead consider the network of humans and things through which the activity is enacted. Accordingly, I regard agency not as context-free (Kontopodis, 2012), but as relational and distributed (Orlikowski, 2010), produced in conjunction with a whole network of different human and non-human actors (Esser, Baader, Betz, & Hungerland, 2016) and enacted in sociocultural contexts (Rajala, Martin, & Kumpulainen, 2016). This echoes with Fenwick's work (2015), according to which, regarding the sociomaterial perspective, "all things – human and non-human hybrids and parts, knowledge and systems – emerge as *effects* of connections and activity" (p. 87).

As we have seen, the activity theory shows how the artifact-mediated construction of objects does not happen in a solitary manner, but is a collaborative and dialogic process in which different perspectives and voices meet and merge (Engeström, 1995). This makes activity theory an important analytical framework in which to understand the

interactions among systems and individual/group perspectives that emerged during the atelier activities in my studies. I also investigate: the new expertise that emerged, the participants' positioning construction, and the negotiations of roles. In addition, I rethink my practice as a researcher by configuring new challenges for future educational research.

## 3. RESEARCH QUESTIONS

This dissertation study aimed to develop a sociomaterial understanding of learning by providing three methodological contributions. First, it presents the implementation modalities of different ateliers. Second, it attempts to analyze the networks of the whole activity system by highlighting implications for participants and their learning connections across contexts. Third, it illustrates the challenges for researcher practice, and presents ideas for future educational research and for teachers interested in rethinking and improving their practice.

By referring to the atelier activities, the following research questions are addressed in the corresponding four research studies:

1. How we can explore agency by adopting a sociomaterial perspective?
2. How does students position themselves in relation to the materiality? How does materiality interconnect with other emerging voices of the student?
3. What opportunities for students' learning connections emerged?
4. What are the implications for parents and teacher relationship?

## 4. ATELIER DESIGN

This chapter introduces the elements that concurred to define the different ateliers' design. Firstly, I present the joint steps that I conducted during the field research and the characteristics that bring together the seven ateliers. Secondly, I show the different set up and data collection methods of the different research studies. Each research study corresponds to four articles, which are presented in the next chapter. Thirdly, I introduce two educational practices that have been the primary influencers of my work.

### 4.1 Atelier characteristics

Building on the theoretical perspectives presented in the previous chapter, the ateliers presented in this dissertation were conceived and set up to analyze the interactions between participants and materiality and the whole activity system in which they are engaged. The data for this dissertation are derived from seven ateliers. Firstly, I designed four ateliers (ateliers 2–5), in which I intended to study the interactions between participants and the sociomaterial proprieties of the ateliers activity. In the same years, I conducted, with a colleague, another atelier (atelier 1) as part of the project "Parents-School: Learning and Community", involving a primary school in Neuchâtel (Switzerland). The project was based on a collaboration between the Institute of Psychology and Education (University of Neuchâtel) and the Department of Family and Community Service of the Canton of Neuchâtel, initiated to encourage interactions between family and school. The data collected during this project aimed to advance my understanding about how the parent-teacher relations were reconfigured during the atelier activity. Thirdly, I analyzed a semester-long course, entitled "Materiality in context", in which I participated, with other colleagues, as a teacher-researcher in 2017. During this course, the students were involved in the design and set up of two ateliers (ateliers 6 and 7) for citizens, in particular children, in collaboration with a cultural association. This course was selected for this dissertation study because of its distinct and innovative pedagogical approach, which promoted actors' engagement and responsibility, and permitted consideration of the atelier as a resource

to analyze the net of students' positioning construction and students' learning movements across multiple contexts.

*Table 4-1: Overview of the ateliers' research focus*

| Year | Atelier(s) | Research focus |
|---|---|---|
| 2014–2015 | 1 | The reconfiguration of relations between parents & teacher |
| 2014–2015 | 2–5 | The network in which agency is embedded, analyzing the material-discursive entanglement |
| 2017 | 6 & 7 | The net of students' positioning construction |
| 2017 | 6 & 7 | Students' learning movements across contexts |

The following common steps were conducted during my field research.

*a) Preliminary steps*

- Six months before the atelier activity, a first meeting with the headmaster and the classroom teacher (atelier 1) and the associations' coordinators (ateliers 2–7) took place to organize the activity.
- One month before the activity, a second meeting was organized to share the tasks and to discuss the registration procedures. In this regard, a registration form to collect the inscriptions was provided by the teacher (atelier 1) and by the association coordinators (ateliers 2–5). In contrast, ateliers 6 and 7 involved open participation without inscriptions, in line with the philosophy of the association that

was involved. The teacher (atelier 1) and the associations' members (ateliers 2–7) were also involved in the conception of the flyer to promote network activity.

*b) Set up of the activity*

- 1 hour before the activity, the teacher (atelier 1) and students (ateliers 6 and 7) collaborated with me and a colleague to set up the space.
- The activity participants were: classmates from a primary school with their parents (atelier 1), children (ateliers 2–5), or citizens (in particular children with their parents) and students (ateliers 6 and 7)
- During the 1.5-hour-long activity, the participants were invited to create boats (ateliers 1–5), means of transportation for figurines (atelier 6), or musical instruments (atelier 7) through free exploration of recycled materials (see Tab. 4-2). The topic for ateliers 1–5 were chosen by the students during the "Materiality in context" course.

*Table 4-2: List of the main natural or recyclable materials used in the ateliers*[6]

| | |
|---|---|
| Natural materials | Small tree branches, sea shells |
| Paper | Office packs, colored gift packaging |
| Cordage | Colored strings, laces, fishing lines |
| Plastic | Tubes, boxes, lids, milk bottles |
| Polystyrene | Food packaging |
| Food containers | Egg containers, paper takeout containers, takeaway boxes |
| Assembly materials | Modeling materials, glue, adhesives |

[6] Adapted from Ferrari & Giacopini, 2005

- The teacher (atelier 1), the parents (atelier 5), and the association coordinators and students (ateliers 6 and 7) were also invited to contribute to the atelier by bringing some recycled materials from home (Table 4-2; Fig. 4.1).

*Figure 4-1:* Pictures of natural or recyclable materials used during the activity.[7]

- The teacher (atelier 1) and some of the associations' members (ateliers 2–7) actively participated in the activity with children.

*Figure 4-2: Overview of pieces made by students, children, and parents during an atelier*[8]

[7] These two photographs are taken by a professional photographer, hired for the project presented in studies 2 and 3.
[8] Pictures taken by students involved in research studies 2 and 3

*c) Follow up of the activity*

- A follow up was organized with the teacher (atelier 1), some of the association members and students (ateliers 6 and 7), and parents (atelier 1).
- Three focus groups and eight individual interviews were organized with students (ateliers 6 and 7), and two individual interviews were conducted with two of the association educators (ateliers 6 and 7). The results that emerged are discussed in research studies 2 and 3.

*Free explorations of materials embedded in a sociocultural environment*

All the atelier participants engaged with materials in a free exploration manner, without following top-down instructions. In research studies 2 and 3, I show how, by engaging in problem-solving situations encountered in the real world, the "student will also come to understand that knowledge is not acquired for the sake of knowledge per se but to be used for the real-life purposes" (Eun, 2010 p. 410). This echoes with Stetsenko and Arievitch's (2002) work, in which knowledge is conceived as an instrument of meaningful, historically evolved cultural practices. In this sense, being able to solve real-life problems effectively is an important indicator of cultural competence. This was, as Eun (2010) underlined, the focus of Vygotsky's developmental research. I now present some excerpts, selected from the dissertation data, to elucidate this assumption.

In the first examples (excerpts 1 and 2), selected from ateliers 6 and 7, the material was incorporated as a mediator of goal-directed action (Cole, 1996). The participant in question showed how a material propriety (iron wire) directed his action to obtain a better result. He was surprised to see that the piece of iron did not slip around a stick, and instead remained stationary; this unexpected "material behavior" was considered useful and determined the next step of his construction.

Excerpt 1:

*Student:* (…) I knew what I had to use to make my mechanism work and keep the different pieces together. But something surprised me actually. To fix my rubber band on the axis of the wheels (made of a wooden stick), I've folded a piece of solid iron wire. I thought, at the first sight, that the tension of the rubber band would have made the iron wire slip around the stick. But actually, during my first test, nothing moved, and that was twice as useful to me. I didn't have to pass through the step of gluing, and that gave me the opportunity to easily disassemble and reassemble everything.

In the second excerpt, the student did not have inspiration, so she decided to walk around and observe the variety of materials available, together with the other participants, who, like her, were walking around to find inspiration. In this case, the system of meaning was not immediate, as in the previous excerpt; it depends on the interpretive framework in which the participants position the materials (Iannaccone, 2017).

Excerpt 2:

*Student:* When my experience started, I didn't have the smallest inspiration. So, I decided to walk around and observe the available material. The materials were placed in different parts of the room and we were free to take anything we liked. There was something for every taste. There were stones, straws, jars, plastic bottles, cardboard pieces, pearls, shells, etc. Materials were highly varied. Some children rushed on certain materials, some others did the same as I did, that is to say, walking around and observing the available material and space, to be inspired.

A shift from an instrumental use to a reflective use emerged when participants become more familiar with the cultural system (Cole, 1996). According to Cole, a reflective mode

indicates a particular form of mindfulness in working with the artifacts, as we can observe in the following excerpts.

In excerpt 3, selected from atelier 6, a student explains an observed difference between the adults' and children's modifications of the materials proprieties. The child in question decided to modify the property of the aluminum by decorating it with other materials. On the contrary, the adult preferred to directly intervene with it by cutting and folding the material.

Excerpt 3:

*Student:* Observing the material used by the participants, I found out that three participants used aluminum cans, even though this material is difficult and dangerous to manipulate. It is interesting to observe that children and adults haven't modified cans in the same way: the boy changed the properties of aluminum surrounding it with a new material, while adults directly acted on the can, cutting and folding it.

Later, based on these observations, the same student presented an explication of these observed differences (excerpt 4). According to him, the adults had more conventional norms than children, and so their constructions reflect their reality not their imagination.

Excerpt 4:

*Student:* Me and the other participants were pleasantly surprised by the ambition and the creativity of this boy. I also noticed that adults had in their mind more social standards than children. Adults tended to manufacture musical instruments existing in reality, while children tended to manufacture invented objects.

The following example (excerpt 5) is based on a focus group (atelier 4), in which children illustrate how their boat came to be by discussing their different encountered difficulties.

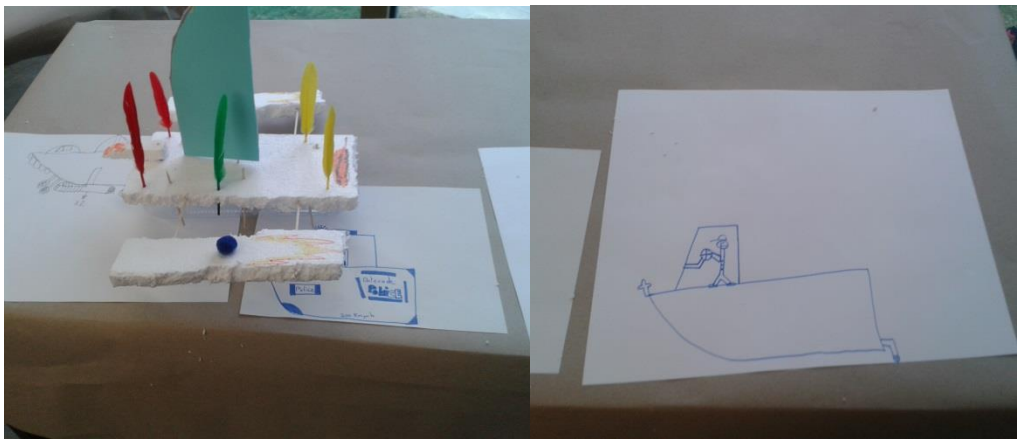
Excerpt 5:

*Child 1:* Erm, this is not the same thing.
*R:* Yes, why isn't it the same thing?
*Child 1:* Because the drawing is a bit nicer here. When you have to do it, it's a bit more difficult.
*R:* Ok. Why is it difficult for you?
*Child 1:* Erm, doing all you have decided to do, it's very interesting. And what about you?
*Child 10:* That's true, because there are not exactly, there cannot be exactly the same objects of the drawing, and then, because it's not easy.
*R:* It's less easy, ok.
*Child 9:* We cannot touch it, this is 3D and the drawing is not.
*Child 10:* It is 2D.
*R:* Thank you, thank you very much.
*Child 8:* In comparison with the plane I've drawn, hum, it is different because we have decided it, the three of us, and then we have changed our minds a bit…
*Child 10:* …and then, we had so many things…
*Child 8:* And then, there were so many things that we have used more things than in the drawing. And we have also made some drawings on the windows, there are more details actually.

Child 1 and child 8 compared the drawing and the realization by presenting two different points of views. Child 1 stated that the drawing was better than the realization. On the contrary, child 8 claimed that their realization was more detailed than the drawing because they had added some decorations directly to the windows. This capacity to touch the construction was also a crucial difference provided by children 9

and 10, who underlined the distinction between a two-dimensional drawing and a three-dimensional construction.

*Figure 4-3: An example of an abstract idea and concrete realization created during the atelier*[9]



Excerpt 6 is based on a different focus group (atelier 7), in which students discussed how the presence or absence of materials determined shifting between a participant's initial idea and concrete realization.

Excerpt 6:

*Student 1:* Because, after all, everything depends on the available material. If they have something in mind and they don't have the material they need, I wonder whether they more often try to find a solution or to change their perspective.

*Student 2*: Actually, in this regard, I've observed that a child wanted to make a car or something like that. He started to build it, and then he thought: "it is actually more similar to a tank", so it became a tank. I think that it is very interesting to see how they may start building something and then realize that it is not similar to the idea they had at the beginning, but what they have made is

[9] Pictures taken from research study 1

similar to something real, and they change their mind.

Student 1 wondered whether the absence of a material pushed the participants to try to find a solution or to change their idea. Based on some direct observations, student 2 illustrated how a participant readapted his idea as a function of the reality.

At the beginning of the activity (particularly in ateliers 6 and 7), the students verbalized generally negative emotions indicating that they did not feel comfortable with the culture of the atelier because, as Cole (1996) said, "they are entering a system of shared understandings that it mysterious to them" (p. 303).

In particular, a student underlined how the feelings evoked by the materials were related to her fear of not being recognized as a "good handy woman" by the others (excerpt 7). This feeling echoed with another student who underlined how the personal experience was related to her stress about not having enough time or imagination (excerpt 8) compared with the others ("they had more imagination than me").

Excerpt 7:

*Student:* The material used became a social springboard, that means that, through our creation, we could (or not) be socially recognized. This is one of the reasons why I've felt a certain pressure while manufacturing my own instrument. Actually, since I feared not to be considered "a good handy woman", I stepped back from the ongoing action to avoid negative critics.

Excerpt 8:

*Student:* I've also observed what the other participants used. A priori, they had more imagination than me, as they had already started. That made me stress out, because I had the impression I was late. I needed more time, so I walked

around again; I took some materials that seemed to correspond to my creation.

In both cases, these emotions emerged spontaneously, without any request by the teachers (Muller Mirza & Grossen, 2017). The students' feelings underwent a marked change during the session. The same participant who was stressed about her work (excerpt 8) little by little became more confident and prouder of her work (excerpt 9). The feelings evoked by the materials ("I started to feel really proud") linked her emotional experience ("I was happy to see that I was capable of doing that") to a more shared emotional experience ("I was glad to show my creation to everybody").

Excerpt 9:

*Student:* Slowly, my means of transportation took shape, I was happy to see that I was capable of doing that. I found orange foam that I could stick on my box to create a seat for my figurine. I had to check out if it worked, so I did some tests in which I made it run and…BINGO! My flowered princess horse-drawn carriage ran and could transport my figurine. I started to feel really proud. I was glad to show my creation to everybody.

These last excerpts clearly show how participants perceived and experienced the emotional aspects of social interactions (Muller Mirza, 2016). This is what Vygotsky (1994) captured with his concept of "perezhivanie", by encapsulating the connection between the external event and the subjective experience:

> "an emotional experience (perezhivanie) is a unit where, on the one hand, in an indivisible state, the environment is represented, i.e., that which is being experienced – an emotional experience (perezhivanie) is always related to something which is found outside the person – and on the other hand, what is represented is how I, myself, am experiencing this i.e. all the personal

characteristics and all the environmental characteristics are represented in an emotional experience (perezhivanie)" (p. 342).

In addition, the individual reports showed how emotions could become the subject of shared observations with the teacher (Muller Mirza & Grossen, 2017). More generally, the eight excerpts show how free exploration of materials directed the action and interpretation of the participants. In line with this, the agent-instrument dialectic (Wertsch, 1998) is seen as an ongoing process interwoven in a cultural system, in which materials and emotions are not isolated but are interdependent (Muller Mirza, Grossen, de Diesbach-Dolder, & Nicollin, 2014).

*Boundary and hybrid zone*

The ateliers presented in this dissertation were conceived of as a boundary and hybrid zone that builds practitioner and academic knowledge together. In recent years, as Rajala (2016) underlined, the hybridity conceptual framework has been used to design pedagogical approaches that create a hybrid space for meaning making. In this regard, Yamakumi (2008, 2009, 2014) illustrated and analyzed a children's after-school activity project called New School to show how a hybrid activity system can redesign new, expanded pedagogic practices in schools. He defined the hybrid educational innovation as a process "intended to create advanced networks of learning based on the principle of collaboration among a variety of participants both inside and outside a school, gradually transcending the school's institutional boundaries" (Yamazumi, 2014, p. 61). I adopted the notion of "hybridity" to highlight the ateliers' condition of being in-between several different sources of knowledge (Gee, 2010).

The notion of a boundary zone (Konkola, 2001) helped me to conceive of the atelier as place where different activity systems (university association/family and school) are present (Tuomi-Gröhn & Engeström, 2003). In research study 3, I show how the porosity of this boundary zone is a resource for learning connections across contexts, through which students are actively reconstructing the knowledge discussed during

and outside of the course. This implies, as I show in the research studies, that a horizontal form of expertise is adopted, in which new elements are introduced from one community to another. I consider it crucial to develop new activities that transcend the school's institutional boundaries (Yamazumi, 2008), in which "being a student entails taking a transformative stance in the learning activity" (Mikkola & Kumpulainen, 2016, p. 174).

### 4.2 Overview of the ateliers' set up and data collection

In the following text, I present an overview of the different ateliers' set up and data collection. More details are presented in the next chapter.

*Research study 1: Ateliers' 2–5 set up and data collection*

In research study 1, I designed four ateliers (ateliers 2–5), which I conducted from 2014 to 2015. In these ateliers, I intended to study participants' agency by adopting a sociomaterial perspective. According to this perspective (as I illustrated in the previous chapter), "agency is produced in conjunction with a whole network of different human and nonhuman actors and is distributed among these" (Esser et al., 2016, p. 9). Based on these works, in this research study I define agency as the dynamic capacity of people to act in relation to the heterogeneity of the actors (humans and non-humans).

The four atelier sessions lasted over 90 minutes each. All of them took place in a designated part of our department (except for atelier 3, which was held in a designated area of a summer camp). The preliminary research steps mentioned above were carried out with the involvement of all partners. These included:

a) The Career Service of the University of Neuchâtel, which regularly organize activities for academic staff members' children;
b) A summer camp in Neuchâtel that organize a week of activities open to children resident in Neuchâtel;

c) A cultural association, which promotes activities to make children aware of environmental issues.

The main aim of the preliminary steps was twofold. Firstly, I aimed to share the partners' different expectations, according to which the following elements emerged:

- To engage children in an educational research activity (Career Service of the University of Neuchâtel);
- To offer ludic activity during the holiday period (Neuchâtel summer camp);
- To sensitize children to environmental issues (a cultural association).

Secondly, I aimed to introduce myself and the objective of the research. We also shared the tasks involved in the preliminary steps. The association was responsible for collecting the inscriptions. I designed the activities and provided the materials. Two representatives of the association were present as observers during the activity and voluntarily participated with the children.

Recyclable materials were employed for all activities. In line with the goal of the association involved in atelier 4, a focus group with children was provided to discuss with them the notion of recyclable materials.[10]

At the beginning of each atelier session, we asked participants to create different types of boats by using the recycled materials (e.g. wood, plastic, paper) found on the tables. Based on Reggio Emilia's approach, which I introduce in the next section (4.3), the materials varied in terms of color, texture, and piece size, and the classrooms chosen for the ateliers had two luminous windows and a big transparent door to capture both natural and artificial light. The colored recyclable materials, which were of many sizes, were put in the center of the room to benefit from the best light. The children did not receive any further details or constraints: they were free to choose their materials,

[10] Some excerpts of this focus group are also presented in a Master's dissertation conducted by Nevio Mainardi (supervised by Prof Iannaccone).

adopt their own working technique, and manage their time as they wished. The children worked simultaneously in four self-selected dyad or triad groups within the same room.

The data for the study were collected by means of:

- Direct observations and field notes.
- Videotapes of four ateliers (around 15 hours of footage). For each atelier, fixed cameras on tripods were installed in each corner of the room. Each camera was directed on a small group.
- Photographs of the drawing, artwork, or other creations produced during the atelier.
- Transcriptions of significant episodes selected by taking into account participants' interactions with others and with materials. I used these transcripts as support for progressive refinement of hypotheses and as evidence for interpretation. I decided not to include the data for the children who played outside the official workshop time in my empirical analyses. I applied for official permission from the participants' parents. Two parents did not give me permission to videotape their children, so I avoid filming activities where those children were present.

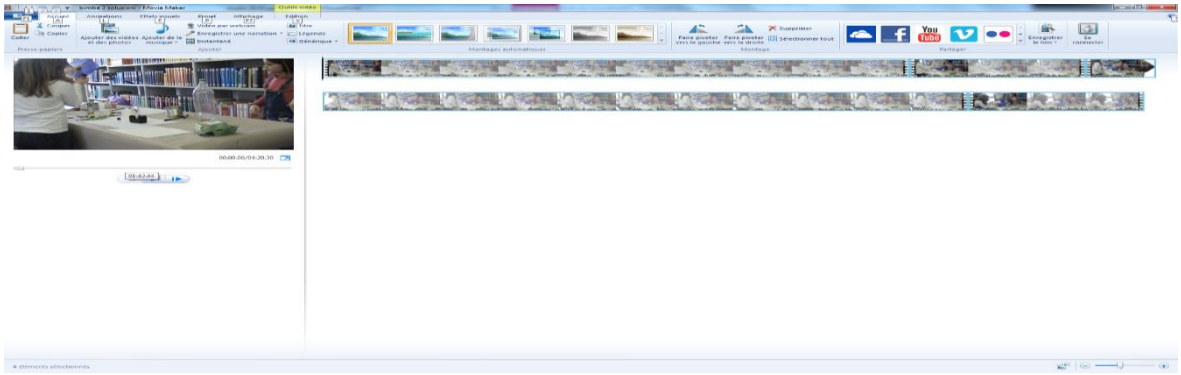
The data analysis involved two steps. First, a global viewing of video recordings was conducted to identify the regularities and patterns in the data source (Roth, 2005). Second, I selected and analyzed all the key episodes in which I identified participants' interactions with others and materials, by taking into account two interlinked aspects:

1) Participants' active explorations of the materials (colored materials of many sizes and transparency); and
2) Participants' relations with the sociomaterial configuration of the atelier (transparency, circled seating arrangement, adjustable tables, and materials).

In the following text, I present an illustrative example to elicit these steps.

After a global viewing of atelier 4, I identified an episode in which three young girls were discussing how to construct a wheel. Firstly, I video cut the episode using Movie Maker software (Fig. 4.4).

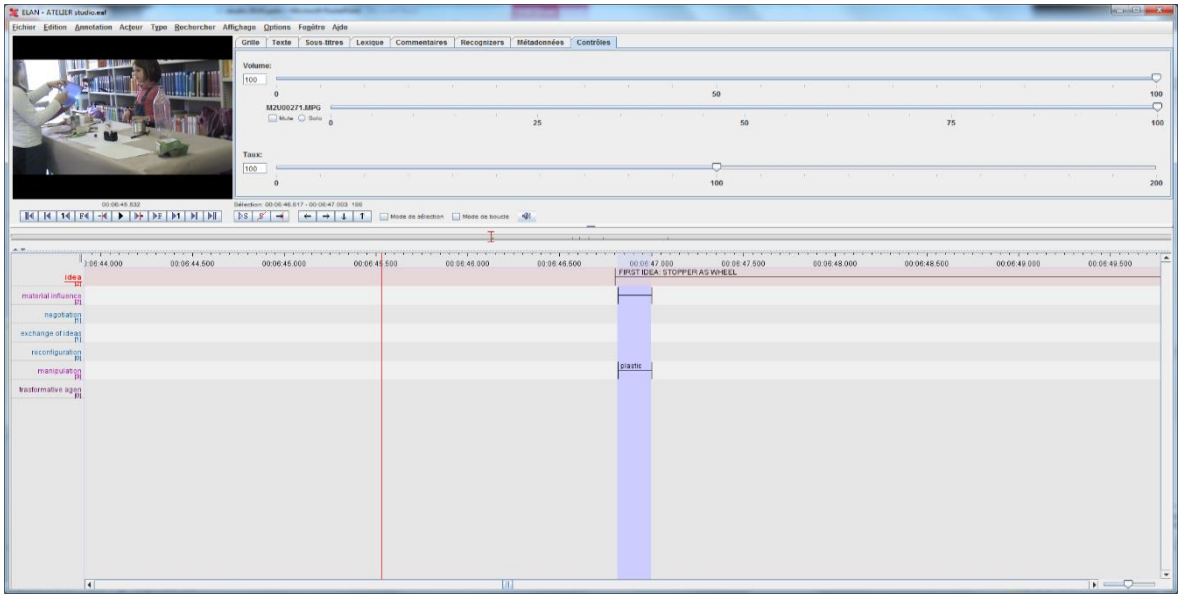
*Figure 4-4: Video cutting.*



Secondly, I coded their exchanges using the software Elan (see Fig. 4-5) to take into account the verbal and non-verbal exchanges (e.g. the manipulation of materials). The following categories were created to analyze agency by considering its material-discursive entanglement: a) criticizing the current way of working, b) supporting and encouraging each other, c) explicating, d) envisioning, and e) resisting.[11]

[11] These categories resonate with Engeström's (2011) accounts of participants' emerging transformative agency (see also Haapasaari, Engeström, & Kerosuo, 2016). However, in their study, the development of participants' transformative agency was analyzed in the form of a Change Laboratory regularly conducted in the workplace.

*Figure 4-5: Example of coding*




Thirdly, the exchanges were transcribed and translated from French into English. Finally I analyzed them.

In excerpt 10, three young girls are discussing the fact that the container does not roll.

Excerpt 10:

1. *Zoe:* (placing again the wheel under the ferry) we have to put some adhesive tape here – how can it work like that then?
2. *Lea:* But it WON'T run anyway.
3. *Zoe:* Oh yes, we don't care actually, we can just do like that [xxx] (she takes the ferry and shows how the ferry can move, out of camera range. (Léa and Eva watch her.)
4. *Zoe:* (crouched, then standing up) but it doesn't hold itself upright.
5. *Eva:* (laughs looking at Zoé)
6. *Lea:* (puts the vehicle on the table and adjusts the handle)
7. *Zoe:* And now let's / decorate
8. *Eva:* We agreed that it was me making the decorations.
9. *Zoe:* (raising the index finger) No, let's do that together!

10. *Eva:* No, but (slowly tries to pull the vehicle toward herself)
11. *Lea:* (takes the vehicle still kept by Eva and lifts it, then puts a half plastic bottle under the ferry and turns to Zoé), but we haven't finished the wheels yet!
12. *Zoe:* It does not matter! (Zoé's hair remains stuck to the piece of pipe cleaner that represents the handle).

Lea criticizes the current way of working (line 2). Zoe identifies the problem by manipulating the container "it doesn't hold itself upright" (line 4); she decides to change activity, and by adopting the pronoun "it" she underlines that her decision is addressed to all. Eva resists (line 8) by underlining that she wants to paint alone. Zoe replies with "let's do that together" to emphasize that nobody will be excluded. At this point, Eva and Lea are physically competing to take the container. Zoe intervenes by saying that "it doesn't matter", but at this point her hair is being pinched in the container (line 12).

In this example, the material and discursive entanglement become evident. This permits us to understand participants' agency not as an individual process but as intertwined in interactions with others and materials.

*Research studies 2 and 3: Ateliers' 6 and 7 set up and data collection*

In research studies 2 and 3, I considered the students' discursive reconstruction of their atelier experience. In particular, in study 2, I analyzed, with my co-authors, how students referred to materials as they were experienced during the activity, and how materiality interconnected with others and culture, by taking into account the whole activity system in which they were involved. In study 3, the aim was to observe the students' learning connections across contexts.

Research studies 2 and 3 had a common research context: a semester-long course undertaken in the last year of the Bachelor's degree in "Psychology and education" at the University of Neuchâtel (Switzerland). The course "Materiality in contexts" was selected and funded by the Rector's Office of the University of Neuchâtel as the

Innovative Pedagogical Project for 2017. The course aim was twofold. First, it aimed to introduce 26 university students (6 males and 20 females, median age of 24 years) to sociomaterial perspectives in education. This involved work group discussions, video observations and hands-on activity, focusing on the design and set up of two ateliers for children (aged 4–11 years) in collaboration with a cultural association. Second, it aimed to promote collaboration between the university and the local community, in order to promote a new way of carrying out school work.

*Table 4-3 Semester-long course design*

| **Date** | **Project phases** | **Activities** | **Place** | **Data** |
|---|---|---|---|---|
| 29.09.2017 | Introduction to project<br><br>Define & redefine the research question | – Forming working group | Classroom | Teacher diary<br><br>Work paper written by each group |
| 11.10.2017 | | – Presentation of association | Association | |
| 18.10.2017 | | – Defining the project research question<br>– Presentation of theoretical framework | Classroom | |
| 1.11.2017 | | – Work group discussion<br>– Plenary discussion<br>– Video observations | Classroom | |
| 7.11.2017 | | – Work group presentation on their atelier proposals | Classroom | |
| 22.11.2017 | First atelier | – First group coordinate atelier | Association | Observations during atelier<br><br>Transcription of class exchanges<br><br>Observations during atelier |
| 29.11.2017 | Sharing & reflection about first atelier | – First group share with other groups what they have learned in the atelier & difficulties experienced | Classroom | |
| 6.12.2017 | Second atelier | – Second group coordinate second atelier | Association | |
| 13.12.2017 | Sharing & reflection about second atelier | – Second group share with other groups what they have learned in the atelier & difficulties experienced | Classroom | |
| 20.12 | Sharing different perspectives about the whole experience | – 3 focus groups (during the course)<br>– Individual interviews (after the course) | 3 classrooms | Transcriptions of FG & individual interviews |

Both the ateliers lasted over 90 minutes and were carried out in the association headquarters. For the first one, the students proposed creating a musical instrument; in the second one, a way of transporting figurines. Eight children (aged 5–10 years) and four adults (parents or adults in charge of the children) joined each atelier as participants. Two researchers were also present as observers, along with two association educators. At the end of each atelier, time was provided for an informal chat between the students, educators, and researchers, to share feedback and observations about the activity.

In research study 2, three audiotape-recorded focus groups were conducted to explore the students' discursive reconstruction of the atelier experience. This method permitted me to observe how students interpret and re-construct their atelier experience, change their meanings, and create new meanings (Markova, Linell, Grossen, & Salazar Orvig, 2007). The focus groups, each lasting about 1 hour, were conducted by three course teacher-researchers, included myself, at the end of the course. The questions covered the following themes: a) a description of their workshop experience, b) the perceived opportunity for materiality learning, and c) a description of a significant episode within the atelier.

As Markova et al. (2007) underlined, focus group discussions are inhabited by different voices: "those of various participants and those of other sources called upon and brought to discussion by the speaker" (p. 122). In order to consider this multivoicedness, I transcribed all focus groups in their entirety, and categorized the voices that emerged as: materials, others, and culture. I also considered the temporal dimension in which they were embedded.

The empirical data discussed in research study 3 are drawn from seven tape-recorded semi-structured interviews conducted at the end of the course by myself as one of the course teacher-researchers. The goal of the interviews was to elicit students'

experienced activity, inspired by Vermersch's (1994) elicitation interview technique[12]. As a form of retrospective interviewing, this technique is based on iterative questioning where the participant is encouraged to describe their experience at finer levels of granularity.[13] The interviews were transcribed and analyzed to identify students' learning connections (also referred to as movements).

Research studies 2 and 3 were limited to one semester-long course. To guarantee the continuity of these studies, in the autumn semester 2018 I will conduct a second "Materiality in contexts" course. The number of students participating will be limited to 16, in order to augment the exchanges between the groups and to avoid students crowding together during the activity. The format will be the same and collaboration with the same cultural association will be assured. New data will be collected to enable more detailed analysis.

*Research study 4: Atelier 1 set up and data collection*

The fourth research study aimed to analyze how the parents' and teachers' relations were reconfigured during the activity. Atelier 1 was conducted as part of the project "Parents-School: Learning and Community" involving a primary school in Neuchâtel (Switzerland). The project was based on a collaboration between the Institute of Psychology and Education (University of Neuchâtel) and the Department of Family and Community Service of the Canton of Neuchâtel.

In the preliminary steps of the project, I assisted a co-author in attending a meeting with a representative of the Department of Family and Community Service, the headmaster of a preschool in Saint Aubin (Neuchâtel) who voluntarily decided to take part in the project, and a class teacher. This was a crucial moment to share the goal of the activity

[12] Translation from the French: "Entretien d'explicitation"
[13] Mouchet and Cattaruzza (2015) showed how the elicitation process of subjectivity plays a crucial role in the learning practice.

and to present our research interests. In this case, the main goal that emerged was to encourage meetings between family and school.

A second meeting was organized with the teacher in order to organize sharing the tasks. The teacher was responsible for collecting the inscriptions and splitting the students into two groups. The groups used the same classroom but at different time slots in order to benefit from the best space. A colleague and I agreed to design and coordinate the activity. The teacher collaborated with us in setting up the space before and after the activity.

Data were collected in 2014. The participants were: 20 children aged 4–5 years, their parents, and the same teacher. Two groups were organized in the primary school, with each one attending a half-day session outside of regular school hours (see Tab. 4.4).

*Table4-4: Set up of atelier 1*

| **Atelier** | **Partnership** | **Project goal** | **Research goal** | **Site** | **Participants** |
|---|---|---|---|---|---|
| Group1 | Department of Family & Community Service of the Canton of Neuchâtel (Switzerland) | To promote interactions between parents & school | To analyze how actors' relations were reconfigured during atelier activity | Designed space in a primary school classroom | 2 researchers<br>1 teacher<br>10 children<br>8 parents |
| Group2 | | | | | 2 researchers<br>1 teacher<br>10 children<br>10 parents |

At the beginning of the atelier session, we asked the children to create, with their parents, "The Saint Aubin fleet", using the materials (e.g. wood, plastic, paper) found on the tables. The children and parents did not receive any further details or constraints: they were free to choose their materials, adopt their own working technique, and manage their time as they wished. The parents were actively involved in problem

solving; they interacted with their children to find technical solutions and to share the use of materials (Fig. 4-6).

Data collection for research study 4 primarily consisted of: direct observations and field notes, and video and audio tapes of the two ateliers. For each atelier, fixed cameras on tripods were installed in each corner of the room. Each camera was directed on a small group. I applied for official permission from the participants' parents.

Data analysis involved the following steps:

1) A global viewing of video data recordings (3 hours of footage).
2) A selection all the key episodes in which I identified participants' interactions with materials, by taking into account two interlinked aspects:
   a) Active exploration of the materials (colored materials of many sizes and transparency)
   b) The participants' role during the activity.
3) Follow up, which entailed:
   a) A meeting, organized with the preschool headmaster, the teacher, and the representative of the Department of Family and Community Service of the Canton of Neuchâtel, to share the activity findings.
   b) A document given to thank parents for their participation in the activities and the sharing of some pictures of the activities.

*Figure 4-6: Parent and child interaction during atelier 1*

The research study results indicated that during the activity the parents did not perceive the teacher who was present as a judging observer, but as a resource person there to deal with the complex issue of the children's formal education.

The activity proposed during the atelier seemed to contribute to the awareness, especially for the parents, of a multiplicity of the educational process and the utility of participation based on the freedom to advance different points of views, without the constrained framework imposed by traditional rules and expectations.

*Figure 4-7: The Saint Aubin fleet created by children and parents during the atelier 1*

Further research could set out to examine how participants mobilize the diverse cultural elements to construct their sensemaking during the activity, and to explore participants' experience of the atelier.

*Table 4-5: Overview of the ateliers' set up*

| **Research study** | **Atelier** | **Partnership** | **Site** | **Participants** | **Data collection** |
|---|---|---|---|---|---|
| 1 | Atelier 2 | Career Service of University of Neuchâtel | Classroom space designed by department researchers | 2 researchers<br>10 children<br>2 adults | Video observations<br>Field notes |
| | Atelier 3 | Summer camp at Neuchâtel | Space designed by summer camp researchers | 2 researchers<br>8 children | Video observations<br>Field notes |
| | Atelier 4 | Career Service of University of Neuchâtel | Space designed by department researchers | 3 researchers<br>10 children<br>1 adult | Video observations<br>Field notes |
| | Atelier 5 | Cultural association that promotes activities to raise children's awareness of environmental issues | Space designed by department researchers | 3 researchers<br>10 children<br>1 adult | Video observations<br>Field notes |
| 2 | Ateliers6 & 7 | Cultural association that promotes artistic activities for citizens | Designed space in cultural association headquarters | 26 students<br>12 children (6 for each atelier)<br>4 parents<br>4 adults | 3 focus groups |
| 3 | Ateliers 6 & 7 | Cultural association that promotes artistic activities for citizens | Designed space in cultural association headquarters | 26 students<br>12 children (6 for each atelier)<br>4 parents<br>4 adults | 7 individual interviews |
| 4 | Atelier 1 | Department of Family & Community Service of Canton of Neuchâtel (Switzerland) | Designed space in primary school classroom (outside of school time) | 14Parents<br>1teacher<br>13 classmates<br>Researchers | Video observations<br>Field notes |

## 4.3 Educational practice influences

In this section, I briefly introduce the two main educational practices that influenced my ateliers' design. Based on my experience during a visit to a Reggio Emilia preschool, I present the Reggio Emilia principles that echo in my work. Then, I briefly introduce an innovative educational activity system called the Fifth Dimension. In both cases, I explain in what way my work was different.

### *A. REGGIO EMILIA APPROACH AND PRESCHOOL EXPERIENCE*

The Reggio Emilia approach considers that humans use "a hundred languages" to express themselves. As Rinaldi (2006) points out, the number 100 was chosen by the founder Malaguzzi in order to be provocative: "to claim for all these languages not only the same dignity but the right to expression and to communicate with each other" (p. 193)[14]. We can identify three different types of languages: materials, environment and documentation.

#### *The language of materials*

The Reggio Emilia approach maintains a delicate balance by providing structure and encouraging children's free explorations (Tarini & White, 1998). Children are not expected to follow directions, and are allowed to explore, plan, and make discoveries that are supported by their teachers.

Through active explorations with objects, children construct knowledge about their environment and the objects within that environment.

[14] *The Hundred Languages of Children* is also the name of a travelling exhibition that has been telling the story of the Reggio Emilia educational experience worldwide to thousands of visitors for over thirty years (1981–2011).

Open-ended materials can be transformed by children to express ideas and create uniquely novel forms, which engage not only the creative and expressive domains but also cognitive capacities. When children are invited to investigate familiar materials in new ways, their capacity for imagination and their ability to investigate scientifically becomes apparent. They can touch the materials, arrange them in various ways, and play with them. For example, children, who are given paper without glue or scissors and are encouraged just to explore it with their hands, begin to see details of properties that they had not considered before (Cadwell, 2003).

In this extract of an interview conducted in May 1997, by Gandini, with an atelierista, Giovanni Piazza, of la Villetta School in Italy (Gandini, 2005), the notion of an alphabet of materials is introduced to underline the interactions between children and materials: "It's through interaction between a child and a material that an alphabet can develop" (p. 13). The grammar of a material described by Giovanni refers "to the physical proprieties that are unique to a material and how children interact with them to express and communicate" (Schwall, 2015, pp. 51–52).

Lella: By alphabet do you mean the forms and shapes that one can make with that material or do you mean the way one can intervene to transform it?

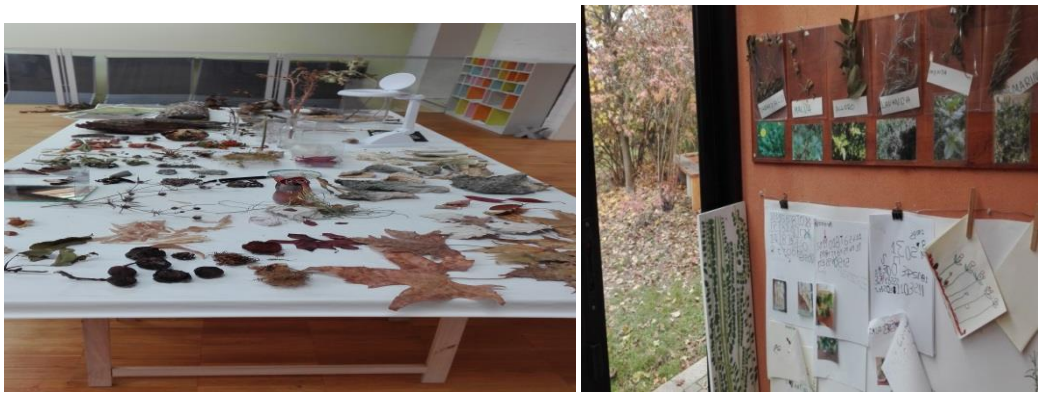
Giovanni: An alphabet is probably best described as the combination of the characteristic of a particular material along with the relationship that arises in the interaction between the child and the materials. It's during the construction of that relationship that the possibilities of modification, transformation and structuring of the material present themselves, so that the transformed material can become a conduit for expression that communicates the child's thoughts and feelings.

Lella: You are helping us to note the importance of researching possible transformation and modification of materials.

Giovanni: Searching for and discovering how a particular material presents itself and is transformed helps the child acquire knowledge about the material itself – about texture, form, shape, colour, exterior and interior appearance. The child gradually learns that a material can be used in many different ways. Children acquire a large spectrum of knowledge about materials and this gives them the chance to use different alphabets in their individual process of representation and give shape to their own ideas.

These materials might be newly purchased, recycled from previous projects, or discovered by children, and are often reclaimed materials from Remida, the recycled materials center established in 1996 in Reggio Emilia, Italy (Eckhoff & Spearman, 2009). Remida "collects, displays and offers alternative and reclaimed materials obtained from unsold stock, and rejects or discard and scrap materials from industrial and handicraft production, with the aim of reinventing their use and meaning" (Ferrari & Giacopini, 2005, p. 9). The idea of a Remida Center for creative recycling provides a valuable community building process. A Remida Day is organized by the city every year in May. Installations, exhibits, ateliers, and seminars are organized in every corner of the city to promote a new culture of recycling.

*Figure 4-8: Examples of natural materials.*[15]



*Language of the environment*

Bruner (2003) described an appropriate environment for young children as "a place to learn together about the real world, and about possible worlds of the imagination. It must be a place where the young discover the uses of mind, of imagination, of materials, and learn the power of doing things together" (p. 137). By visiting the infant and toddler centers and preschools, one is immediately struck by the aesthetic beauty of the environments. The Reggio Emilia approach is embedded in a culture where creativity and the arts are almost an extension of being, and nothing is considered marginal space.

[15] *Pictures taken during a visit to a Reggio Emilia preschool*

Mirrors and transparent windows enhance the continuity between indoors and outdoors.

Vecchi (2010), an atelierista in a Reggio Emilia schools[16], stated that: "inhabiting a place which is lovely and cared for is perceived to be a condition of psychological well-being and, therefore, the right of the people and in general, even more so of children, all children" (p. 89).

We can identify four common spaces:

1. A piazza: a large space in the middle of the building, in which children play together, and teachers meet their colleagues or parents. Malaguzzi said in an interview that: "the piazza is also a passage. In part it is structured by the objects in it, but there are also the children and it allows them to flow through, to walk or to linger as they wish" (Gandini, 1998, pp. 165–166).
2. A dining area: a modulated area, in which lunch break and tea time are provided.
3. A courtyard: an open-air space that children can access at all times. It creates an indoor and outdoor space, "a classroom without a roof" as one child said.
4. Corridor and front doors: daily and weekly communication are posted to share with parents the key moments of the children's lives in the school, to organize meetings, and to share ideas.

In Reggio Emilia preschools, the space represents process-oriented architecture, which Rinaldi (2006) said "foster[s] communication and is itself communication" (p. 88). The dialogue with children, teacher, and parents is a priority. Based on Rinaldi's study, I incorporated the different perspectives (Tab. 4-6) when organizing the spaces.

[16] An atelierista is a person with a background in the visual arts who works in close collaboration with teachers to supply and organize a wide variety of materials and tools to the atelier, and who works around the school to actively encourage and observe children's creative and learning processes (Gandini, 2005, p. 197).

*Table 4-6: Organization of the space: different perspectives*[17]

| | **Children's objective** | **Teacher's objective** | **Parent's objective** |
|---|---|---|---|
| Organization of space | – To explore & research alone & with others, both peers & adults<br>– To work & communicate with others<br>– To reinforce their identities, autonomy, & security | – To have appropriate spaces & furnishing to satisfy their needs to meet with other adults, both colleagues & parents<br>– To feel supported & integrated in their relationship with children | – To be listened to & informed |

The interest in the environment gave rise to an environmental meta-project for childhood (Ceppi & Zini, 1998), which began with the ongoing dialogue between Reggio Emilia and the world of design[18]. Children had been invited to explore the school, and various spaces were evaluated by children from their different points of view based on exploration. "Dialogues with Places" was one exhibition chosen to inaugurate the Loris Malaguzzi International Centre. The exhibition opens with the following statement: "Every place has a soul, an identity. Trying to understand that soul and relate to it means learning to also recognize one's own soul".

*Ateliers*

Ateliers have been defined as "Places where brain, hands, sensibilities, rationality, emotion and imagination all work together in close cooperation" (Vecchi, 2010, p. 2). Malaguzzi chose the French term "atelier"[19], which evokes the idea of a laboratory for many types of transformation, construction, and visual expression (Gandini, 2005). In 1972, the atelier became officially part of the schools' new rulebook.[20] The idea of the

[17] Based on Rinaldi, 2006, p. 87
[18] The project was carried out with Milan's Domus Academy.
[19] In North America, this term is often translated as "studio" (see Gandini, 2015).
[20] Among the main points established by the city government of Reggio Emilia, there were: a) participation by parents elected in each school to form a city-wide school committee; b) priority

atelier was conceived by Loris Malaguzzi with the intention of bringing about a revolution in teaching and learning in schools for young children. The atelier is a sort of "trans-disciplinary fertilizer, full of vitality capable of welcoming different ways of thinking, not afraid of interference and contamination but considering them to be a possibility and not off the subject" (Vecchi, 2010, p. 1).

As Vecchi points out, an atelier serves two functions. "First it provides a place for children to become masters of all kinds of techniques (…) all the symbolic languages (…). Second it assists the adults in understanding processes of how children learn" (Vecchi, 1998, p. 140). Malaguzzi wanted children to be able to express their languages everywhere and at any moment, and so mini-ateliers were installed in each class. "The atelier is a space rich in materials, tools and people with professional competences" (Malaguzzi, 1998, p. 74). The atelier is accessible during the day and the atelierista is always ready to support children's creativity processes.

During an interview with Vecchi (2010), Simona, an educator, underlines two main risks. First, to consider the atelier as an accessory when, on the contrary, it is part of the process. Second, ateliers could simply become a technique "without seeing them as a relationship between many elements where important knowledge-building processes are developed" (Vecchi, 2010, p. 58).

During my staying in Reggio Emilia, I made two short visits to preschools. The first visit was made during non-school hours and the school environment seemed to be a sort of museum exhibit. On the contrary, when we visited the school during an ordinary day, I noticed that the children moved around independently: "their autonomy does not come

access to infant and toddler centers, and preschools for children with special needs; c) an atelier and an atelierista in each preschool and each infant and toddler center; d) permanent collegial work and professional development in each preschool or infant and toddler center for all teachers, atelieristas, cooks, and auxiliary personnel; and e) recognition of the value of the indoor and outdoor environments as spaces for learning, including kitchens, bathrooms, and outdoor spaces (Gandini, 2015, p. 9).

from something given to them but from an environment that allows you to make choices" (Vecchi, 2010, p. 60).

During these visits, I noticed that the atelier's accessibility was also physical. The atelier doors were always open, and children were free to enter as they preferred and to stay as long want as they wanted. The atelierista promotes a continuous dialogue between spaces, materials, children, and adults. Daily discussions between atelierista and teachers are provided to guarantee continuity. Families were also invited to participate. For example, in the preschool that I visited, a grandfather collaborated with the atelierista regarding a common artistic project.

*Teacher as co-researcher*

Together with children and atelieristas, "*the professional marvellous*", as Malaguzzi defined teachers, are central characters in Reggio Emilia preschools (Vecchi, 2010). Bruner (2006) recalls that what struck him most when first entering the Reggio Emilia preschool was a teacher who was listening to a child's theories on how shadows are formed (p. 29). He offered a distinction between teaching that takes place in the expository mode and teaching that utilizes the hypothetical mode:

> "In the former, the decisions concerning the mode and pace and style of exposition are principally determined by the teacher as expositor; the student is the listener (…). In the hypothetical mode, the teacher and the student are in a more cooperative position (…). The student is not a bench-bound listener but is taking part in the formulation and at times may play the principal role in it" (p. 58).

In this sense, the fact that teachers act as gentle guides, never interfering but helping children along, is important. "The Reggio Emilia approach emphasizes the open-ended nature of the learning process. The teacher should not have a fixed goal or product in mind towards which the child should work" (Stone, 2012, p. 281). The children become

responsible for what they learn, at their own pace, making natural non-forced progressions.

During my visits to the preschools, I observed that during the activity, the teacher's principal role was to be a partner in the children's observation: "to maintain the focus on child observation is the only way to keep his ear and eye attentive"[21]. Some teachers take brief notes during their exchanges with children in order to share their reflections with other colleagues at the end of the day. This indicates the crucial role of documentation in the daily life of the Reggio Emilia preschools.

*The language of the documentation*

Pedagogical documentation is a vital part of the Reggio Emilia pedagogy (Dahlberg & Moss, 2010), being a veritable form of communication (Warash, Curtis, Hursh, & Tucci, 2008). Firstly, it provides children with a concrete memory of what they said and did. Secondly, "it's a vehicle for teachers to understand the children and make modifications to teaching strategy" (Warash et al., 2008, p. 444). Thirdly, it is a way to confront each other in order to have a better understanding of all perspectives. This shows, as Eichsteller (2009) underlined, "the significance of close observation to a continually reflected and evaluated practice, which is the basis for innovative experiments and the precondition for accomplishments" (p. 389).

Pedagogical documentation is a process for making pedagogical work visible and subject to interpretation, dialogue, confrontation, and understanding (Rinaldi, 2006). On the one hand, "it visualises children's learning process, their search for meaning and their ways of contrasting knowledge. On the other hand, it enables the connection in everyday work of theory and practice" (p. 16). In the preschool courtsides and classes that I visited, I observed different panels in which past shared inquiries were also

[21] Extract from an informal exchange with a teacher during a school visit.

presented as historical memories of the preschool discovery. It is also ethical, because, thanks to documentation, the children also "become aware about the teacher's perspective" (p. 196).

*Differences with ateliers presented in this dissertation*

The opportunity to observe how teachers and atelieristas foster the development of the children's repertoire of languages, by encouraging their engagement with a variety of reclaimed or recycled objects and materials, was very important to advance my understanding about their teacher practices. In this sense, the ateliers presented in this dissertation and the ateliers installed in Reggio Emilia schools are similar in promoting different forms of stimuli and ways of thinking, in which the teachers' role is conceived of as a co-researcher with participants.

However, there are some differences between the two atelier designs. Firstly, the temporal dimension varies. The ateliers presented in this study did not exceed 90 minutes and they were limited to the day they took place. On the contrary, the Reggio Emilia ateliers were always open, and children or parents could enter and stay as long as they wanted. For future studies, it would be interesting to plan other ateliers without temporal constrains, in order to increase their "generative power" (Wardekker, 2000) by promoting the continuity of activities and to respect more the rhythm of each participant. Secondly, ateliers were included in each Reggio Emilia preschool and mini-ateliers were also installed in each class during class hours. On the contrary, the ateliers presented in this dissertation were set up in association spaces or classrooms out of school hours. It would be interesting to organize the same experience during school hours in order to analyze the dynamics that emerged. Thirdly, as we have seen, documentation plays a crucial role in providing memories of the activities and relaying these to others (parents, children, and teacher) in order to better understand all perspectives. In this sense, as I will illustrate in Chapter 7, the Reggio Emilia approach could contribute to the design of ateliers conducted as instruments for "developmental transfer" (Tuomi-Gröhn & Engeström, 2003) in vocational teacher education, by

involving teachers, teachers-in-training, and researchers in the discussion of the different perspectives.

### *B. THE FIFTH DIMENSION*

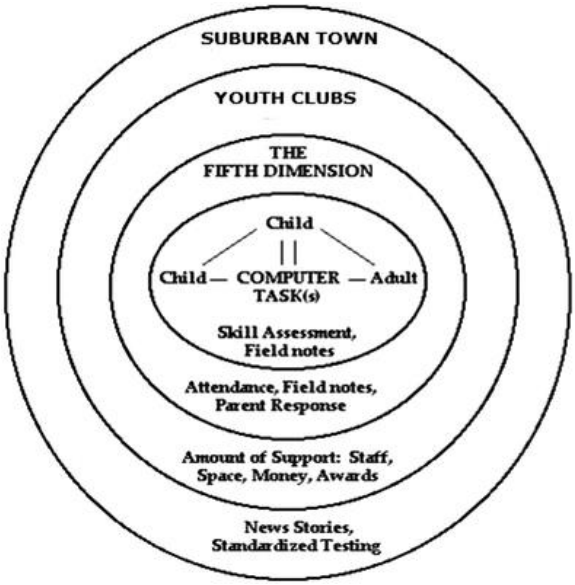
Michael Cole and his colleagues (1996) designed an innovative educational activity system called the Fifth Dimension that offers a specially designed environment in which to explore a variety of computer games during after-school hours. This was open to students enrolled in a course focused on fieldwork in a community setting. The Fifth Dimension is implemented as a partnership between a local higher education institution and a local community institution (Cole & Distributed Literacy Consortium, 2006). "Central to our undertaking of creating a network of after-school programs using the resource of both universities and neighboring community sites for the mutual benefit of both was the goal of learning what it would take to sustain this innovation, and then doing so" (p. 12).

Cole (1996) adopted the garden metaphor of culture to describe his work on "Field College":

"We (…) started out in the role of the agronomist who visits the garden, and then added to it the role of the gardener who tends the garden. Theory and practice became different moments in a single process of inquiry" (p. 286).

The embeddedness of this after-school program was well schematized by Cole (1996) as a set of concentric circles (see Fig. 4-11), in which "activity is analyzed over time at multiple, intertwined, contextual levels and each level is formed and influenced by the levels above and below it" (Cole & Distributed Literacy Consortium, 2006, p. 67).

*Figure 4-9: After school program*[22]




Fifth Dimension participants are heterogeneous not only in term of age but also in terms of the length of partner participation and expertise. Considering the Fifth Dimension as a tertiary artifact is instrumental to the following:

1. The associations and parents, because they approve the activities the children are engaged in.
2. The undergraduates, "both in terms of mastering valued technical skills and accumulating course credits and for revaluating their interest in working with children once they leave college" (Cole, 1996, p. 299).
3. Researchers: the Fifth Dimension provides a rich medium of research.
4. Children: the Fifth Dimension is a place to play.
5. The university and community. "The university and community partners differ in how they support the program, and forms of support differ among universities and among community organization as well. (…) the best evaluation at institutional level depends on the goal of the collaborating institutions" (Cole & Distributed Literacy Consortium, 2006, p. 82). The university and community

[22] Cole, 1996, p.300

formed three evaluation research teams: a) the cognitive outcomes team who conducted a quasi-experimental evaluation of the program's impact on academic abilities; b) a process evaluation team who adopted an ethnographic perspective to identify the social and cultural components of interactions that distinguished Fifth Dimension activities; and c) a language and culture team.

Regarding point 2, the main activities of the undergraduates are:

a) Attending a campus class devoted to lectures, reading, student presentation, and discussion relating to Fifth Dimension experiences;
b) Participating one to three times a week at a Fifth Dimension site to work and play directly with children;
c) Writing detailed field notes on experiences and observations after each visit to the Fifth Dimension site;
d) Writing an end-of-course research paper based on site experience and readings.

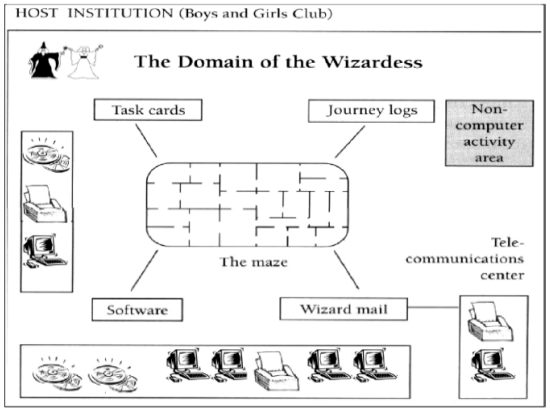
These activities provide undergraduates with a rule regarding the perennial question of how much help they should give the children: "give as little help as you can but enough so that both you and the child are having appropriate time (…) this characterization fits with Rogoff's idea of fluid reversals of student and teacher roles in communities of learners" (Cole & Distributed Literacy Consortium, 2006, p. 24). As Martin underlined (2006), "the culturally constituted and supported social interactions and participation learning described in Cole's Fifth Dimension are powerful demonstrations of the social cultural approach to teaching and learning process" (p. 607).

*Differences with ateliers presented in this dissertation*

It was crucial for my work to observe the way in which Fifth Dimension participants' interactions with the artifacts[23] evolved over the time, from an orientation mode in which the artifacts are treated as entities in themselves, to an instrumental mode in which artifacts reflect goal-directed action, to a reflective mode. The ateliers presented in this dissertation and the Fifth Dimension are very similar in promoting a wide range of artifacts, respecting local communities, and creating numerous occasions to foster awareness of the cultural system. However, there are four main differences between the Fifth Dimension and my atelier design. First, the Fifth Dimension sites of implementation are mostly based in California (for a detailed list, see Cole & Distributed Literacy Consortium, 2006, pp. 10–11), where there is increased interest and investment to expand after-school programs concerning social order and children safety. The population attending these after-school programs consists of elementary school aged children. On the contrary, the atelier sites are based in the Neuchâtel district of Switzerland, where there are not the same crime problems. Participants voluntarily took part in the activities without attending a particular after-school program. Second, the Fifth Dimension is a computer-mediated program (see Fig. 4-12), which included "several computers, a table for non-computer activities and a maze made of cardboard that contained 21 rooms. Each room provided access to different games. Each game was accompanied by a card specifying beginner, good, and excellent level of the performance" (Cole, 2017, p. 774).

[23] The Fifth Dimension artifacts included a maze, a task card, computers, and other materials described in detail elsewhere (see Cole & Distributed Literacy Consortium, 2006, Chapter 2, and Cole, 1996, Chapter 10).

*Figure 4-10: A schematic overview of the Fifth Dimension*




[24]

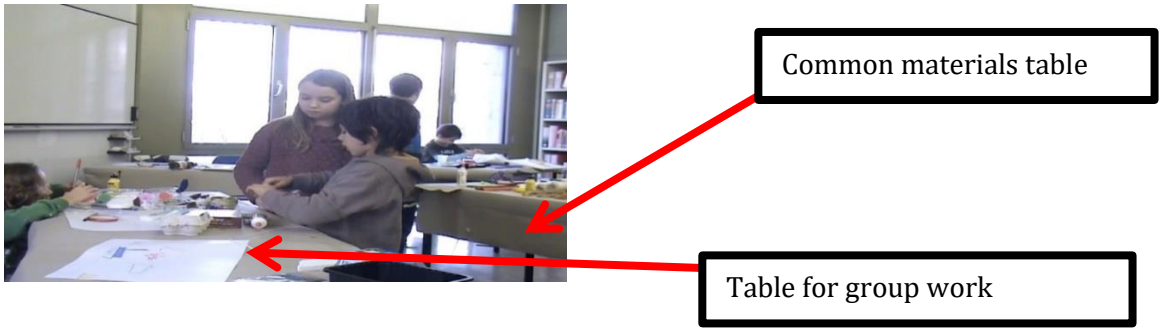
In contrast, the atelier involves a recycled material mediated activity, without any technological support. The setting included different tables for group working and a common materials table placed in the center of the room. The arrangement was adopted in light of local community needs (see Fig. 4-13). No guide or procedure was provided to steer the participants' construction activity or choice of materials used.

*Figure 4-11: Two examples of different arrangements adopted in the atelier.*

(A) (picture taken from research study 4)


(B) (picture taken from research study 1)

[24] Cole, 1996, p. 291




Third, in the Fifth Dimension, the undergraduates were enrolled as older peers, and the local communities were not involved in design steps of the activity at all. On the contrary, in the atelier, the students were actively involved as "apprentice researchers" in the design and activity development, in collaboration with the local community[25].

Fourth, concerning the evaluation of the activity, Fifth Dimension research teams provide quantitative and qualitative evaluations. Evaluation of the ateliers involved a qualitative assessment of student learning, but no quantitative evaluation has been conducted yet.

*Table 4-7: Summary of differences between the Fifth Dimension and ateliers*

| **Parameter** | **Fifth Dimension** | **Atelier** |
|---|---|---|
| Sites | Mostly based in California | Neuchâtel district of Switzerland |
| Population | Elementary school aged children | Children, parents, citizens |
| Task | Task card for each game, as a tool to guide novice players<br><br>Procedure for completing tasks & specification of levels of achievement are present | No guides or procedures are given to complete work |

[25] In Chapter 6, I present in more detail the implications of local partnership in the research design.

| | | |
|---|---|---|
| Activity | Computer-mediated activity | Recycled materials mediated activity |
| Role of student | Undergraduates enrolled as “older peers” | Students take part in activity as “young researchers” |
| Role of local community | Host after-school program | Involved in all steps of designing the activity |
| Evaluation | Qualitative & quantitative evaluations of children’s learning are conducted | Qualitative evaluation with students was conducted (studies 2 & 3) |

## 5. RESEARCH STUDIES

In this chapter, I present four research studies, each of which corresponds to a published or submitted article. The first research study attempts to investigate participants' agency by adopting a sociomaterial perspective in order to consider the actions among the participants, the discourses, and the materials not as separate but as intertwined parts. The second and the third research studies present the students' active involvement in a design of two ateliers in collaboration with a cultural association. In Research study 2, we investigate the students' positioning construction in relation to their atelier experience. In the research study 3, we show how content, knowledge, and materials from one context (university) are made relevant by students in another context (out of university), and vice versa. Research study4 is more focused on how atelier activity can promote new forms of collaboration between parents and the teacher.

### 5.1 Exploring children agency in a designed atelier: a sociomaterial perspective

## 5.2 Sociomateriality as a partner in the polyphony of students' positioning[26]


## Abstract

In this paper, we argue that materiality is not a separate voice, but affects the polyphony of the entangled process of students' positioning. To illustrate this assumption, we draw on the Bakhtinian perspective and on the theory of positioning. The research context was a semester-long course on "Materiality in contexts" attended by 26 university students (6 male and 20 female), which introduced socio-material perspectives in education. During the course, hands-on activities were organized, including two workshops (ateliers) addressed to children (aged 4-11 years) and their parents, in which they were involved in creating musical instruments and inventing figurines' means of transportation. At the end of the course, three focus groups were conducted to allow the university students to reconstruct their experience. Through a qualitative analysis, we discuss several excerpts extracted from the focus groups to show how socio-materiality enters the polyphonic orchestration of voices concurring to define students' positioning.



**Keywords** : student positioning; multiple voices; dialogic space


### 1. THEORETICAL INTRODUCTION

As Marková et al. (2007) demonstrated, speakers are not the only authors of their discourse. On the contrary, our speech is construed and filled by a variety of voices and discourses in relation to which we position ourselves. Wenger (1998), in turn, claimed that the negotiation of meaning may involve language but is not limited to it (p. 53). Accordingly, this study analyzed students' reconstructions of workshop (atelier) [27] experience in order to show that "sensemaking is always a polyphonic process involving multiple voices" (Ritella & Ligorio, 2016; p. 217). We argue that materiality is not a

[26] Cattaruzza, E., Ligorio, M. B., Iannaccone, A. (submitted). Sociomateriality as a partner in the polyphony of students' positioning. *Learning, Culture and Social Interaction.*

[27] In this paper the *terms* 'workshop' and 'atelier' are used interchangeably.

separate voice, but it contributes strongly to the polyphony occurring in the entangled process of students' positioning. To illustrate our proposal, we examined students' descriptions of a hands-on activity in which they were involved during a semester-long course. At the end of the course, three focus groups were conducted to verify the polyphonic orchestration of voices concurring to define students' positioning.

Within the dialogic approach framing the educational experience as an epistemological event, dialogue is discussed as a form of shared inquiry (Wells, 1999) and discursive construction of shared knowledge (Linell, 2009). The theory of positioning, drawn from Bakhtinian ideas (1981), recognizes the existence of multiple voices. The influence of Bakhtin's statements is evident in Hermans' (1996) idea of a flexible self, composed of multiple positions encompassing different aspects of the self. According to that idea, as Wertsch (1991) underlined, there are multiples ways to represent reality when approaching a problem (p. 13). The sources of positioning can reside inside and outside the person (Ragatt, 2015), with both views being strongly linked in a dialogical relationship (Legrottaglie & Ligorio, 2017; p. 60). As Iannaccone, Marsico and Tateo (2013) argued, "internal and external positions intertwine producing specific configurations of the self attached to the social interaction in an educational context" (p. 223).

In this paper, we consider the discursive reconstruction of an educational experience as a dialogic space in which students position themselves in relation to a variety of voices.. We adopt Wegerif's notion of dialogic space (2007), defined as a space in which the "learner and teacher engage with each other and, in a sense, learn to see the task through each other's eyes" (p. 4). More recently, Hetherington and Wegerif (2018) have introduced a teacher education approach to support teachers thinking about science pedagogy in new ways that include the voices of materials in the dialogue. According to these researchers, dialogic space includes not only the voices of the teacher but also the voices of materials.

## 2. RESEARCH DESIGN

### 2.1 Study aims

The general aim of this study was to show the polyphonic orchestration of voices concurring to define students' positioning. Specifically, our research questions were:

(a) How does students position themselves in relation to the materiality?

(b) How does materiality interconnect with other emerging voices of the student?

### 2.2 Research context

The research context was a semester-long course developed at the Institute of Psychology and Education, University of Neuchâtel (Switzerland).[28] This course was selected and funded by the Rectory as an "Innovative Pedagogical Project".

The course had three pedagogical aims. The first aim was to introduce 26 university students (6 male and 20 female) to socio-material perspectives in education (Fenwick, Edwards, & Sawchuk, 2011; Iannaccone, 2017) through a pedagogical experience that integrated theoretical support and hands-on activities. Two separate workshops were designed and set up by the students themselves during the course. The students were divided by the teacher into two groups (13 students in each) and each student participated in one workshop. In the first workshop, the students proposed the creation of musical instruments; the second workshop was aimed at building means of transportation for figurines. In both cases, recycled materials were used (see Fig. 1). The second pedagogical aim was to expand the student's way of learning by improving the dialogue connecting the university and the local community. Both workshops were organized in collaboration with a cultural association.[29] The workshops were carried out in the association's headquarters situated in Neuchâtel, and opened to citizens,

[28] Four teacher-researchers were involved in the design of the course: Prof. Iannaccone, Prof. Kloetzer, Ms Cattaruzza and Ms Convertini.

[29] The cultural association regularly organizes activities (e.g. theatre, exhibitions) in which citizens are invited to participate. More information can be found at: www.lebalkkon.ch

particularly children and their parents. The third pedagogical aim was to give students the opportunity of a participatory learning experience.

The 26 university students were actively involved by taking on the role of entertainer, observer or participant during the activity. There were: 8 student entertainers, who introduced the activity, managed the planning of the activity and the material arrangement;10 student observers, who were in charge of observing the situation, with the support of artefacts created during the course by the students themselves (e.g. observational grids, maps); and 8 student participants were actively involved with children and adults in the activity.

The course design has been reported in detail elsewhere (Cattaruzza, Iannaccone & Kloetzer, submitted).

Figure 1. Examples of the recycled materials employed during the workshops.

## 2.3 Participants

The semester-long course "Materiality in contexts" was offered to the final-year students of bachelor's and master's degrees. As mentioned above, 26 students (6 male and 20 female) were enrolled and participated in the workshops (13 students in each workshop) by taking on different roles.

Nine children and five adults (parents or caretakers) participated in the first workshop; five children and three adults participated in the second workshop. Two researchers (two authors of this paper) and two educators appointed by the association participated in both workshops.

### 2.4 Data collection

The empirical data discussed in this paper are drawn from three focus group (FG) discussions as an analytical means of exploring socially shared knowledge (Marková et al. 2007). The FGs, each lasting about 1 hour, were conducted by three purposely trained course teacher-researchers (two of whom are authors of this paper). As Marková and colleagues (2007) showed, the FG is not a priori dialogical, but the researcher's theoretical assumptions determine whether it is used as a dialogical or non-dialogical method.The FGs were used to analyze students' experiences during the atelier activities. To ensure a sense of continuity with the workshops, the three FGs were organized at the same times but in three different rooms, one for each role covered by the university students during the workshops. The FG structure was inspired by the assumption that "the subject manifests him or herself in the discourse in his or her role as speaker for example through the different means by which speakers talk about themselves or about objects in the world" (Marková et al., 2007; p. 108). The questions in the FGs with students covered the following themes: a description of their workshop experience; the perceived opportunity for materiality learning; and a description of a key episode.

### 2.5 Data analysis

The data were analyzed in two steps. In the first step, the three FGs (50-60 minutes of recording for each FG) were transcribed in their entirety[30]. They were subsequently coded by a researcher (one author of this paper), who identified the discursive utterances in which the following voices emerged: voices of materials, of others and of culture.

[30] Thanks to the help of two research assistants

(a) *Voices of materials.* In line with Hetherington and Wegerif (2018), we considered dialogue stimulated by/with the materiality of objects. In particular, we analyzed how students referred to materials as they were experienced during the activity.
(b) *Voices of others*. As underlined by Marková et al. (2007), these voices became manifest in different ways, for example as reported speech or virtual discourse (attributed to absent individuals).
(c) *Voices of culture.* We analyzed how students used cultural elements to verbalize their feelings (Zittoun, 2006) and how their culture awareness emerged.

The second step concerned the qualitative analysis of how students utilized a temporal dimension to explain or justify their positioning, by assuming that "the negotiation of meaning is fundamentally a temporal process" (Wenger, 1998; p. 86). Legrottaglie and Ligorio (2017) also highlighted the importance of the temporal dimension in relation to teachers' professional identity. In line with these studies, we attempted to extrapolate the temporal dimension that emerged during the FGs, and considered that "there is always interplay between the past, the here and now and the possible and imagined" (Brown & Renshaw, 2006; p. 251).

## 3. RESULTS AND DISCUSSION

The data from the three FGs showed how students' individual positioning, connected to the diverse perspective and understanding of their role, weas interconnected with a collective positioning that closely depended on the specific role adopted. In this section, we will discuss the results, according to the voices outlined and the temporal dimensions that emerged. Excerpts were taken from the three FGs (the roles the university students covered are reported). The voices and positions that emerged, which were sometimes in contrast and at other times in alignment, reflect the different roles adopted, and the materials and cultures involved in the activity.

The following eight excerpts demonstrate how the students' positioning is related to materiality, others and culture in four common ways: (a) by comparing themselves with these voices (b) by reflecting on their relation with them; (c) by thinking about how they

perceived them; and (d) by considering their influence on them.

### 3.1 Voices of materials

As Wenger-Trayner and Wenger-Trayner (2014) underlined, "combining multiple voices can produce a two way critical stance through a mutual process of critique and engagement in reflection" (p. 19). In the following two excerpts, the student observers refer to materials they experienced during the activity.

**Excerpt 1. Student observers**

Stud. 7 I don't know whether the girl who made the spinning top did that because she missed the wheels for example, or if she wanted to do that since the beginning

Stud. 8 Actually, in this regard, I've observed that a child wanted to make a car or something else, I don't remember. He started to build it, and then he thought: "it is actually more similar to a tank", so it became a tank. I think that it is very interesting to see how they may start building something and then realize that it is not similar to the idea they had at the beginning, but what they have made is similar to something real, and they change their mind.

Stud. 6 Yes, at the end it becomes a bit of everything. There was a child who said he was done. I asked him what it was and he answered that it was a boat-car-plane

Stud. 8 A boat.

Stud. 6 No, it was not that. It was a means of transportation that involved all means of transportation.

In excerpt 1, the students discuss the children's construction processes. In particular, student 7 refers to a girl's construction (a spinning top) by wondering if it was conceived spontaneously. Student 8, in his turn, gives another example of how a child changed his idea ("He started to build it, and then he thought: 'it is actually more similar to a tank', so it became a tank"). Student 6 clarifies the description of student 8 by adding that at the end "It was a means of transportation that involved all means of transportation."

In excerpt 2, the student osbservers wonder about the material arrangement.

**Excerpt 2. Student observers**

Stud. 1 I would be curious to know that, it would be interesting to know that…because actually it also depends on the material available. If they had something in their mind and they don't have the material they need, I wonder whether they are more inclined to try to find a solution or to change perspective.

Stud. 2 I also think that it would have been interesting to observe them elsewhere, not only where they were making things. We were in a calm area that hasn't been used and there also was a snack corner. As group leader, I served some water with concentrated fruit syrup and I told them that they could have a snack. On that occasion, it would have been interesting – I am thinking about this right now – to take notes about these moments, it would have maybe been interesting because very nice interactions took place, something was happening. I also think that they were discussing about going back and re-building their objects while talking and eating a biscuit. I think that it would have been interesting to take more notes, to think more about that, apart from the actual place where they were building their objects.

Student 1 is wondering if the absence of the materials forces children to find an alternative solution or to change their idea. Student 2 expresses his future wish to observe the different places in which ideas are fabricated during the activity. In particular, she mentioned the snack corner in which children informally discuss their fabrication.

In these excerpts, students position themselves in two different ways in respect to materiality: (a) the children's material process of construction, and (b) the material arrangement organized for the activity.

### 3.2 Voices of others

These voices manifest themselves as other enunciators that the speaker mobilizes on his or her behalf. As Marková et al. (2007) have stated, "it is through his/her voice that different voices speak and that the discussion is inhabited by a great range of characters

and discourses" (p. 126). In what follows, we can see how students position themselves in different ways by calling upon what others have done on other occasions. In particular, in the following excerpt the student entertainers referred to the association educators.

**Excerpt 3. Student entertainers**

Stud. 1 But actually, the group leaders of the association, those responsible for these free workshops – with free subjects – haven't been working on the organization as we did. So, they are less engaged, they are more focused on the parent-children meeting in itself.

Stud. 2 I shared a bit the same perspective. My objective was not taking action, I was aware that it wasn't my role but monitoring that people [he refers to the participants] were free to choose whether they wanted or did not want to do the activity proposed, because this freedom is important. But then, if there were maybe people [he refers to the participants] looking for certain materials, I tried to help them asking for this stuff. But it's true that, in reality, I haven't participated, even if the activities were quite interesting.

Stud. 3 I think that there are different ways to manage a workshop. We can be actually more in touch to what is happening, or we may launch the activity and then stay apart from it. It's just a different way to manage the workshop. I don't think that there is a right or a wrong way to act, provided that it is good for children. These group leaders have their own methods and children may be more used to them if they have already participated several times in this kind of workshop.

The discourse of student 1 is totally based on reporting his perception of the educator's position without expressing his own position. Student 2, in his turn, positions himself according to the educators by clearly affirming his own position as aligned to that of the absent individuals. Whereas student 3 positions himself in a neutral position: "I don't think that there is a right or a wrong way to act".

In the following example (excerpt 4) the student participants refer to their experiences during the atelier when discussing how they position themselves in relation to the children's needs. Their positioning is progessively built up in the discourse. This excerpt is a good example of the way in which students adopt various points of view about their relation with children.

**Excerpt 4. Student participants**

Stud. 3 Personally, I think that I kept looking at them and if a child needed something, I quickly approached to comply with his needs, even if sometimes I was sent back because there wasn't any (need)

Stud. 1 Yes

Stud. 3 I thought that he wasn't properly managing to do it, but actually he wanted to succeed by himself.

Stud. 2 Maybe the requests we have received were induced by our approach.

Student 3 starts her reasoning by underlining her position ("If a child needed something, I quicky approached to comply with his needs"), but right after, in the statement that follows, a male pronoun emerges. The recourse to the male pronoun concords with the fact that the student speaks, at this point, from the point of view of the child ("he wanted to succeed by himself"). Student 2, in his turn, positions himself by referring to group of the participants by adopting the pronoum "we".

An even more complex intertwining is evident in the next excerpt (excerpt 5), where individual positions emerged in relation to how the student participants imagined the children perceived the activity.

**Excerpt 5. Student participants**

Stud. 2 I wonder whether the adults participating in the workshop had any influence…on the children…given that it was adults, then maybe "reference people", potentially a model and children maybe have [inaudible] on what the other person was doing, next to them, thinking "I may do what the adult is doing" and they have maybe a bit compared themselves with them. I think in

particular of what our friend [a student] has done, a car running by itself with a system of elastics inside, and I wonder if the children compared themselves to him too, wondering how he managed to make it really really really run by itself or something like that.

Stud. 3 I know that the child close to Steve was blocked, he didn't manage to make his mean of transportation anymore, he was so astonished, and he said: "Oh, it works".

In excerpt 5, student 2 is wondering if the presence of adults influenced the children's activity or not. In particular, she referred to the presence of a particular colleague during the atelier and the child sat near to him. The recourse to the third person ("he didnt' manage…he was so astonished") from student 3 concords with the fact that he replies from the point of view of the child evoked by student 2.

In the following excerpt (excerpt 6) the role of the observer is discussed in different ways by the student observers.

**Excerpt 6. Student observers**

Stud. 4 Yes. So, what does it mean observing, which is the role of the observer in the space, maybe he/she has a neutral position about the reality he is living, otherwise there is…

Stud. 1 But also which is the influence we have on them. When we have such observers in the room, behaviourism is more often identified. This means that you have an influence on people that are around you, people you are observing and their behaviour changes, their acts may not be interpreted in the same way, that's the main challenge I think, stepping back from it.

Stud. 4 Independently from people, we have an influence, we modify objects just looking at them through our own perception, every time we see different objects as if the perception was [inaudible]

Stud. 2 I don't think that we have a great influence as observers. We told them at the beginning that there was a certain number of people that were there as observers and were not going to participate to the workshop, but I don't think, at least in our workshop, that there were so many people saying, "I am

observed, I'm unconsciously going to act differently".

Stud. 1 Yes it hasn't stressed them.

Student 1 introduced a theoretical concept (behaviourism), and positioned himself at first with "we" and then clearly with "I". He underlined the difficulties in observing people because their behaviours change constantly. Student 4 used the pronoun "we" to underline that the presence of an observer has an influence not only on people but also on objects. Student 2 positions himself ("I don't think that") in an opposite view by arguing that the children were not stressed by the others' presence.

### 3.3 Voices of culture

In the following examples, the students refer to culture in different ways. Excerpt 7 shows how students mobilized artefacts as symbolic resources to verbalize their feelings. The notion of symbolic resources (Zittoun, 2006) designates cultural elements that are used by a person to mediate other psychological processes (Zittoun & Grossen, 2013).

**Excerpt 7. Student entertainers**

Stud. 7 But also, what was good was this thinking process we had to do almost immediately actually. It was a bit like, if I can use that metaphor, Lightman in Lie to me for example. But, that's it.

Stud. 1 What I wasn't expecting was this interaction aspect how you manage not only your relationship with the others, but also that between the others.

Stud. 4 It's a bit different, it makes us think about many things, and I also believe that we have been creative too, when creating this workshop. I have found myself in front of my empty yogurt cup at home thinking, "I won't throw it out, because it may be useful."

In excerpt 7, student entertainer 7 used a cultural element (the main character of an American crime series) to verbalize his feelings when students and educators the association were analyzing together what happened during the atelier by comparing it

to the American team of experts in the crime series ("Lie to Me"). Student 1 gave a personal definition of the interactional aspects that emerged during the activity. Student 4 verbalized her creative attitude by evoking a situation in which she was at her house and the yogurt tin reminded her of the possibility of using recycled materials.

The following excerpt (excerpt 8) shows that, as stated by Cole (1996), "engagement in the activities creates a heightened awareness of the culture" (p. 302).

**Excerpt 8. Student entertainer**

Stud. 4 and I had the feeling, when I was helping a child I told myself "I'm losing something," "somebody could have some difficulties and I didn't see him" [somebody in difficultly] I told myself maybe there is something that I lost but after I see that this is quite normal.

Student 4 expresses her thoughts during her interaction with a child. As a novice entertainer, she was afraid that by helping one child she would not respond to other children needs' and "lose" someone else in difficulty. She concluded her reasoning by positioning herself in relation to workshop cultural awareness, according to which "it was quite normal" to not respond to all children's requests.

We can see that in excerpts 7 and 8, students positioned themselves in three different ways in respect to the voices of culture: (a) by referring to cultural elements as a symbolic resource (the American crime series) and (b) in reference to material resources (yogurt cup), and (c) by referring to their cultural awareness.

### 3.4 Temporal dimension

An emerging awareness of the students concerning how the past can be reauthored into the present by imagining future possibilities is evident from these excerpts (Brown & Renshaw, 2006). For example, in excerpt 5, student 2 refers to the past observed situation ("I think in particular of what our friend has done") to imagine children's possible reactions ("I wonder if the children compared themselves to him too").

In line with that, in excerpt 2 we can observe how the past ("we were in a calm area") is reauthored by student 2 into the present ("I am thinking about this right now") who, at the same time, imagines future possibilities ("it would have been interesting to observe them elsewhere"). Even in excerpt 7 we can see how student 4 drew on temporal

relations, in this case the past ("I have found myself in front of my empty yogurt cup") and the present ("it makes us think about many things"), to explain or justify her ideas to another (Brown & Renshaw, 2006).

## 4. CONCLUSIONS

Students necessarily construct themselves as heterogeneous and multivoiced subjects (Marková et al., 2007). We attempted to look more closely into the net of such positioning construction. In this paper, we qualitatively analyzed an interactive situation where university students – who covered different roles – designed and carried out two workshops during a semester-long course. In the first workshop, the students proposed to the participants the creation of musical instruments; in the second workshop, they proposed means of transportation for figurines. In both cases, recycled materials were placed at their disposal. Hence, the participants were invited to engage themselves in an active process of creation. In this paper, we consider how university students, acting as adults accompanying the children in this process, reflect collectively on their experience of being involved in these workshops. We were interested to understand how students positioned themselves in relation to the multivoiced polyphony that emerged from this experience.

We have observed how students' positioning is modulated by the interaction with materials, others and culture. This allows us to answer to our research questions. Firstly, we noticed that university students assigned a crucial role to materiality, which is understood as both the material and the physical location where the materials are used. These two aspects together are considered as capable of directing the children's object creation process. Consequently, materiality interconnects with the voices of the other participants and the speakers' culture, by entering the polyphony of students' positioning. Secondly, we observed that students' positioning connected to their role is also interconnected with a collective positioning. In this way, the polyphony of positioning appears as a net of individual and collective elements, which can be likened to a mirror game involving all participants. Thirdly, students become aware of the temporal perspective of their activity by reuniting past, present and future as a ground

for their positioning. Finally, our data showed the plurality and diversity of the students' positioning embedded in a cultural historical reality, where material and culture, collective and individual, past, present and future, intersect. This echoes with Stetsenko's (2017) transformative worldview, according to which "reality is reconceived as being constantly transformed by persons acting together as members of social communities and moreover as agentive actors who co-create these communities and their social practices" (p. 269).

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## 5.3 Learning Movements that emerge in a highly Educational Boundary Zone [31]


### Abstract

In this paper, the notion of a boundary zone is mobilized as a resource for connected learning. As Kumpulainen and Sefton-Green (2014) stated, connected learning introduces a methodological challenge: how does one capture the dynamic nature of making connections? This article highlights students' meaning-making processes that emerged in an education boundary zone called an atelier (or workshop). We specifically consider how the porosity of this boundary zone permits students to connect things learned by moving from one context to another. Four learning movements emerged across contexts: (a) from course topic to course activity; (b) from life experience to course activity; (c) from course activity to life experience; and (d) from course topic to another course topic. The empirical data discussed in the paper are drawn and selected from 9 interviews with students and from 26 individual student reports. These demonstrate the students' learning movements across contexts and highlight the implications for an expanded conceptualization of learning.


**Keywords:** Boundary zone, high education, expanded learning, boundary crossing


### Introduction

Expansive learning (Engeström, 1987) occurs in schools when learning for teachers and children goes beyond a given context of pedagogic structure (Yamazumi, 2008, 2009). Connecting learning across school and out-of-school contexts is a growing topic in educational research and practice (Rajala et al., 2016). In this paper, we argue that it becomes increasingly important in today's education "to break the encapsulation of school learning by a stepwise widening of the object and context of learning" (Engeström, 1991; p. 257).

Tuomi-Gröhn and Engeström (2003) stated that meaningful transfer takes place through an interaction between collective activity systems. According to them, this process is multidirectional and multifaceted, involving transitions from the school to

[31] Cattaruzza, E., Iannaccone, A., & Kloetzer, L. (submitted). Learning movements that emerge in a highly educational boundary zone. *Dialogic Pedagogy*. – This article received the Best Student Paper Award (SIG17&25, in Cambridge in August 2018)

the workplace, and from the workplace to the school. On account of its dynamic nature, this transfer is called developmental transfer. It implies, as Konkola and al. (2007) stated, that the school needs to prepare its teachers and students not just to do their assigned routine jobs but also to work as boundary crossers between the school and the work organization, bringing new intellectual and practical tools and insights into the processes of change (p. 217).

The theoretical assumption that guided our work was that education is based on dialogic meaning-making, in which a socio-material context is conceived as a porous zone to promote student boundary crossing. The aim of our study is twofold: (1) to analyze the students' meaning-making processes (learning movements) that emerge in a boundary zone; and (2) to promote a transformative, expansive view of learning.

**The notion of a boundary zone**

As Mikkola and Kumpulainen (2016) pointed out, "boundary crossing refers to ongoing reciprocal actions and interactions between contexts" (p. 165). In this sense, boundary crossing can be very useful in creating new expertise (Tuomi-Gröhn & Engeström, 2003) and can prevent communities of practices from becoming too static (Wenger, 1998). Akkerman and Bakker (2011), in their literature review, discerned four dialogical learning mechanisms of boundaries: identification, coordination, reflection and transformation (see also Akkerman & Van Eijck, 2013; Hyvärinen et al., 2016).

(a) Identification is about getting to know what the diverse practices are about in relation to one another. "What is typical in identification processes is that the boundaries between practices are encountered and reconstructed, without necessarily overcoming discontinuities" (Akkerman & Bakker, 2011; p. 143).

(b) Coordination requires a communicative connection between diverse practices or perspectives. Moreover, the "coordination process entails increasing boundary permeability and the routinisation of practices" (Hyvärinen et al., 2016; p. 133).

(c) Reflection emphasizes the role of boundary crossing in coming to realize and explicate differences between practices, and thus learning something new about one's own and others' practices (Akkerman & Bakker, 2011; p. 144).

(d) Transformation refers to changes in practices or even to the creation of new practices.

In the teaching-learning framework, Kumpulainen and Mikkola (2015) considered the implications of the dialogic approach in relation to understanding learning across contexts. Grossen, Zittoun and Ros (2012) introduced the dialogic concept of a boundary crossing event, mobilized as a resource for learning. This refers to "the connection (made either by the teacher or by a student) between a cultural element that is part of the lesson and other elements that belong to the outside world" (p. 15). Their intention was twofold: (a) to emphasize the uniqueness of the teaching-learning framework; and (b) to highlight the semiotic processes and uses of artefacts that people activate to open a potential appropriation space. They refer to Winnicott's notion of potential space by introducing the concept of "potential appropriation space". As Zittoun (2004) underlined, the term 'potential' is intended to stress that a teaching-learning situation may, under certain conditions, offer an opportunity (potentiality) for learning.

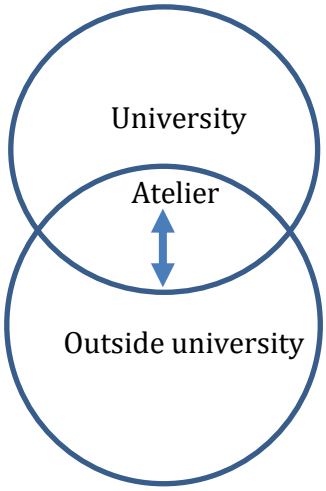
Konkola (2001) introduced the concept of a boundary zone to define a place where each activity system reflects its own structure, attitudes, beliefs norms and roles. This means that, as Tuomi-Gröhn & Engeström (2003) have stated, "elements from both sides are always present in the boundary zone" (p. 5). They suggest that the issue of transfer should be understood within an activity-theoretical frame in which the notion of expansive learning and developmental transfer are central.

The socio-material learning context (atelier) in which students are placed can be seen as an instrument of developmental transfer (Tuomi-Gröhn and Engeström, 2003) in two ways. First, in the atelier, the students are actively reconstructing the knowledge discussed during the course. Second, the interactive model of the atelier itself can be modified for transferral. The methodological challenge lies in analyzing how the

porosity of this boundary zone facilitates students' learning connections across contexts (Fig. 1).

This paper describes data from students who completed a semester-long course, conceived and developed in the Department of Psychology and Education of the University of Neuchâtel (Switzerland). In this course, students were considered as active boundary crossers, creating connections between the academic activity and other learning contexts. We present several excerpts extracted from interviews and individual reports in order to show the students' learning movements' across these contexts and the implications for an expanded conceptualization of learning.

Fig. 1: Boundary zone atelier




**Methods**

The empirical data presented in this paper were collected during a semester-long course entitled "Materiality in contexts" at the Department of Psychology, University of Neuchâtel (Switzerland). The study was selected and funded by the Rector's Office of the University of Neuchâtel as an Innovative Pedagogical Project in 2017[32].

The pedagogical aims of the course were:

[32] Four teacher-researchers were involved in the course (Prof. Iannaccone, Prof. Kloetzer, Ms Cattaruzza and Ms.Convertini).

(1) To introduce 26 university students (6 male and 20 female, in the final year of their bachelor's or master's degree) to the socio-material perspectives in education (Fenwick, Edwards & Sawchuk, 2011; Iannaccone, 2017) through a hands-on activity that involved designing and setting up two workshops (ateliers)[33] for children (aged 4-11 years); and

(2) To present a new way to expand learning by promoting a dialogue connecting the university and the local community.

The workshops were carried out in Le Balkkon's cultural association headquarters,[34] Neuchâtel, and opened to family and citizens. The course was organized in three parts:

First part: An inquiry-oriented curriculum model was adopted (Wells, 1999), according to which the students' inquiry process was constantly refined through the help of scientific papers, video observations and team work discussions that took place during the course. In this sense, the content of the curriculum was not an end in itself, but was treated as set of resources that mediated their investigations (Wells, 2002). Students were invited to work in small groups in order to formulate their research questions about socio-materiality and their design of the activity (see Table 1). Different meetings were organized by the teachers within each group to enable observation of the inquiry process in a gradual manner. Face-to-face meetings were alternated with the use of other online collaborative means chosen by the students (e.g. Google Drive and WhatsApp groups) to share work documents and questions.

[33] In this paper, the two terms 'workshop' and 'atelier' are used interchangeably.
[34] The cultural association regularly organizes activities (e.g. conference, theatre, exhibitions) in which citizens are invited to participate. More information can be found at: www.lebalkkon.ch

Table 1: The groups' research questions.

| | **Group 1** | **Group 2** |
|---|---|---|
| **Research question** | Quelles interactions émergent dans le cadre d'une atelier de création d'objet sonore? | En quoi le rapport à la matérialité se différence-t-il entre les individus lors d'un atelier créative? |
| **Activity** | Création d'un instrument de musique à partir du matériel de récupération. | Construire un moyen de transport qui roule, qui flotte ou qui vole pour transporter des objets ou des petites figurines et faire la course avec. |
| **Examples of the final products** |  |  |

Second part: In line with the participatory learning principle adopted during the course, students were invited to take on the role of entertainer, observer or participant during the two atelier activities. There were: (a) 8 student entertainers, who were required to introduce and close the activity, and supervise the whole activity and the material arrangement; 10 student observers, who were required to observe the interactions, with the help of artefacts created during the course (ex-observational grid, maps, etc.); and (c) 8 student participants, who were required to participate in the activities with the children and families.

The ateliers were organized across two different time periods, to give students the opportunity to share during the class lessons their work strategies and their reflections on the development of their activity.

At the end of each workshop, debriefing was provided in association's headquarters, to allow students, teacher-researchers and educators to share feedback and observations about the activities.

Third part: In this phase, we gathered information from the students regarding the different perspectives adopted during the experienced activity (participant, entertainer, observer) via focus groups and individual interviews.

*Data collection*

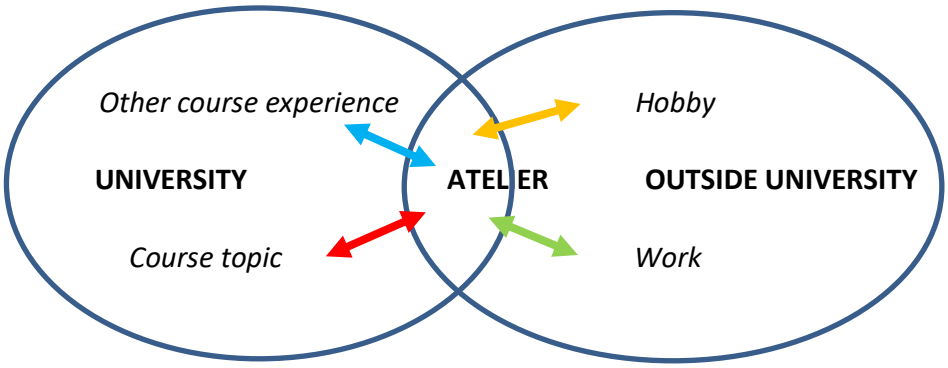
During the semester-long course, we collected data from semi-structured interviews, focus groups and student reports. Nine tape-recorded semi-structured interviews (from seven volunteer students and two educators at the association) were conducted at the end of the course by one teacher-researcher (one of the authors of this paper). Three focus groups, lasting about 1 hour each, were conducted by three teacher-researchers of the course (two of them are authors of this paper). Twenty-six individual student reports, which included a description of their experienced activity and other materials produced by students during the course (pictures, drafts, etc.).

The empirical data discussed in this paper are drawn from the seven recorded semi-structured interviews conducted with students. The results that emerged from the focus groups are reported elsewhere (Cattaruzza, Ligorio, & Iannaccone, submitted). The interviews were conducted to elicit the students' experienced activity, inspired by *Vermersch's* (1994) elicitation interview technique. The interviews were transcribed and analyzed to identify the students' meaning-making processes (learning movements).

## Results

Four student learning movements emerged (Fig. 2): (a) from course topic to course activity; (b) from life experience to course activity; (c) from course activity to life experience; and (d) from course topic to another course topic.

Fig. 2: The students' learning movements that emerged




*First student learning movement: from academic concept to atelier activity*

The following two excerpts illustrate how students create connections between academic concepts and atelier activity by referring to their experience during the course. In excerpt 1, taken from an interview, Michel[35] compares the notion of socio-cognitive conflict presented in the course to the group dynamic. He describes the inquiry process of his group by underling the importance of finding solutions (lines 5-7) but also to go farther in the inquiry (lines 13-15). According to him, the learning process emerged in a natural way (line 19), not just at an individual level but also at a collective level (line 23).

### Excerpt 1: Michel – entertainer

**1.** Michel: Uh, in our group, I can observe
**2.** Inter: hmm
**3.** Michel: the socio-cognitive conflict,
**4.** Inter: hmm, hmm
**5.** Michel: it is always there. We have been sharing ideas since the beginning. Each of us explained his/her observations and intentions. And actually, the others' contribution

[35] All names used in this paper are pseudonyms

**6.** Inter: hmm
**7.** Michel: offered some solutions.
**8.** Inter: hmm
**9.** Michel: Even just in the, I'd say, first session, in which we established a list of what we wanted to do,
**10.** Inter: hmm
**11.** Michel: even just at that moment, if we share our ideas
**12.** Inter: hmm
**13.** Michel: we have a greater breakthrough/perspective, we go further in
**14.** Inter: yes
**15.** Michel: in the research, in the idea of what
**16.** Inter: hmm
**17.** Michel: we would like to do.
**18.** Inter: hmm, hmm
**19.** Michel: And just at that moment, since the beginning, we observe a natural form of learning. And uh (1.4) and, apart from that, there's always an individual contribution, there's some research, there's some
**20.** Inter: hmm
**21.** Michel: curiosity
**22.** Inter: hmm
**23**. Michel: So, uh, I think that a collective and individual form (…) of learning exists for these types of tasks.

Isabel, as reported in her individual report (excerpt 2), describes her group's process of imagination in terms of Vygotsky's productive imagination shared during the course. By referring to Vygotsky's work, she presents imagination as an important basis of her group's creative activity used to envision the details of their ateliers.

### *Excerpt* 2: Isabel – entertainer

> Indeed, we had to imagine the situation of the *atelier* in the premises we have been visiting, imagine what was feasible with a given public as part of the course and the association, a course actually given with material originally meant for another use, and all that with some unknown factors (number of the other participants, exact time needed to accomplish this task,…). It was what Vygotsky calls a productive, and not reproductive, imagination that collects these elements from the material and practical environmental reality. It became very clear to me while we were trying to conceive together the *atelier* in its smallest details not to forget something important and to avoid any unforeseen events: we were aware that it was actually impossible to avoid them, even planning everything in advance. It was our responsibility, as group leaders, to manage the moments in which the reality differed from

what we had previously imagined, that is to say the famous unforeseen events. Our imagination has guided our actions when preparing the documents and collecting the material for our *atelier*.

*Second student learning movement: from life experience to course activity*

The following three excerpts shows how life experience is mobilized by students as a resource to connect their competence achieved in other contexts to the competence mobilized during the course activity. This echoes with the boundary crossing event described by Grossen et al. (2012), in which: "the teacher or student imports a cultural element, a social event, or a personal experience occurring outside the context of the classroom and connects it with a cultural element currently taught in the classroom" (p. 19).

In excerpt 3, Tobias shows how his experience as a photographer was useful to his role of observer during the atelier.

**Excerpt 3: Tobias – observer**

1. Tobias: actually outside work, I practice *photography* a lot actually
2. Inter: Ok.
3. Tobias: But (1.4) uh, I cannot tell / it's the same thing to observe through a *camera* (…). It's difficult to compare, but, if we compare, uh, let's say that I've told you that I was quite used to observation.
4. Inter: hmm
5. Tobias: in different contexts of course
6. Inter: hmm hmm
7. Tobias: We cannot / as I've told you, we cannot really compare. But I've often made some *photo-reportage about people*
8. Inter: ah
9. Tobias: yes, then observing / is / is even (1.1) is fundamental in what I want to do, my photo projects actually.

In the next excerpt, Amélie refers to her work as a substitute teacher to justify her attitude to approaching children during the activity.

**Excerpt 4 : Amélie – entertainer**

1. Amélie: It makes you want to approach children, me at least, given that I've done that many times at the end

2. Inter: In which context?
3. Amélie: As I often work as a substitute teacher, it's natural to me to approach children and help them somehow

Interestingly, here, students seem to import skills acquired through their extra-academic activities in the course setting: a taste for observation and tool-mediated observation (via photography) in the case of Tobias, and skills to "approach children" acquired in teaching in the case of Amélie.

*Third student learning movement: from class activity to life experience*

In contrast, in excerpt 5, Manuel explains how he has exported his observational competence developed during the class to an outside of school context. This excerpt resonates with the second boundary event presented by Grossen et al. (2012), according to which "the second type consists of exporting a school subject matter outside the class in order to make sense of elements, events or experiences that take place in everyday life" (line 20). Manuel illustrates how he transfers his experience of the observer role acquired during the course activity to other contexts (lines 7 and 23) in which children participate in a similar activity that involves assembling materials.

**Excerpt 5: Manuel – observer**

1. Manuel: At the youth service, in the city of Chaux-de-Fonds
2. Inter: Yes
3. Manuel: we organize every Wednesday some activities for children.
4. Inter: ok
5. Manuel: And that's why / now I have the uh / actually now I have / thanks to your /
6. Inter: yes
7. Manuel: during these sessions, I instinctively observe them more, as / when they have / when there's a / typically when a manual activity is organized.
8. Inter: yes
9. Manuel: Yesterday they have made some boats actually
10. Inter: oh yes
11. Manuel: for example.
12. Inter: oh yes. This is great!
13. Manuel: starting from already made boat hulls,
14. Inter: yes
15. Manuel: actually. But we have / we have made together the masts, the /

16. Inter: oh yes
17. Manuel: the funnels, these kinds of things.
18. Inter: yes
19. Manuel: And (…) yesterday, I've spent my time / of course, we must interact with children, because we are not there as mere observers,
20. Inter: yes yes
21. Manuel: we are monitors.
22. Inter: yes
23. Manuel: But, my reaction was observing how they acted
24. Inter: yes
25. Manuel: actually.
26. Inter: yes yes
27. Manuel: explain to them, then / to / and then just to / to act, actually.

*Fourth student learning movement: from course topic to another course topic*

In the following excerpts, students connect a school subject, or method developed during the course, and export it to another course, and vice versa.

In excerpt 6, Thomas describes how a method (retroactive observation) discussed during the course was very useful, not only at the end of the workshop but also in another course.

**Excerpt 6 : Thomas – entertainer**

1. Thomas: So, there's just a thing I've observed when reading the text by Anne-Nelly Perret-Clermont
2. Inter: hmm hmm
3. Thomas: at one time, she talks about uh retroactive observation
4. Inter: hmm hmm
5. Thomas: and, we have done that automatically at the end of the atelier
6. Inter: hmm
7. Thomas: with uh the people that were there and the two female directors of the association,
8. Inter: hmm
9. Thomas: but this has also been useful for another group
10. Inter: ok
11. Thomas: in / we were making a study about passionate people.
12. Inter: hmm
13. Thomas: And uh, we were recording, we were shooting, but then, afterwards, we gave ourselves some feedback on what we had seen, on what we had felt
14. Inter: hmm

15. Thomas: not to forget that we were living during the interview.
16. Inter: ok
17. Thomas: And I think that doing that afterwards always gives a supplementary key
18. Inter: hmm
19. Thomas: and that may be useful to us for everything.
20. Inter: All the time, yes
21. Thomas: Because I've often had the impression that we change our memories,
22. Inter: hmm
23. Thomas: with this / maybe our desires, with what we want
24. Inter: hmm
25. Thomas: and that may, I'd say it, yes, take away some objectivity from what we have been looking for.

In excerpt 7, Gabriel refers to his historical research to show his familiarity with material support during the course.

**Excerpt 7: Gabriel – participant**

1. Inter: ok
2. Gabriel: who was enough (1.3) to seek the point uh (…) / actually to seek the relationship between tangible and intangible things, something that is also / intertwines with my historical research
3. Inter: yes
4. Gabriel: through archival, digital supports
5. Inter: of course
6. Gabriel: material supports
7. Inter: of course (0.6)
8. Gabriel: So, I've managed, [inaudible] (0.4)
9. Inter: yes
10. Gabriel: [inaudible], to find it.

## Discussion

This paper demonstrates that students are not just members of their local activity system community (Wells, 1999), in this case the course lessons. They are also participating in many different activity systems (work, hobby, etc.). The challenge, as Saljo (2003) points out, is "to structure the activities in such a manner that people are willing to see learning as worthwhile" (p. 320).

In line with that, we argue that a dialogic perspective depends on three main pedagogical challenges. First, the role of teacher as a mediator of interdisciplinary dialogue between contexts. Second, the creation of a third space to promote dialogue connecting the university and local community. Third, considering student engagement as a means of taking responsibility. This echoes with Stetsenko's (2017) transformative activist stance, according to which "the knowing of oneself and of the world needs to be understood as inextricably connected, even unified, facets of one and the same process of becoming an agent and actor of historically unfolding community practices" (p. 336). With such a perspective, the teacher and researcher should be encouraged to contribute to a new perspective on extended learning environments in education to overcome "the encapsulation of schooling" (Engeström, 1991).

Additional research is needed to further investigate the roles of teacher and researcher engagement as crucial parts of this dynamic process between contexts.

**Funding**

The course on which the analysis is based was funded by the Rectory of the University of Neuchâtel as an "Innovative Pedagogical Project" (academic year 2017-2018).

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## 5.4 Provoking social changes in a family-school space of activity[36]

*Introduction*

Human life could be seen as a complex sequence of activities that take place in more or less secure social spaces (Iannaccone & Zittoun, 2014; Perret-Clermont, 2001, 2004). In daily activities, humans regularly and frequently cross the boundaries between these spaces, implying fascinating consequences for processual and dynamic analyses, especially in psychology (Iannaccone, 2013; Tuomi-Gröhn & Engeström, 2003). Among the large theoretical and empirical amount of scientific works focussing on inter-contextual concrete and symbolic movements, in the present paper we would emphasize the case of the family-school space intended as a dynamic system of interactions. Our goal is to show how a psychological intervention in the critical field of contemporary social life is sensitive to any situated perspective of action. Despite a large tradition of research that mainly collects beliefs of parents and teachers to reconstruct the interactions between school and family, we should assume a more dynamic perspective obtaining data through the systematic observations of parents', children's and teachers' interactions during concrete activities. In this sense, we aim to highlight a perspective that should allow for a more ecological description of the inter-contextual interactions. We intend to show to what extent this approach (and its operationalization through the notion of the activity space) can favour new opportunities for the theoretical acquisition and the development of more effective pedagogical devices, oriented to the improvement of home-school relationships. According to a previous research tradition (Marsico, Komatsu & Iannaccone, 2013), we are convinced that this type of perspective can provide concrete opportunities to promote positive changes in the inter-contextual balance between family and school contexts.

In order to present the main elements connected to our goal, the paper is organized as follows: firstly, a brief review of researches conducted on home-school relationships is offered in order to highlight some central elements that socio-cultural approaches can

[36] Cattaruzza, E., Iannaccone, A., & Arcidiacono, F. (In press). Provoking social changes in a family-school space of activity. *Psychology & Society* (special issue)

bring to the actual theoretical debate on the above mentioned topic; secondly, the presentation of some reflexions about an action-research project we have recently realized will contribute to show how a particular space of joint activities (a "socio-material atelier") can offer opportunities for positive changes in the relationships among pupils, parents and teachers.

*A brief school-family literature review*

Investigations about school-family relationships are largely represented in psychology and in educational sciences. The number of studies in this area of research is very impressive. For example, the reviews provided by Christensen and Sheridan (2001), Hill and Taylor (2004), Pomerantz, Moorman and Litwack (2007), Galindo and Sheldon (2012) highlight the controversial effects of home-school interactions on students' achievement. Another contribution (Akkari & Changkakoti, 2009) underlines the relevant problem of the co-presence of multiple cultural models of family in most European and north American schools. The large heterogeneity of cultural values, amplified by the frequent processes of geographical migration, is not any more an easily manageable question with respect to the school-family relationships.

Among the contributions dedicated to the question of the school-family relationships, different papers appear as reference in the psychological literature. For example, the works of Epstein (1990, 2001), Connors and Epstein (1995) focus on the role of information offered by the school to the parents, on the type of information between school and family, on the level of parental participation to the learning activities at home, and on the involvement of parents towards decisions and activities that are realized at school. Within the same framework, Fantuzzo Tighe and Childs (2000) have shown how these factors are connected to three main elements: 1) the modalities of parental participation to the various school activities; 2) their contribution to the learning activities at home; and 3) the communication between family and school. Other analyses have highlighted the relevance of parental sustain and affective relationships between parents and children (Deslandes, Bertrand, Royer & Turcotte, 1995). The main role played by affective relationships has been also highlighted by Gronlick and Slowiaczek (1994): the authors have studied the parental involvement in the school

context (e.g., their participation to the activities organized by the school), the parental intellectual involvement and their interest towards children's school activities. In addition, Eccles and Harold (1996) have highlighted the role of helpers played by the parents in realizing the school homework and, more generally, in favouring a good relationship with their children.

These investigations, as the large part of other similar works conducted on parents', children's and teachers' beliefs, have collected data by using methods largely inspired by questionnaires and interviews. In other word, these studies essentially collect verbal reports that are detached in many cases by the temporal and spatial contexts of concrete activities they are referring to. The obtained data are then informative about the parents', students' and teachers' statements, and account for different representations of the school and systems of beliefs towards formal and informal education. In this kind of research, a methodological risk is to underestimate the gap between beliefs and concrete actions of people engaged in social activities. Moreover, interesting examples are represented by the models of investigation connected to the ethno-theories of the development and learning (Rubin & Chung, 2006; Lancy, 2012). However, in spite of the large amount of empirical works, there is little fragmentary consensus among findings (Bérubé, Poulin & Fortin, 2007) and probably an insufficient space for theoretical innovations.

A main question concerns the impossibility of generalizing conclusions that are related to a multidimensional area of research (Epstein & Dauber, 1991; Grolnick & Slowiaczek, 1994; Eccles & Harold, 1996; Kohl, Lengua & McMahon, 2000; Deslandes & Bertrand, 2005). Probably, some aspects of the results that are not generalizable depend on the methodological choices of these types of research. In spite of the potential methodological limitations that will be discussed later on, these studies have the merit to collect a large amount of interesting information about the relationships between school and family, as well as the cultural, social and economic contexts in which they are built. In fact, the adoption of the ecological perspective, as proposed by Bronfenbrenner (1979), although recently criticized (Boulanger, 2017 this issue), has offered an explicative frame of this type of data, relatively coherent to the complexity of the multiple social relationships within educational contexts. In addition, these studies

have contributed to identify a certain number of representations that parents, teachers and students produce reciprocally and about the academic achievement of pupils. Among the factors that are considered crucial, the active participation of parents to the school activities appears essential, also because the parental involvement seems to favour a normative development of children's educational experiences. However, as we have already highlighted, the main problem of these studies concerns the static view of the school-family relationships. According to Akkari and Changkakoti (2009), we believe that it is not possible to catch a causal connection between educational strategies deployed by families, parental implications into school activities, communication between parents and teachers and academic achievement of pupils without taking into account a perspective of investigation that precisely focuses on activities. This view sustains the need of considering the local school culture, mainly through an ethnographic detailed observation of the interactions within the school context (Selleri & Carugati, 2013; Giglio & Arcidiacono, 2017). This implies that within situations of complexity and full of implicit rules and meanings, it is essential to understand to what extent the parents' statements cannot be adopted as unique source of information, without the analysis of the activities and processes of regulation/negotiation that characterize the interactions around school-family relationships. This perspective is confirmed by a relatively small number of interesting works in which researchers have adopted techniques of participant observation, by collecting verbal and nonverbal data during everyday social interactions across contexts. These investigations have been conducted in specific micro-settings (e.g., home, classroom) and have been largely inspired by the symbolic interactionism and ethnographic approaches. In this sense, there has been a shift of the focus of analysis from the second-hand verbal reports (the representations) to observable elements of complex events, trying to present evidences of interaction as they happen (Arcidiacono, 2014; Arcidiacono & Pontecorvo, 2004; Pontecorvo & Arcidiacono, 2014). The relevance and the pertinence of the observation as a way to integrate verbal and nonverbal elements is then recognized as necessary condition in order to produce abductive interpretations of the dynamics of social interactions, and in particular the family-school relationships. This type of approach seems to be adequate in maintaining

the focus to the progressive construction of discourses and activities in which participants are involved, as well as the dialogical dimension of their interactions. These investigations assume that the unit of analysis is not the isolated phenomenon under study, nor the individual conduct, but the entire system of interactions, time and the space of action in which a specific activity is constructed and performed (Arcidiacono, 2013; Buđevac, Arcidiacono & Baucal, 2015; Iannaccone & Arcidiacono, 2014; Pontecorvo & Arcidiacono, 2007).

The two types of methodological approaches that we have briefly described above (producing analyses based on verbal report and/or observation) are relevant in providing possible procedures to investigate the relationships between school and family, but at the same time, present limitations in their way to use the obtained information as data to perform a post-hoc reconstruction of the interdependence between micro-contexts. The question of taking into account the concrete conditions of the field at that time (Lewin, 1997) influences in a substantial way the educational policies related to the school-family: it is a point that is questioned since 90's (Montandon & Perrenoud, 1994), although without conceiving a new way of investigating the field, nor proposing alternative models of intervention. In the last thirty years, several interesting proposals have suggested ways to cope with these methodological limitations, especially within the theory of systems and complexity (see Price-Mitchell, 2009 for a review within the school-family domain).

More recently, Iannaccone and Marsico (2013) have suggested the necessity of studying the relationships between family and school as a specific unit of analysis, accounting for the need of highlighting phenomena within interconnected contexts. One of the main contributions of this approach is the possibility to conceptualize a specific identity construct that emerges in educational settings. In our opinion, this methodological option should be useful and beneficial at least for two reasons: a) it can contribute to increase the awareness, within the scientific community, of the limitations of the data collected in situations that are "distant" from the related activities; b) it can implement the adoption of units of analysis that contribute to avoid a monological reductionism. Concerning the first point (the distance from the activity), we are convinced that it is necessary to reflect about the nature of the information we have about the family-school

relationships. An access to these data should possible through questionnaires and interviews, as a way to reconstruct the representation of events generated over spaces and times. These data usually refer to past experiences that are often very far from the actions performed during the investigation (Iannaccone & Marsico, 2013). In this sense, data allow a partial and indirect reconstruction that is not specifically oriented to the real experienced situation. Iannaccone and Cattaruzza (2015a) have specifically discussed the problem of the access to events located in the past, by highlighting that the distance from the activity increases the likelihood of a static view of the representations elaborated through different surveys.

An opposite view based on the dynamic character of the interactions within the two contexts should be exemplified through the notion of "educational self" that has been proposed to account for a certain number of scientific results in the field of education (Iannaccone, Marsico & Tateo, 2012). The idea of the educational self implies a dynamic vision (positioning) of the participants involved in interpersonal experiences in context. The elaborated representations are then considered as forms of organization of identities connected to educational experiences. These forms could vary during the course of the interaction, according to the dynamic characteristics of the contexts. According to Iannaccone (2013), data collected through questionnaires and interviews can be considered as more or less stable expressions of the representations that participants have about the context of the educational practices. However, as observed in investigations in which the focus is on the interconnection among actors of an educational context (e.g., the parents, the teachers), the initial representations and the system of values that guide actors in their activities are exposed to a dialogical process of continue re-elaboration during the social experiences (Iannaccone & Marsico, 2013), as already highlighted within the dialogical approach assumed by Linell (2009) and Marková (2013).

According to what has been highlighted above, we are convinced that, apart the amount of data that are available by using questionnaires and interviews, the methodological process of analysis of family-school relationships should benefit of a further step taking into account the processual dimensions of the representation offered by participants. For example, the information obtained through questionnaires and interviews can

constitute the starting point to promote forms of interactions (in our specific case, between parents and teachers) as a sort of narrative interview (Daiute, 2014). These situations, partly inspired by the techniques of the focus groups, are settings in which the participants can "present" their own narrative within a collective situation in which the personal positions are confronted to the points of view of the others. It means that in these cases the interpersonal confrontation can offer the opportunity to reflect on the nature of each point of view, with respect to the others' positions, and to modify it during the interaction. Other research perspectives have also highlighted the importance of crossed self-confrontation methodologies (Clot, 2000), especially in the field of work psychology.

In order to avoid the risk of transforming and reducing, even partially, the interactive dynamics into elements that are exclusively monological (as it is typically the case of the questionnaires), we are convinced that two passages are necessary: from one hand, it is important to consider the notion of the transaction between contexts of activity (for example, contexts in which school-family interactions are concretely realized); on the other hand, it is necessary to look at the representations that are dynamically elaborated by the different actors. In order to attend these two passages, it is important to interpret the activities produced by the participants as forms of conversational interaction, as elements of specific *interactional contexts*. In other words, in analysing the verbal reports and transcriptions obtained by the researchers it is necessary to constantly refer to the specific activities that participants realize during their everyday interactions. The observation of these activities can offer relevant elements contributing to better understand and interpret "static" verbal reports. The complementary information can also allow to identify the interconnections among actors, as it has been the case during a recent research project[37] (Iannaccone, 2010; Iannaccone & Marsico 2013; Marsico & Iannaccone 2012). The analysis of some aspects of the mentioned project suggests the relevance of integrative situations that occur while actors of schools and families met and, in many cases, make difficult the change of the relationships. More particularly, the above-mentioned research focuses on the

[37] We are referring to the research project "Parental styles and processes of socialization during adolescence" (grant obtained by Antonio Iannaccone for the years 2004-2007).

dynamics of cooperation versus dynamics of conflict that emerge during school-family meetings and that regulate the deployment of conversation. Results show that the families' capacity of playing an active role during the interactions with the teachers (for instance, to be able to show clearly a disagreement, to argue about evaluations made by the teacher, etc.) is mainly connected to the socio-professional status of the parents. Families with low socio-occupational status show their disagreement in a less explicit way, leaving the impression of a reduced degree of family-school conflicts. However, by analysing the conversations among actors it is evident that this kind of interpretation can emerge exclusively by a static look to the data. While a separate approach to the representations of parents and teachers provides somehow a "static" and non-engaged vision of the reciprocal beliefs, an analysis of the interactional dynamics during the real encounters can make visible the conflictual dimensions that remain often implicit in families with low socio-professional status. The lack of explicit reference to conflicts seems connected to the fact that families perceive meetings at school as "unsecure" spaces of activity, situations in which they did not feel comfortable. In fact, the interactions are regulated by linguistic exchanges that often emphasize the cultural differences between parents and teachers. These aspects are confirmed by the existing literature pointing out the case of parents with low socio-professional status who have been confronted to difficult school experiences. In such a case, it is crucial to take into account the specific point of view of parents and teachers, through the creation of secure spaces of interaction in which the actors can advance explicit elements that otherwise are not visible during school-family meetings.

Studies related to the analysis of communities of practices (Wenger & Wenger-Trayner, 2015) suggest the possibility that a research-action in the zone of contact between the two systems of activity (the family and the school) should be more effective and pertinent than other types of interventions exclusively based on preliminary knowledge emerging from social representations and conceptions. Our choice of implementing a "socio-material atelier" is exactly situated within this logic of research and intends to offer and guarantee to the participants a secure space of activity.

*The action-research project Parents-school: Learning and community: A case study*

According to the previous considerations, in the following part of the paper we describe the combination of ethnographic and participatory elements that are at the core of our interactional setting, and that have been planned in order to facilitate a process of change within the specific system of the home-school relationships. Through the reference to empirical evidences related to a project[38] we have conducted in 2014, we present a theoretical perspective on how a collaborative socio-material atelier (hereafter, the atelier) could open new and concrete perspectives for orienting future pedagogical designs to improve the relationships among parents, students and teachers. The collaborative work consists in an activity that mobilizes *processual* and *dialogic* dimensions of the school-family meeting: at the core of our proposal there is the opportunity to invite the participants (parents, preschool children and teachers) to activate, within a creative and open space, processes of re-interpretation of their reciprocal interpersonal relations. The space is based on a conception of socio-materiality that has been described by Iannaccone and Cattaruzza (2015b) and it is connoted by an explicit ludic dimension: parents, children and teachers are invited to attend an atelier in which they can build small ships, by using tools and materials available during their everyday life.

Parents' involvement (Fleer & Rillero, 1999) as co-researcher with the teacher shows a new way to conceive the traditional relationship between parents and teachers. This is related to some socio-cultural assumptions that characterize our approach and that we intend to clarify as follows. Firstly, the space of the atelier has been created in order to provoke a reorganization of the processes of attribution/modulation of meaning to the proposed activities (e.g., school-family formal meetings). In our idea, a reorganization at the level of the meanings can impact the system of relationships among participants. Secondly, the atelier was designed in order to sustain a collaborative activity favouring

[38] We are referring to the project "Parents-School: Learning and Community" involving a Primary School in Neuchâtel (Switzerland). The project is based on a collaboration between the Institute of Psychology and Education at the University of Neuchâtel (Switzerland) and the Department of Family and Community Service of the Canton of Neuchâtel (Switzerland).

the participants' awareness of the family's and school's systems of rules and the specific representations and repertories of practices (Carugati 2013; Crafter & de Abreau, 2013). In the following part of the paper, we briefly present and examine some salient characteristics of such an approach designed around the atelier.

*The research site and the data collection*

In our perspective, the atelier constitutes a space of socio-material activity in which the participants (in our case, parents, teacher and children) can be involved at the same level at different kinds of hand-on activities, canonical/non-canonical use of objects, free organization of the interpersonal distances and types of engagement in the activity. According to the Reggio Children approach[39] based on the prominence of relationships (Malaguzzi, 1993,1994; Edwards, Gandini & Forman, 1998), the atelier was hosted by a class of a pre-primary school in Switzerland. The participants were twelve children aged between 4 and 5, and their parents (Portuguese, Italian and Swiss families). The atelier was organized in two half day sessions, outside regular school hours. For each session, small groups of participants, involving the children and their parents, were organized. At the beginning of each session, we introduced the participants to an assignment related to the construction of a small ship by using different materials (wood, plastic, paper) arranged on the tables. We did not give them further details, in order to leave them free to use the materials and to choose the modality of work. Researchers and teachers were present as participant observers. Audio and video recordings were collected by means of four fixed cameras positioned on tripods within the classroom. We also collected notes during the observation and pictures during the atelier, especially concerning drawings, artworks or any other materials produced during the activity.

[39] Loris Malaguzzi, founder of the "Reggio Emilia approach," puts at the heart of his mission the need to define the role of the adult not as a transmitter, but as a creator of relationships - relationships not only between people but also between things, between thoughts, with the environment (Malaguzzi, 1994). He imagines a school as an immense hot air balloon in which children can see the world in a different way, and the teacher needs to learn how to be a better hot air balloon pilot, in order to convince parents that what they are doing is something extremely important for their children. This metaphor highlights how Malaguzzi considers teachers and families as central actors for the children's education.

As conjectured during the preliminary steps of the research, the atelier plays as space of activity that favours the construction of school-family relationships in a systemic and dynamic perspective. This space constitutes a real field of research in terms of characteristics that are close to an eco-systemic view of educational contexts. The practical parameters that have been fixed during the organization and the accomplishment of the atelier concern different elements. Firstly, according to Lave (1988), the distinction between *arena* and *setting* has been considered to reflect on the different operational uses of the term context. In this sense, an arena (see figure 1) refers to the contextual aspects of the context that are not directly negotiable by the individuals. The arena is a "physically, economically, politically, and socially organized space-in-time" (Lave, 1988, p. 150).

*Figure 1: the arena*

Instead, a setting (see figure 2) refers to the context created by the individual during his/her interaction with the arena - including interactions with other individuals.

*Figure 2: the setting*

This distinction between the arena and the setting is helpful in order to avoid a mechanic vision of the interaction: in fact, the focus is neither the individual nor the environment, but the dynamic relations between the two elements. As highlighted by Valsiner (1987), "once that adult organizes the child's movement from one well-organized setting to another then the child may accept expectations of the new setting without difficulty" (pp. 183-184).

In our case, based on the assumption that the movement is an important aspect for working and learning, especially because provides communication (Martin, 2006), the arena is jointly designed by the researchers and the teacher in order to favour the maximum degree of freedom to the participants' movements. On the one hand, different tables and chairs are arranged alongside each other in the middle of the classroom. As the participants are invited to work together in the same space, we assume that their interactions, the physical arrangement of the work place, as well as the possibility to observe the work of the others could be important sources of learning (Mottier Lopez, 2004). On the other hand, the setting is organized autonomously by parents and children: in some case, they decided to share the same material in order to build together all the pieces of the ship; in other cases, they decided to work separately and then to gather all the pieces at the end. As Rogoff, Mosier, Mistry and Göncü (1993) pointed out, "children's roles in structuring an activity in social interaction may involve

central responsibility for managing the situation - even when their partners have greater knowledge - and for adjusting their own level of participation" (p. 236).

According to the mentioned approach, a second main issue concerns the fact that, as partners of the participants, we are inside the learning situation (Bradekamp, 1993), for instance by asking questions and redirecting the activities. A couple of months before the beginning of the atelier, we met the director of the school and the classroom teacher in order to share with them our ideas about the activities to be proposed. This preliminary step was very important, because the "dialogue implies not only talking but also acting together" (Wardekker, 2000, pp. 269-270). After this meeting the teacher decided to participate to the atelier. She was helping us to set the room and to prepare the necessary materials. During the activities, we did not give her specific instructions: we have observed how she spontaneously acted and, for instance, we noticed that she never evaluated or judged the work of parents. On the contrary, she always respected the collaborative work between parents and children. Within our design, we have worked with the teacher for each group of parent-child and, as well as between the groups. As pointed out by a former collaborator of Reggio Children, "the teacher must be involved within the child's exploring procedure, if the teacher wants to understand how to be the organizer and provoker of occasion, […] and co-actor in discoveries on the other" (Filippini, 1990, cited by Edwards, 1998, p. 181). The parents revealed to have appreciated this way of working, especially because they did not perceive our presence as evaluators. On the contrary, they considered the observers as partners for their discoveries with children.

*Some observations*

As first analytical step, a global examination of the groups' activities has been conducted. Afterwards, we identified more precise sequences of activity concerning the relationships between parents, children and the teacher.

Taking into consideration the arena and the setting, we have observed several interesting interactive processes: more particularly, we are referring to the support provided by the adult (Stone, 1993), the recruitment of the children according to their interests, the capacity to maintain the goal's orientation, as well as the consideration of

the critical task features. In general terms, we have observed practices framed by the participants in relation to specific characteristics of the available tools and the local context in which the activities occurred (Puntambekar & Kolodner, 2004). The parents were actively involved in problem solving situations, they were interacting with their children in order to find technical solutions and to share the use of the tools. This aspect seems relevant because the collaborative problem solving has the potential to teach participants how to deal with complex tasks and how to work with and to learn from others (Forman & McPhail, 1993). According to Paradise and Rogoff (2009), during the atelier we have observed frequent collective efforts to concretely contribute to the problem solving activities. For example, we are referring to cases in which a father discovered some problems during the construction of the ship, or the mother did not find a good way to paste different pieces of material, or the child intervened to offer his/her personal idea about a possible solution. Based on the Reggio Emilia approach, we can highlight a large amount of collaborative practices that were shared by adults and children in order "to explore, observe, question, discuss, hypothesize, represent, and then proceed to revisit their initial observations and hypothesis in order to further refine and clarify their understandings (Hewett, 2001, p. 96). In this sense, within the atelier the participants assumed roles that "were more as apprentices than as the targets of instruction" (Katz, 1998, p. 9).

*Conclusion*

We would like to complete our reflection about the implementation of the atelier by summarizing the reasons of some choices adopted in the presented project. As we already indicated, our intention was to favour the participation of the parents and to suggest new avenues for future research about family and school relationships. According to our observations, participants show mutual knowledge and respect of cultural differences while working together, in a face to face situation. By assuming the perspective of the Reggio Children approach, it was expected that the presence of families coming from different cultural and social origins can offer more "possibilities for dialogue and to grow up amongst a plurality of contributions" (Spaggiari, 1998, p. 111). More concretely, a space of interpersonal and intercultural activity seems an

element that offers educational opportunities and allows families assuming a more effective role as co-educators, rather than the actual pedagogical practices. On the other hand, we have noticed that the space of the atelier can expand the positive attitude of parents who did not perceive the presence of the teacher as a judging observer, but as a resource person to deal with the complex issue of the formal children's education.

The ludic character of the activities proposed during the atelier seems to contribute to the awareness, especially for the adults, of a multiplicity of the educational process and the utility of a participation based on the freedom to advance different points of views, without the constrained frame imposed by traditional rules and expectations. As consequence, the idea that parents "avoid" to actively participate to the school life – idea that seems to be documented by many research based on different quantitative surveys – can be considered as the result of designs that leave no space to the parents to be aware of their agency. Numerous studies realized to stabilise forms of interaction between schools and families have obtained contradictory results, or, in some cases, even opposite findings with respect to the expectations of the research designers.

As we have tried to show, the approaches centred on the activity (Engeström, 1987) seem to better fit to the need of developing a real collaborative activity between school and family. In this vein, we rely on the proposals of the above-mentioned author who highlight to what extend the reference to the psychology of activity can contribute to make less ambiguous the concept of collaboration, by applying it to a real behaviour and not just to (partial) representations of human conducts. In addition, this option will allow to precise, within a collaborative activity, the various levels of participation, by facilitating an effective organization of the activity and by defining its specific modality of evaluation. We are convinced that, apart the dimension connected to the activity, researchers in psychology and education should take into account the dimension of the constant construction of meanings that are mobilized by participants during their interactions. In this sense, the access to the subjective experience of the activity could be an important resource for learning (Mouchet & Cattaruzza, 2015). Further research could set out to examine how we can assess the participants' experience to the atelier. This step will contribute to make clearer and effective the results of interventions (such

as the atelier we have proposed) developed within inter-contextual interactions and aimed at sustaining social changes in the family-school space of activity.

*Acknowledgements*

We sincerely thank the Department of Family and Community Service of the Canton of Neuchâtel (Switzerland), and more particularly Mrs. Christiane Droz Giglio for her support. We are deeply grateful to the *teacher, families,* and *children* who generously offered *their* time in participating to the study. The earlier draft of this paper has benefited from the insightful comments and critical advices of our colleague Dany Boulanger, as well as the anonymous reviewers. We are in debt with them for their helpful work. Naturally, the deficiencies that remain are our own responsibility.

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## 6. RESEARCHER PRACTICE

By referring to my research experience, in this chapter I present three main implications that this research has brought to my practice with regard to: a) my roles, b) the criteria that I have adopted, and c) my engagement.

*Different roles*

As described in Chapter 4, different steps were taken during my field work. For each step, I was constantly in dialogue with the different actors to conduct research based on relationships and participation in which "dialogue implied not only talking but also acting together" (Wardekker, 2000, pp. 269–270).

During the preliminary step, my role was twofold. On the one hand, as *designer* of the activity, I organized many encounters with the different partners (teachers and associations). This was a crucial moment for creating a relationship of mutual trust and was not without some difficulties. In particular, in this phase, I needed to overcome their mistrust with the university, which is often perceived as an "ivory tower" that is disconnected from the society. I also needed to replace their vision of a researcher as being a potential evaluator. In order to promote a fruitful and equal relationship, I adjusted my research practice by integrating their ideas and suggestions in a shared design of the whole activity, and involved them in all steps of the activity. On the other hand, as *teacher-mediator* (research studies 2 and 3), I accompanied the student work groups in formulating their research questions, negotiating ideas and practical tools, and developing their autonomy. Here the difficulty was that the role adopted as teacher-mediator moved away from a traditional top-down transmission of knowledge, and students, at the beginning, were not used to active participation. Hence, in this phase, it was very important to organize different meetings with each student work group, to encourage their engagement and responsibility in a gradual manner.

During the second step (the set up of the activity), acting as *entertainer* (ateliers 1–5), I first prepared the materials and the physical arrangement. In this case, especially when the atelier was carried out in the collaborator's space, I involved the partners in setting up the space by asking them for permission to remove or add furniture (tables, chairs, etc.), or asking them to bring some recycled materials from home.

Then I introduced the activity to the participants and I managed the timing. In ateliers 6 and 7, these phases were conducted by students and so I covered the role of *observer*. In most cases, it was the first time the students were involved in hands-on activity outside of the class. I noticed that my physical presence during the activity was therefore perceived not as judgmental, but, on the contrary, they felt reassured (as reported during the feedback at the end of the activity).

The last step was the follow up of the activity. Three different follows up were provided. As *coordinator*, an institutional follow up was conducted at the school and the associations that required it (ateliers 1, 2 and 4). As *teacher*, a pedagogical follow up was provided at the end of ateliers 6 and 7, to allow students to share feedback and observations with educators and myself about the activities. As *researcher*, I organized, at the end of the course (ateliers 6 and 7), three focus groups and eight individual interviews for an in-depth evaluation of the students' experiences during the atelier activities.

These different roles allowed me to be more aware about the networks of these interacting activity systems (schools, university, associations, family). They provided a source of innovation, demanding actions of continuous adjustment and negotiation of my own practice. This echoes with one of the criterion adopted in the study that I present in the following section: that of research awareness.

*Criteria*

Research awareness is defined by Leeman and Wardekker (2014) as "[being] aware that research done by others may help in understanding your own practice and in solving problems in your encounters but may also help you notice problems in your own practice" (p. 49). As discussed above, during the research studies, I was in continuous dialogue with the associations (ateliers 1–7), the teacher (atelier 1), and the students (ateliers 6 and 7), by giving assistance or discussing with them how observed practice could be modified or ameliorated. This also permitted me to rethink my own practice as part of the "community of inquiry" (Wardekker, 2000). But at the same time, it involves continuous negotiations (e.g. on reaching an agreement about the design of the atelier activity), and much effort and energy, which all actors, including the researcher, had to spend to adjust their practices. Drawing on Muller Mirza and Perret-Clermont's work (2016), I decided to consider these divergences between my intentions and what the partners actually wanted "not as mistakes or misunderstandings but rather as windows on the processes of change and on learning" (p. 79). This helped me to see these discrepancies as resources to advance my research process.

As Wardekker (2000) underlined, research is also inherently ethical. The author said that it is probably more accurate to speak of a *researcher-polylogue*: "the goal of this polylogue has not been one-sidedly determined by the researcher who wants to assemble data, but it is about possible development of the practice" (p. 270). Leeman and Wardekker (2014) called this form of research mindedness "research competence", which comprises two kinds of skills. On the one hand, "skills in problem formulation, data gathering and analysis, and interpretation of the results"; on the other hand, the "skill of connecting the choice of problems, methods, and instruments as well as the interpretation of results to the aims of education" (p. 49).

My physical presence during the ateliers was necessary for two main reasons. The first reason was to ensure that ethical issues were respected. In this sense, I adopted the code

of ethics of the Federation Suisse des Psychologues (FSP), based on the European Federation of Psychologists' Association (EFPA) [40] (see annexe). Moving from the assumption that "ethical questions are context-bound" (Postholm & Madsen, 2006, p. 55), preliminary meetings were also organized with all coordinators of the associations involved in each atelier, in order to share the content of the informed consent. Students in ateliers 6 and 7 were also invited to have a preliminary read of the ethics document (available online on our institute's website[41]). Concerning the recordings made during the follow up session or during the activity, I protected participants' privacy by using pseudonyms for the transcriptions and by respecting their choice to be video recorded or not. In two cases, the parents did not give permission to video record their children, and so I set up the atelier in such a way that their children would not be included in the video recording.

The second main reason for my physical presence was to interpret the videos, because, as Rainio has evidenced, "the atmosphere or the scale of emotions lived through by the participants is rarely visible in video data" (Rainio, 2010, p. 53). Schön stressed the importance of reflection on practice through the experience (1987). More recently, Leeman and Wardekker (2014) introduced the notion of inquisitiveness, which recalls the crucial role of reflective or critical thinking. During this study, as a researcher, I co-constructed my reflective practice not as an isolated individual, but as implicated with materials (e.g. notes, transcriptions, videos, recycled objects, photography) and people. At the same time, as a teacher (research studies 2 and 3), I used dialogue in the classroom in tandem with materials in order to encourage the relationship between them, rather than considering them as separated parts (Barad, 2007; Hetherington & Wegerif, 2018). This echoes with Barad's work, according to which, as illustrated in the previous chapter, the intra-actions of researcher, students, and materials are all crucial to promote learning.

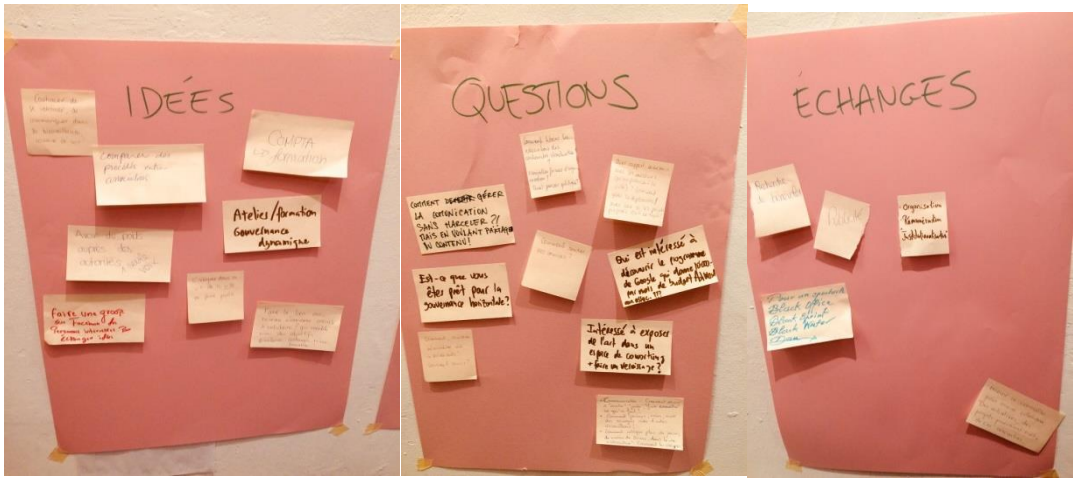
[40] Details available at: www.efpa.eu/ethics
[41] In: https://www.unine.ch/ipe/home/formation_et_ressources/ethique_plagiat_deontologie

*Engagement*

Based on the collected observations made during the study and the informal discussions shared with the different partners, I noticed that the associations were quite isolated in their activities. Being aware that "for a socioculturalist an essential part of learning is the engagement with the world" (Edwards, 2002), at the end of my study I decided to organize, in collaboration with one of the associations actively involved in studies 2 and 3, a first boundary encounter (Wenger, 1998), to provide connections between these different contexts (in this case, associations of downtown Neuchâtel).

The main goal was to provide an opportunity to get to know each other by encouraging cooperation. A first meeting was organized in Spring 2018. Fifteen associations were present and another 10 expressed their interest to participate to future meetings. Three topics emerged from the discussion: a) to cooperate in the organization of a common event in which all the associations can express and present themselves to citizens; b) to create a macro-association that encompasses all the different initiatives by promoting networks with associations; c) to create an informal space in which all the associations can exchange discussions about their problems and their projects. Three other meetings have been planned for the coming months and so the work is still in progress.
This intervention was not planned in my study but was part of those "unpredictable novel possibilities and patterns always emerging" (Fenwick, 2015). Bringing new intellectual and practical tools into the process of change, I acted as a change agent rather than an observer or interpreter of the reality. This echoes with Stetsenko's (2017) transformative activist stance (TAS), which shifts away from the notion of adaptation to the status quo toward the notion of social change and activism. Her assumption is that the world is not just given to us in a status quo, as a fixed and static structure that exists independently of us. Instead, the world is seen as "constantly 'in the making': composed of collaborative practices to which we all contribute in our unique ways" (Vianna & Stetsenko, 2015, p. 582).

*Figure 6-1. Brainstorming results of the first network meeting in Neuchâtel in May 2018.*




*Reflections on my research experience*

During this study, I have covered many roles, each of which involved negotiations and adjustments not necessarily planned a priori. This resonates with one of the TAS-based educational research principles introduced by Stetsenko (2017), according to which:

> "Researchers' initial commitments are not fully characterized, nor completely sufficient in advance of research. Instead, they need to be explored and expanded in collaboration with participants and constantly updated considering unfolding dynamics instigated in and by research" (p. 586).

As I have shown in my work, all the actors, including myself as a researcher, mutually challenged each other to move beyond our current views in pursuit of a common vision. My position changed in the process of working out and realizing the research, in dialogue and collaboration with all the actors involved. My research practice was not a simply an individual mental act, but developed into a "webs of relations" (Fenwick, 2015) characterized by intra-actions (Barad, 2007) between people and materials. Moreover, making connections across the interacting activity systems (schools, university, associations, family), facilitating coordination by creating new practices and

adopting new expertise, contributed to the introduction of more elements of myself into my work than I had imagined.

## 7. CONCLUSION

In this dissertation, I provide a sociomaterial account of learning by taking into account the networks through which it takes shape. It is based on the idea that this network is constructed of relations between multiple systems. Activity theory provides a useful lens to study the whole activity system in which it is involved. By considering the elements (humans, things, parts, and systems) through which learning, and teaching are enacted (Fenwick et al., 2011), I argue that the richness of these networks is not easily contained within textbooks or traditional lessons (Engeström, 1999a). The challenge was to conceive of a pedagogical device in such a manner as to analyze learning not only situated in a physical, social context (Greeno, 1989) and in social practice (Lave & Wenger, 1991), but also embedded in the material and discursive entanglements between multiple systems (Engeström, 1999b).

This chapter is divided into three main sections. The first offers an overview of the main results that emerged from the research studies. The second illustrates the implications for future educational researchers, teachers, or educators who might be interested in adopting or developing these practices. The third suggests future research openings.

### 7.1 Main results of research studies

In research study 1, I examined four atelier activities. The aim was to operationalize the sociomaterial perspective in order to investigate agency not as an abstract phenomenon, but as interrelated to its heterogeneous network. The study focused on participants' active explorations of materials by considering the actions among the participants, the discourses, and the materials not as separate parts, but by taking into account their enactment. This alternative view enables the creation of categories that allow analysis of agency not as an individualistic capacity to act but as enacted in interactions, by taking into account the material and discursive entanglement. These categories permitted me to observe, on the one hand, how participants criticized others' ways of manipulating materials that allowed them to share the identified problem, and,

on the other hand, how they supported and encouraged each other by minimizing the problem and asking for an explanation through physical modifications. I also analyzed how their personal explications, suggestions, and impositions are embedded in physical and material entanglement. The findings show the importance of considering not only how the sociomaterial configuration of the atelier activity shaped participants' agency, but also how participants influenced the sociomaterial configuration in bilateral exchanges. This indicates that educational practices need to be studied not as isolated entities but by taking into account the whole network of connections in which they are embedded.

In research studies 2 and 3, the students had the opportunity to design and implement in practice two ateliers for children (aged 4–11 years), in collaboration with a cultural association. Research study 2 aimed to understand the students' positioning construction in relation to their atelier experience. In this case, the methodological challenge was: how can we examine the whole of student positioning construction? By examining the collective reconstruction of their atelier experience, the findings showed the following. First, the students' positioning is related to materials, others, and culture in four common ways: a) by comparing themselves with these voices, b) by reflecting on their relationship with them, c) by thinking about how they perceived them, and d) by considering their influence on them. Second, it is a net of individual, collective, and temporal elements, in which different kinds of temporality and internal and external dialogues with one another emerged.

In research study 3, we showed how content, knowledge, and materials from one context (the university) are made relevant by students in another context (outside of the university), and vice versa, by developing horizontal expertise as a boundary crosser. This raises another methodological challenge: how can we capture the dynamic nature of students' connections across contexts? In this case, we consider the atelier experience as a resource that permits students to create connections. The analysis of their individual reconstructions shows four learning movements: 1) between the academic concept that they have developed during the course and the atelier activity, 2)

between the competence that they have achieved in other contexts and the competence mobilized during the atelier activity, and 3) vice versa, and 4) between a school subject or method developed during the course and another course encountered in their academic experience.

In research study 4, we analyzed two different activity systems that interact in ateliers: family and school. The data were taken from the project "Parents-School: Learning and Community", in which I was involved as a researcher. In this study, we investigated parents' participation in the atelier activity. The results revealed that the ludic dimension offered by the atelier activity promoted new forms of collaboration between parents and the teacher. Both spontaneously assumed the role of partners of children's discoveries without any evaluation. These interactions diverged from the triadic communication typical of more traditional teaching approaches, in which the teacher evaluates and the parents often assume a passive role in the child's learning process. Our findings indicate that the interactions which emerged during the atelier activity create opportunities for all the actors involved to rethink their roles.

The findings of this dissertation study show that all participants (students, children, parents, teacher, researchers*)* contributed to something that was not yet there; they acquired their activity and expertise while creating it (Engeström, 1991). They (dis)covered new roles, and each of them demanded actions and negotiations to seek and share information and practices between multiple activity systems. Promoting actors' engagement and responsibility may present new challenges for future educational teachers and researchers.

## 7.2 Implications for educational research and teaching practice

The consideration of learning not simply as an individualistic, human-centered mental activity, but as enacted in relations and forms of connections among humans and non-humans, parts, and systems, presents different challenges. As researchers, we have to examine not only the dynamic process of materialization, including material and discursive practices (Fenwick, 2015) through which the flux of multiple interactions and connections are embedded, but also acknowledge the sociomaterial relations in which we ourselves, as researchers, are enmeshed (Fenwick et al., 2011). As teachers, rather than considering materials and dialogue as separate parts (Barad, 2007; Hetherington & Wegerif, 2018), we have to encourage the relationship between them to actively engage students in activities by sharing materials and cultural resources embedded in their lifeworld (Mikkola & Kumpulainen, 2016; Zittoun & Grossen, 2013; Zittoun, 2006; Gutierrez, Baquedano-Lopey, & Tejeda, 1999).

This form of thinking, which Hultman and Lenz Taguchi (2010) have called nomadic, decenters the role of teacher, learner, or researcher as a knowing subject because "it is impossible to isolate knowing from being and discourse from matter; they are mutually implicated" (p. 539). This echoes with Barad's work (2007), illustrated in the previous chapter, according to which, as researchers, "we are not outside observers of the world. Neither are we simply located at particular places in the world; rather, we are part of the world in its ongoing intra-activity" (p. 184).

In line with that, by shifting the emphasis from participation to contribution, we introduce a change in the assumption that, as, Vianna and Stetsenko (2015) underlined, the "world is not just a 'given' in its status quo as a fixed structure (…) [on the contrary, it] is constantly 'in the making': composed of collaborative practices to which we all contribute to our unique ways" (p. 582). The findings show that all the actors involved in the research had a role as agents for change. Researchers, students, and teachers did not limit themselves to just do their assigned routine jobs, but also to work as boundary crossers between the school and the work organization, bringing new intellectual and

practical tools and insights into the processes of change (Tuomi-Gröhn & Engeström, 2003).

This new expertise encourages us to rethink our teaching practices. On the one hand, one can design a more participatory pedagogy that engages students in the knowledge-making process which transcends the school's institutional boundaries (Brown & Renshaw, 2000), providing resources to involve them in new collective activities. On the other hand, one can valorize the ongoing reciprocal actions and interactions between contexts (Mikkola & Kumpulainen, 2016) and generations. Consequently, the cooperation with other activity systems is to be encouraged by developing new boundary-crossing places (Lambert, 2003).

Another key implication that emerged from this dissertation study concerns the responsibility of the policy makers' pedagogical rationale and the educational researchers, which is considered crucial. Otherwise there is a risk of encouraging the pedagogization of everyday life (Erstad, Kumpulainen, Mäkitalo, Schrøder, Pruulmann-Vengerfeldt, & Jóhannsdóttir, 2016; Sefton-Green, 2016; Rajala, 2016). Sefton-Green (2016) defines the pedagogization of everyday life as "the spread of schooled forms of discipline into wider social life" (p. 248). The author cites sociologist Bernstein (2001), who referred to the UK as an example of a totally pedagogized society as a result of neoliberalism imperatives in which trainability emerged as a new ability. Bernstein's concept of trainability places the emphasis "upon 'something' the actor must possess in order for that actor to be appropriately formed and reformed according to technological, organizational and market contingencies" (pp. 365–366). Dominant controlling limits learning goals to those of adaptation and reproduction of status quo (Stetsenko, 2017). As educational researchers, we have a double responsibility: 1) "to not celebrate such boundary crossing in naïve and uncritical ways" (Erstad et al., 2016, p. 2); and 2) to envision a different world "making a commitment to bringing it about and struggling to realize it by altering and transcending it now" (Stetsenko, 2017, pp. 31–32).

Future educational researchers, teachers, and future teachers are calling to address this important responsibility by contributing new theoretical ideas and practices.

## 7.3 Openings: research perspectives

In the following section, I present three openings for future research.

*Toward strengthening learning and creativity relations*

Learning and creativity in the school setting have been given increased attention in recent educational research (Sefton-Green, Thomson, Jones, & Breslin, 2011), even if, as Sannino and Ellis (2014) underlined, their relationship was not much investigated "especially when creativity is taken in a collective sense" (p. 1). Sannino and Ellis' work contribute to the idea of studying learning and collective creativity as an intertwined process. In line with that, in the field of music education, Johansson (2014) showed that situations of collective creativity and learning may be, for example, the (re)production of composed or improvised music. In the same domain, Giglio (2015) placed students' collective creative activity at the center of the teaching practice by introducing a pedagogical approach based on sequences of creative musical production (Perret-Clermont & Giglio, 2017).

Based on such research, it would be interesting to study how the collective creative process emerges during ateliers and how the researcher/teacher interventions change in line with that. As we have seen in the previous chapters, the atelier conceived as a place to promote children's creativity officially became part of each Reggio Emilia preschool program in 1972. Creative thinking was recognized in Romandy's study plan as a transversal competence [42] only from 2014. Hence, promotion of the collective creative function in teacher practice and student development is crucial (Iannaccone,

[42] For details, see: https://www.plandetudes.ch/capacites-transversales1

2017). New boundary places (Lambert, 2003) could be created, in which students and teachers act as boundary crossers, by sharing creative inquiry and learning tasks. This suggests that they should distance themselves from certain traditional teaching practices (Giglio, 2015).

*Exploring the research-designers' and participants' perception of the experience*

In this dissertation, I question a linear and top-down conception of design. Far from a linear model of design, Muller Mirza and Perret-Clermont (2016), in their study on a Swiss farmer training setting in Madagascar, introduced a co-emergent model to take into account the active role of both the designer and the beneficiaries. In line with that, it would be interesting to explore the *opaque* actions of the research-designer and participants' experience to further elucidate their relationship. Cesari Lusso, Iannaccone, and Mollo (2015) referred to the opaque actions as all those activities that take place in educational contexts but without the full awareness of those who are involved.

In the special issue "Subjectivity as an education and training resource," Mouchet and Cattaruzza (2015) described how the elicitation process of subjectivity plays a crucial role in learning practices. Iannaccone and Cattaruzza (2015) went further by showing how the assumptions of the psycho-phenomenological approach (Vermersch, 2012) are significant not only for the validity of first-person data collected but also for the position of the researcher. To advance these studies, I propose exploring further the participants' and the researcher-designers' experiences by expanding the interdependence between the social, the personal, and the material. Elicitation interviews (Vermersch, 1994) and journals could be adopted as methods to gain access to the research-designers' and participants' perception of the sociomaterial experience. As Mahn and John-Steiner (2002) underlined, a teacher's awareness of students' ways of perceiving and reacting to classroom interaction (their perezhivanie) "contributes significantly to the teacher's ability to engage the students in meaningful engaging education" (p. 53). Accordingly, I argue that the shared emotional interactions determined during the elicitation

interviews and journals could facilitate "the transformation of experience from interpersonal to intrapersonal" (p. 53).

*Promoting a community of sociomaterial practices*

In the previous chapters, I reported that Reggio Emilia documentation is presented in each Reggio preschool in order to share inquiries and activities with the children, parents, and other adults and teachers. It would be interesting to share the materials and the artifacts created and collected during the research studies also with teachers, teachers-in-training, and researchers, to discuss with them the sociomaterial dynamics that emerged. In this sense, the atelier can be seen as an instrument for "developmental transfer" (Tuomi-Gröhn & Engeström, 2003) in vocational teacher education, as in the learning studio proposed by Lambert (2003), which promotes innovative learning that crosses boundaries over time. Focus groups could be used as a methodological resource to share the development and transformation of practices over time. Shared reflections with University of Teacher Education (HEP) researchers will also be crucial to promote a dialogue between teachers, teachers-in-training, and researchers in order to increase the "generative power" (Wardekker, 2000) and to encourage a community of sociomaterial practices.

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# 9. ANNEXES

## ANNEXE 1: Deontological code

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# Respect des codes de déontologie et d'éthique

Je déclare avoir pris connaissance :

- du « code déontologique » de la Société Suisse de Psychologie (SSP) ;
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**ANNEXE 2**

**Article : Exploring children agency in a designed atelier: a socio-material perspective**

PSIHOLOGIJA, 2018, OnlineFirst, 1–15 UDC

DOI: https://doi.org/10.2298/PSI171106021C

# Exploring children's agency in a designed atelier: A socio-material perspective*

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This paper aimed to explore the interplay between the socio-material configuration of a designed atelier and children's agency. Ateliers were designed for and utilized by children aged 8–11 years. The material properties of the atelier and the expressions of agency are analyzed as interdependent rather than dualistic elements. In this study, agency was distributed and emerged in relation to the socio-material environment. The paper concluded with reflections about pedagogical and research implications to adopt a socio-material approach.

*Keywords:* socio-material perspective, children agency, designed atelier

Highlights:

- Active explorations of materials were embedded in the socio-material configurations
- It was necessary to take the whole dialogical relationship into account
- Learning wasclosely interdependent to thesocio-material network

In recent years, a number of educational researchers have engaged with socio-material approaches. Socio-material approaches "interrupt understandings of knowledge, learning and education as solely social or personal processes and insist upon attending to the material that is enmeshed with the social, technical and human" (Fenwick, Edwards, & Sawchuk, 2011, p.3).

In educational research, Sørensen (2009) has argued that there is a "blindness toward the question of how educational practice is affected by

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*Acknowledgement*. I thank Professor Antonio Iannaccone and the two anonymous reviewers for their insightful comments and feedback on the earlier version of this paper.

* This is an early electronic version of the manuscript that has been accepted for publication in Psihologija journal. Please note that this is not the final version of the article and that it can be subjected to minor changes before final print. Please cite as: Cattaruzza, E. (2018). Exploring children's agency in a designed atelier: A socio-material perspective. *Psihologija*. doi: https://doi.org/10.2298/PSI171106021C

materials" (p.2). Research in work-related learning and children's education draws upon cultural-historical activity theory "to understand the dynamics of activity and mediation in educational process and the effects of socio-material connection and misconnections" (Fenwick et al., 2011, p.93). In this sense, the actor-network theory shows how entities that we commonly work with are in fact assemblages of a myriad of things in connection with other human and non-human things (Latour, 1994, 2005). Barad and colleagues (Barad, 2003, 2007; Barad & Nelson, 1996) have shown how these entities become linked through what they call "intra-actions". "Matters comes to matter through the iterative intra activity of the world in its becoming" (Barad, 2003, p.823). Lawn and Grosvenor (2005) highlighted the relevance of the material cultures of schooling in order to unpack "the ways in which class and school routines bound together objects and actions" (p.13).

More recently, Kontopodis and Perret-Clermont (2016) have shown how "teaching, learning and development take place on various levels and across a wide range of interrelated socio-material orderings" (p.9). They implied the notion of socio-material orderings, which refers to semiotic and to material relations, and to the interrelations between materiality and sociality (Kontopodis, 2007; Latour, 2005; Law & Mol, 1995).

Based on the assumption that "it is through the being-together of things that actions including those identified as learning become possible" (Fenwick et al., 2011, p.6). In this paper, I explore the socio-material configuration of a designed atelier, and the emerged expressions of agency, not as dualistic elements but by taking in account their interplay. The theoretical grounding of the key concepts adopted in the study is introduced before presenting my research design.

## Affordance properties of a child's environment

Hellpach's essay *Psychologie der Umwelt* (1924) is considered the starting point for the concept of environmental psychology. In his studies, the environment, according to the influence it has on people, can be classified into: a natural environment, a social environment, and a historical-cultural environment (Hellpach, 1911, 1924). In the same period, another German scholar, Martha Muchow was a pioneer in analyzing environments through the eyes of children. She and her brother (Muchow & Muchow 1935/2015) extensively explored the notion of life space (Lewin, 1936) by studying the personal life space of children growing up in Hamburg in the period between the two World Wars. Muchow introduced three perspectives by combining various empirical methods (Muchow & Muchow, 1935/2015):

a) *The space in which the urban child lives.* Children were provided with ordinary maps of Hamburg, and were invited to mark with different colors the places where they usually live.
b) *The space that the child experiences.* Children were questioned in detail about what, when and where they usually played, and what these places meant to them.

c) *The space that the child lives*. This was the central part of her research. The analysis was based on three kinds of observation methods. The main aim was "to infer from the behavior of the children and from their manner of interacting with circumstances of the urban world how they transform urban space by living it" (Muchow & Muchow, 1935/2015, p.65).

As the Gibsons highlighted later (1986, 1992), to perceive an affordance is to detect an environmental property that provides possibilities for action. Gibson points out that: "the reciprocity of organism and environment and the reciprocity of perception and action are both reflected in the concept of affordance" (Gibson, 2000, p.295). So exploratory activity facilities and constraints perpetual learning (Adolph & Kretch, 2015).

Based on these assumptions, Heft (1988) applied an affordance perspective to a pre-existing detailed record of a day in the life of a nine-year-old boy. "The total list of supportive environmental features was then categorized according to common actions. In other words, the environmental features were clustered as to their affordance properties" (Heft, 2010, p.20).

Kyttä enlarged Heft's taxonomy with affordances for sociality (Kyttä, 2002, 2006). She first conducted empirical studies about the children's outdoor environments in communities with several levels of urbanization: a rural village in Belarus and an urban environment in Helsinki (Kyttä, 2002). In the second instance, she proposed a child-friendly environment known as a "Bullerby model" (whose name is taken from the *Noisy Village* books by Astrid Lindgren), in which "according to the ideal circumstances children enjoy sufficient possibilities to move around independently in the environment and to perceive the environment as a rich source of affordances" (Kyttä, 2006, p.141).

Based on their research of an adolescent's environmental space in the south of England, Clark and Uzzell (2002, 2006) conceptualized environment in terms of mutual physical and social affordances by incorporating social context and social behavior in their taxonomy. "The physical aspects of the environment are the 'building blocks' of the functional affordances of people's settings such as the surfaces, greenery, and terrain. Likewise, the presence of other people can also be thought of in terms of 'building blocks' – social knowledge, observed behavior, expressed attitudes, and indigenous culture. All provide affordances, out of which people understand, make sense of and then act in and upon their world" (Clark & Uzzell, 2006, p.179). In this sense, Linell (2009) highlights that "environments are both (more and less) material, and they are inscribed with meaning affordances that have been socially constructed over time" (p.60). According to dialogism, we are necessarily confronted with a social practice wherein actors interact and communicate, and in which the individual contributions cannot be understood in isolation from each other (Rainio, 2008, p.209).

In the educational field, Bruner (2003) described an appropriate environment for young children as: "a place where the young discover the uses of mind, imagination, materials, and learn the power of doing things together" (p.137). In his work, Martin (2006) pointed out that "the physical environment

arranged by the teacher provides a learning setting and at the same time acts as participant in teaching and learning" (p.92–93). In breaking away from traditional pedagogical practices, Montessori developed teaching tools in her Children's House (*Casa dei bambini*) that encouraged learners to explore their environments through self-directed and co-operative learning activities (Montessori, 1965). The Reggio Emilia approach conceived the environment as being an integral part of the creation process (Edwards, 2003; Malaguzzi, 1998). In this sense, the founder Malaguzzi introduced the atelier in pre-schools of Reggio as "a place for manipulating or experimenting with separate or combined visual languages, either in isolation or in combination with the verbal one" (Malaguzzi, 1998, p.64). The ateliers were conceived as spaces rich in materials, with tools present in and out the classroom.

Based on this, I designed five Reggio-inspired ateliers. The main aim was to explore the interaction between socio-material configuration and expressions of children's agency.

## Agency: a socio-cultural definition

In socio-cultural terms, agency cannot just be defined as a primary characteristic of an individual, but it should be considered in relation to the socio-cultural contexts in which it is enacted (Rajala, Martin, & Kumpulainen, 2016). In this paper, I consider agency as a dynamic process that is constructed relationally (Edwards, 2009; Edwards & D'arcy, 2004; Kumpulainen, Lipponen, Hilppö, & Mikkola, 2014; Lipponen & Kumpulainen, 2011) and mediated by discourse and practical tools (Wertsch, Tulviste, & Hagstrom, 1993). Agency is so conceived, as Ahearn (2001) stated, as: "a socioculturally mediated capacity to act" (p.112). Moreover, Esser, Baader, Betz, and Hungerland (2016) highlighted that: "agency is produced in conjunction with a whole network of different human and non-human actors and is distributed among these" (p.9).

In this regard, it is not context-free (Kontopodis, 2012) but "learning and meaning-making areembedded in social and material practices" (Nordtømme, 2012, p.320). Based on these views, I define agency as the dynamic capacity of people to act in relation to the heterogeneity of the actors. This definition is closely connected with Fenwick and colleagues' (2011) studies, according to whom, "agency is not an essential property of one actor but emerges through micro-negotiations at the various nodes connecting entities" (p.112). It is also linked to the notion of relational agency (Edwards & D'Arcy, 2004; Edwards & Kinti, 2010; Edwards & Mackenzie, 2005), which is defined as "an ability to seek out and use the support of others as resources for action and equally to be able to respond to the need for support from others" (Edwards & D'Arcy, 2004, p.150). The definition also has some resonance with Billet's (2006) theory of relational interdependency, in which he examines the interactions between individuals' intentional action and workplace practices.

# Methods

## Atelier sites

Data were collected from 2014 to 2015. During this period, I designed and utilized five ateliers for children aged 8–11 years. Each atelier was organized with different partners (see Table 1) and included groups of 8–13 children. One atelier was set up in a primary school class in collaboration with parents and a teacher.[2] Three ateliers were organized in a class of our department, and one atelier involved the room of a summer camp in Neuchâtel. The ateliers were organized outside of the traditional school setting in order to observe whether the provision of dedicated spaces for the exploration of materials created a fresh learning zone "where there was more freedom of movements of learners and teachers and new pathways of participation available" (Edwards & D'Arcy, 2004, p.153).

Table 1
*Summary of the atelier collaborators*

| Atelier | Collaborators | Times and site | Participants |
|---|---|---|---|
| Atelier 1 (2014) | Primary School in Neuchâtel (Switzerland).<br>the University of Neuchâtel (Switzerland) and the Department of Family and Community Service of the Canton of Neuchâtel (Switzerland) | 2 half days<br>In a primary school class, outside of school time | 13 Parents's classmates<br>teacher,<br>2 researchers<br>13 classmates |
| Atelier 2 (2014) | Career Service at the University of Neuchâtel | 1 half day<br>In a specially designed classroom in our department | Researchers<br>10 children<br>(not knowing each other) |
| Atelier3 (2014) | Summer camp at Neuchâtel | 2 half days<br>In a specially designed classroom at the camp | Researchers<br>8 children<br>(not knowing each other) |
| Atelier 4 (2015) | Career Service at the University of Neuchâtel | 1 half day<br>In a specially designed classroom in our department | Researchers<br>10 children (not knowing each other) |
| Atelier 5 (2015) | An association, which promotes activities aimed at raising children's consciousness regarding environmental issues | 1 half day<br>In a specially designed classroom in our department | Researchers<br>10 children (not knowing each other) |

## Atelier setup

The atelier settings were designed to facilitate the movement and exchange of children. As underlined by Lewin (1936), of particular importance are: "the nature and the extent of what is allowed to him and what his own abilities permit him to do" (p.44). In line with this, Valsiner (1987) stated that "settings as structured social situations with elaborate scripts for action are socially constructed cultural means for people to lead their lives, rather than rules given to them by some external agent" (p.185). Correspondingly, Martin's (2006) research focused on the

2 Elsewhere I used this case study to analyze family and school inter-contextual relationships in terms of dynamic systems of interaction (Cattaruzza, Iannaccone, & Arcidiacono, in press).

impact of the classroom environment on performance by examining the relationship between the physical setting and the behavior of teacher and students (see also Hathaway, 1995)

Baucal (2012) highlighted the difference between a fixed and flexible classroom design. In a fixed arrangement, "we can expect that the dominant activity for teachers is giving lectures, and the dominant activity of students is listening" (p.76). On the contrary, in a flexible arrangement where several kinds of learning activities can be easily performed, "it might be assumed that students and teachers develop different kinds of identities, competences, attitudes" (Baucal, 2012, p.76). Based on this, I adopted a flexible arrangement when designing the ateliers, in which the presence of adjustable tables and materials, with a circle arrangement and detached objects, urged dyad or triad work groups to move and recreate the space for free movement according to their preferences.

"What is important is that children can freely handle and benefit from collections and contribute to them. They can touch them, arrange them in various ways and play with them" (DiBello & Ashelman, 2010, p.43). Recyclable materials were also employed. Several areas were set up for different activities: a table placed in the center of the atelier was filled with a variety of natural and recyclable materials (see Fig.1 and Table2). At the beginning of each atelier session, we asked participants to create different kinds of transportation using the materials (ex: wood, plastic, paper) found on the tables. Materials varied in color, texture, and piece size. The classrooms chosen for the five ateliers had two luminous windows and a big transparent door to capture both natural and artificial light. The colored recyclable materials, of various sizes, were put in the center of the room in order to benefit from the best light. The children did not receive any further details or constraints: they were free to choose their materials, adopt their own working technique, and manage their time as they wished. The children worked simultaneously in four self-selected dyad or triad groups in the same room.

The room was designed and equipped by the researchers, taking in account the Reggio-inspired design principles.[3]

*Figure 1.* Examples of natural /or recyclable materials used in the five ateliers

3 Apps and MacDonald (2012, p.50) summarized these principles as follows:

1) To create a community focus, in order to foster relationships, communication, and curriculum development.

2) To use transparency in the environment through indirect and natural lighting, and transparent materials.

3) To include natural and authentic materials.

4) To bring the outside into the classroom in order to create areas of natural beauty.

5) To provide dedicated spaces, in order to minimize transitions and allow children's building and exploration to continue over a sustained period.

6) To complete pedagogical documentation in order to capture children's messages about their classroom environment, and understand their learning experiences and theories

Table 2
*List of materials used in the five ateliers (adapted from Ferrari & Giacopini, 2005)*

| | |
|---|---|
| Natural materials | Small tree branches, sea shells |
| Paper | Office packs, colored gift packaging |
| Cordage | Colored strings, laces, fishing lines |
| Plastic | Tubes, boxes, lids, glass, milk bottles |
| Polystyrene | Food packaging |
| Food containers | Egg containers, paper takeout containers, takeaway boxes |
| Assembly materials | Modeling materials, glue, adhesives |

## Data collection

During the activities, as a researcher, I could actively observe the children's attitudes, join groups of children when they called me, have short spontaneous conversations with them, or just stay nearby.

Data collection for this study primarily consisted of:

- Observations and field notes.
- Videotapes of five ateliers (around 15 hours of footage). For each atelier, fixed cameras on tripods were installed in each corner of the room. Each camera was directed on a small group.
- Photographs of the drawing, artwork, or other creations produced during the atelier session.

## Data analysis

As stated by Clark and Uzzell (2006), "individuals perceive the environment holistically and do not perceive or utilize social and physical aspects of the environment separately and in isolation from each other" (p.179). In line with this idea, I analyzed the physical affordances and the expression of agency not as dualistic elements of the atelier, but as interdependent factors. This analysis involved four steps:

- First, a global viewing of video data recordings was conducted.
- Second, I identified all the episodes in which participants interacted with others, materials, and environments. As my focus was on the interactions between the socio-material environment and the participants, I excluded the data in which participants were passive. Nevertheless, as Rainio (2008) said, "being passive and responsive can produce some agency for the participant in the context of their being students at school" (p.124).
- Third, I employed, as units of analysis, verbal and non-verbal sequences for key episodes in which expressions of agency emerged in relation to material properties.
- Fourth, I analyzed these key episodes, not as separate elements, but as embedded within the socio-material configuration.

# Results and discussion

As Eckhoff and Spearman (2009) stated, "through active exploration with objects, children construct knowledge about their environment and the objects within that environment" (p.12). According to that, video analysis showed that

the children's expressions of agency emerged in relation to two interlinked aspects: a) active exploration of the materials (colored materials of various sizes and transparency) and b) the socio-material configuration of the atelier (transparency, circle seating arrangement, adjustable tables, and materials etc.). I selected 12 demonstrative excerpts of interactions (Table 3). Conversations were transcribed and translated from French into English. In most cases, the following five combinations of expressions of agency[4] emerged:

a) Criticizing the current way of working, allowing the participants to identify the problem. This expression of agency emerges by observing and manipulating materials (excerpt 1).
b) Supporting and encouraging each other. This support manifests in different ways, by: minimizing the problem (excerpts 2 and 3), asking for an explanation of the current way of working (excerpt 4), and physically changing their position. For example, in this latter case, Albert turned his chair in order to observe Luc's work, and when he realized that Luc was having difficulty pasting a piece of plastic, he moved his chair in order to be closer to him and suggested a solution (excerpt 12).
c) Explicating. Two temporal dimensions emerged: past and present. In the first case, Hugo evoked his past experience in order to explain his point of view concerning the number of turbines to add to their plane (excerpt 5). In the second case, the property of the piece of wood (excerpt 6) and a piece of plastic (excerpt 7) currently used supported the participants' suggestions.
d) Envisioning is the capacity to envisage ideas and make subsequent suggestions in order to resolve a problem (excerpts 8 and 9) or to imagine a creative solution (e.g. the eggs box mask became a rabbit face; excerpt 10).
e) Resisting involves imposing a personal view on the current activity. We can see, for example, how Luc presented the solution to Gaston by altering the spatial arrangement and manipulating the materials (excerpt 11). Luc was inspired by another group situated in front of him and suggested adopting the same solution (excerpt 11). Gaston, in one instance, moves to the other table to verify if the information was accurate; in another instance, he simply turned his chair to observe another way of working (excerpt 11).

4 These expressions resonate with Engeström's (2011) accounts of participants' emerging transformative agency (see also Haapasaari, Engeström, & Kerosuo, 2016). However, in their study, the development of participant's transformative agency was analyzed in the form of a Change Laboratory (CL) regularly conducted in the workplace. In this context, participants together with a researcher analyze work practices and seek possibilities for collective action in order to accomplish systematic change (Engeström & Sannino, 2010).

Table 3
*Expressions of agency that emerged*

| Physical aspects of the atelier | Affordances | Expressions | Criteria | Analytical Description | Demonstrative excerpts |
|---|---|---|---|---|---|
| Colored materials of various sizes and transparency | Manipulating | **Criticizing** | Identifying the problem with the current way of working | Manipulating a piece of paper | **1. Élodie and Katie, atelier 3:**<br>Elodie:"The problem is that it comes off easily" (indicating and manipulating a piece of paper that she used to build a wheel)<br>Katie: "Actually, we don't know how to make a wheel..." |
| | | **Supporting** | Minimizing problems<br>Asking for explanation | Materials' properties | **2. Maggie and Katie, atelier 5:**<br>Maggie: "It (the paper wheel) doesn't turn anyway!"<br>Katie: "Actually we don't care..., it does not stand upright anyway"@<br>**3. Odel and Elodie, atelier 3:**<br>Odel: "Oh no, I'm wrong..." (after breaking the piece of plastic used to build a window)<br>Élodie: "Don't worry, there's another window" (indicating another piece of plastic)<br>**4. Elodie and Odel, atelier 3:**<br>Elodie: "Why are you using a rubber band?"<br>Odel: "Why not?"<br>Elodie: "Mhm" |
| | | **Explicating** | Evoking past experience<br>Explicating their point of view | Manipulating a piece of wood or sponge | **5. Elodie, Hugo and Odel, atelier 3:**<br>Elodie: "On the airplane, there's just one (turbine)" (she indicates the piece of plastic)<br>Hugo: "No, I took the airplane, I saw many..."<br>Odel: "Yes, there are many (turbines) but not on the same side" (he takes the piece of plastic to put it on the other side)<br>**6. Luc and Jean, atelier 4:**<br>Luc: "It's soft (a piece of wood), you can cut with your hands! It's easier"<br>Jean: "Ah. (...) I try" (he touches the wood piece)<br>**7. Nicolas and Etienne, atelier 2:**<br>Nicolas: "We can take this piece of plastic, it could be better than a piece of sponge"<br>Etienne: "But the piece of plastic is more solid"<br>Nicolas: "Yes, but also the sponge piece is solid. Touch it" (he gives him the piece)<br>Etienne: (he touches it) "Ok, pick (it) over there! (he points to a big piece of sponge on the other table) |

| Physical aspects of the atelier | Affordances | Expressions | Criteria | Analytical Description | Demonstrative excerpts |
|---|---|---|---|---|---|
| Colored materials of various sizes and transparency | Pointing | **Envisioning** | Oriented suggestions | Resolving problems<br>Imagining | **8. Maggie and Katie, atelier 4:**<br>Maggie: "It doesn't move!"<br>Katie: "Then, we can put two things here (indicating a point in the middle of the bottle) and we can make a hole with this (indicating a piece of paper). What do you think?"<br>**9. Odel and Hugo, atelier 3:**<br>Odel: "And then, what can we do with this (the airplane)?"<br>Hugo: "We can throw it from the window"@@<br>**10. Maggie and Katie, atelier 5:**<br>Maggie: "Look through it (a transparent box of eggs)"<br>Katie: (Katie put the box of eggs on her face)<br>Maggie: "Oh! You are a rabbit!" |
| Circle arrangements<br>Adjustable table and chairs<br>Detachable materials | Looking around<br>Moving | **Resisting** | Imposing personal view | Observing other group<br>Turning the chair<br>Moving | **11. Luc and Gaston, atelier 4:**<br>Luc: (While he is observing the group in front of him) "I had another idea Gaston! We can do more"<br>Gaston: "More?"<br>Luc: "Yes, higher!"<br>Gaston: "Are you joking?"<br>Luc: "Why?"<br>Gaston: "It's too big!"<br>Luc: "But ... let's see them! (He points to the other group) We can do it!"<br>Gaston: (He turns his chair to better observe the other group)<br>Luc: "Lets' do!" (He moves to them) |
| | Pointing<br>Looking<br>Moving | **Supporting** | Encouraging | Changing physical position<br>Asking for explanation/ advice | **12. Albert and Luc, atelier 4:**<br>(Luc has some difficulty in pasting a piece of plastic. At the same time, Albert, a participant of another group, moves his chair to observe Luc's work)<br>Albert: "What are you trying to do? This one?" (He points to the drawing on the table)<br>Luc: "Yes (...)"<br>Albert: "You can use an elastic band (...). It could be easier(...)" (He moves the chair in order to show how)<br>Luc: "Mhmm (...)" |

The excerpts presented are taken from recorded audiotapes and transcribed discussions between children, which took place in the work groups. Pseudonyms are used for children to maintain their anonymity. @ = indicates laughter; (text) = author's comments; (...) = pause

## Further research and conclusion

The data analysis shows that five expressions of agency emerged in the children during the atelier, and these are embedded in the socio-material configurations. In this sense, it was necessary to take the whole dialogical relationship into account. I had to consider not only how the socio-material configuration of the environment shaped the children's agency, but also how the children influenced the socio-material configuration in bilateral exchanges in what Siry, Wilmes, and Haus (2016) called "the dance of agency and structure" (p. 16).

The results are in line with Eteläpelto, Vähäsantanen, Hökkä, and Paloniemi (2013), who showed that the relationship between the social environment and the individual can be understood as exclusively or inclusively distinct. If the individual and socio-material environment are understood as being exclusively distinct, this implies that socio-material environments can be reduced to variables that impact on individual action. If the socio-material environment and individual agency are seen as joined, this implies they can be investigated as closely interdependent. I suggest to approach agency not an abstract phenomenon, but interrelated to heterogeneous network. In this sense, taken as a whole, the agencies that emerge during the atelier are located in space and time and in relation to specific materials and arrangement (Fenwick et al., 2011; Kontopodis, 2012). Work by Lipponen and Kumpulainen (2011) suggests that agency can be studied by focusing on distributed action among the participants and, importantly, their socio-material environment.

We can summarize three pedagogical and research implications that emerge from this interplay between individuals and their socio-material environment. First, the creation of an open-ended design involves changes in the positions of children considered as accountable actors (Greeno, 2006; Lipponen & Kumpulainen, 2011). The work of Muchow highlighted that "all stories we tell about children are stories told by adults researchers" (Mey, 2015, p.246). In order to further elucidate the relationship within the socio-material environment, access to the participants' experience of the activity would be an important resource for future learning research (Iannaccone & Cattaruzza, 2015; Mouchet & Cattaruzza, 2015). In line with recent studies on children's perspectives from a socio-cultural approach (Hilppö, Lipponen, Kumpulainen, & Virlander, 2016), further research could also set out to examine how we gain access to the children's and teacher's experiences.

Second, as Mason (2002) underlined in his research, noticing events is a fundamental element of expertise for teacher education. In line with that, Lipponen and Kumpulainen (2011) analyzed how the identification of an interaction episode in which agency emerges has pedagogical potential for teacher education and teacher professional development. I argue that there is an urgent need to encourage professional competence in this area in future, new teachers; on the assumption that as Edwards and d'Arcy (2004) stressed, teaching practice is more than an ability to represent a curriculum.

Third, as we have seen, agency is not individualistic, but emerges in relation to the socio-material network. In this sense, "teaching and learning cannot be identified separately from the network through which they are themselves enacted" (Fenwick et al., 2011, p.6). Hence, teacher practices and children's engagement need to be studied not as isolated entities but by taking in account the network of connections in which they are embedded. While the atelier was fruitful for a first exploration of the dynamic networks and elucidated the potential of the socio-material enactments, we acknowledge a need for future studies in and out school settings, to elaborate further the socio-material perspectives in the educational researches.

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RECEIVED 06.11.2017.
REVISION RECEIVED 01.02.2018.
ACCEPTED 02.02.2018.

## 9. ANNEXE