

Developing Critical Thinking in Early Childhood Through the Philosophy of Reggio Emilia

Mercè Fernández-Santín, Maria Feliu-Torruella

*Universidad de Barcelona, DIDPATRI Research group, Facultad de Educación-
Campus Mundet, Edificio de Llevant, Pg. Vall d'Hebron 171, 08035 Barcelona, Spain*

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This paper presents a series of recommendations for the adoption of the Reggio Emilia philosophy in early childhood and primary education, to foster curricular developments in the arts to develop critical thinking in infants. To design a curricular model, an experimental project was carried out towards fostering the implementation of this philosophy in the Atelier classroom during a complete school year with a group of two-year-old students. This qualitative study is a design-based research and its focus is the behavioural monitoring of the developmental progress of capacities and activities in the classroom through a pedagogic experimentation.

The results arise from the assessment of the practical implementation of the theoretical framework developed for this study through creative activities, by mapping children's behaviour in a fieldwork diary and also, as video footage. Our analysis provides a series of recommendations for teachers and schools for the adoption of the philosophical

model of Reggio Emilia within curricular development in critical thinking and arts teaching, alongside with curricular guidelines for universities to train future teachers on arts teaching fostering critical thinking.

Keywords: critical Thinking; Reggio Emilia; early childhood; art education; creativity.

Introduction

Developing a comprehensive curriculum to foster critical thinking in early childhood education can be challenging, as it requires to design and redesign activities which promote negotiated and collaborative learning, while adopting innovative approaches to support teachers to enable these activities with very young infants.

This paper presents a series of recommendations to foster critical thinking in early childhood education, through a practical experimentation using the Reggio Emilia (RE) pedagogical approach, which promotes an innovative, participatory and democratic learning methodology through research and experimentation, crafting bonds between students, teachers, families and community. We aim at providing educators and schools with the toolkit needed to enable the development of critical thinking, using the arts on a project based approach from an early age.

Authors like Sarason (1990), Sternberg (2010) and Robinson (2009) consider that schools tend to force children to simply give right answers, instead of driving them to think critically and to use their creativity to find the answers to the problems they

encounter. For Torrance (1970), Runco & Jaeger (2012) and Runco et al.,(2016) creativity is often an autonomous activity which requires independence, therefore, they consider that students are more creative while alone or when they are outside the school, because the school settings usually allow little autonomy, due to the student teacher ratio, which makes difficult to support individual work and limits independence .

Instead, RE helps schools and teachers to enable a curriculum which not only comprises the arts and plastic arts teaching, but conveys the whole of early childhood and primary education (Schiller, 1995; Abramson, Robinson & Ankenman, 1995; Edwards, Gandini & Foreman, 1998; Ovi, 2001; Salmon, 2008; Mendioroz Lacambra & Rivero Gracia, 2019), through the development of projects that involve students collectively and individually, alongside with the teachers and parents as an active learning community (Ennis, 1987; Miller & Malcolm, 1990; Ennis, 1991; Lepičnik-Vodopivec, 2012; Halpern, 2014; Mendioroz Lacambra & Rivero Gracia, 2019).

Our research comprises innovative artistic education, and critical thinking development approaches in early-childhood and primary school education, to present practical possibilities for developing learning activities (Fernández-Santín & Feliu-Torruella, 2017), using the Atelier as experimental space (Schiller, 1995; Edwards, Gandini & Foreman, 1998; Ovi, 2001; Inan, Trundle, Kantor, 2010; New, 2007a), as for Edwards (2002) “The teacher needs a classroom in which children can bring together their thinking, feeling, and willing, no matter what their personalities and temperaments” (p.7).

2. The conceptual framework of Reggio Emilia

For Malaguzzi (1995) and Eisner (2004) the concept of the child as an artist indicates the unlimited and unrestricted creative capacity that infants have during the stage of early childhood education, as they argue that everything that you cannot experience and freely create during this period may never be recovered.

Malaguzzi (1993) aimed at developing friendly, active, inventive and livable schools that are a place of research, learning, recognition and reflection, where children, teachers and families are welcomed, as in RE, the school is considered as a living organism where spaces and opportunities for coexistence and relational exchange are offered for people to think, discuss and solve problems, and moreover, to foster children's curiosity and creativity.

The RE approach is constructivist, as knowledge is built by fostering interpersonal relations (Forman, 1994; Swann, 2008) and it promotes learning through projects and activities (Bell, 2010), offering great opportunities to develop critical thinking (Jordan, Fazio-Brunson & Butler, 2019). For Fraser (2009) "RE, values the children's resourcefulness and competence, and believe that the children have ideas that are worthy of attention" (p.14) which is key, as for Tsui (2002) an "active learning approach might be facilitating critical thinking development by encouraging students to verbalize and try out ideas" (p.751).

2.1 Reggio Emilia and the arts

Generally, the model in which arts are taught in schools inhibits, delimits and restricts the full potential of the students' creative process as often, artistic activities are

limited at only copying, reproducing or reinterpreting an artwork (O'Hanley, 2013; Suffian & Nachiappan, 2019), with this type of restrictive activities, the possibilities of developing critical thinking are limited.

De la Torre (2005) argues that school is the main reason why children abandon their creative thinking and imagination, due its excessive predominance of cognitive content, however, in Catalonia, where the study takes place, the Kindergarten Curriculum in the field of Arts provides guidelines for work indicating the need to present an interesting environment to stimulate the children's development, including creativity and imagination. This guidance can help to adapt the methodologies to adjust new learning processes according to new situations in a society that is constantly changing (Generalitat de Catalunya, 2016).

According to Cemades (2008) and Sternberg (2010) schools must try to educate children to solve problems in a creative and independent way, so educators must seek a way that allows carrying out teaching-learning processes that can stimulate creativity, he suggests that an educational model based on constructivism can help to foster creativity by helping students to search for information and to conduct research with the teacher as a guide, while Ovi (2001) mentions that they should provide the appropriate materials to the children, supporting and guiding them in their projects.

In RE, children use the arts as a mean for expression, as it favours the development of creativity, interpersonal relations, negotiated learning and critical thinking while promoting the dialogue between different members of the community (Forman & Kushner, 1983; Forman, 1994; Swann, 2008). The educators plan activities and use the arts to foster critique, problem solving, and creativity skills and to develop the languages of the children, which go beyond speaking, therefore, carefully selecting

the materials that allow children to create, encouraging the engagement of children in understanding a variety of phenomena to promote critical thinking while guiding them in their learning (De Bono, 1999; Ovi, 2001; Eckhoff & Spearman, 2009; Thompson, 2011)

The spaces in RE schools also promote creativity, as Abramson, Robinson, & Ankenman (1995) explain, these “have unusual, open-ended, creative play structures and spaces that are often related to projects. School interiors and grounds are beautiful and a source of pride for children, teachers, parents and the community” (p.198), that is why RE schools have a very special classroom called Atelier, which is a carefully designed and welcoming learning space, where creativity is developed through activities with a wide range of materials and experiences, to facilitate the understanding of the world through projects crafted according to the needs of the children (Vecchi, 1993; Gandini, 1993; Bredekamp, 1993; Tarr, 2001; New, 2007b).

Creativity in the RE approach, according to Bresler (1998), “often involves problem setting as well as problem solving; it requires personal investment and ownership. At the same time, it is nurtured by active support and recognition of a community of practice” (p.4). So it is important to design curricular activities that promote creativity, including collaborative tasks that foster problem solving to enable channels for negotiated learning (Flutter, 2007; Drew & Mackie, 2011).

2.2 The axis of Reggio Emilia

According to New (2007a) “Reggio Emilia demonstrates the power of creative and critical thinking, especially when helped along by courage, charisma, and good timing”

(p.5). The RE approach provides opportunities for teachers and students to think creatively, flexibly and critically, as it is focused on the children (Kim, 2011).

Thus through an integrative review of the relevant literature (Torraco, 2005; Souza, Silva, & Carvalho, 2010), we have systematised the core concepts of RE as part of a comprehensive research work prior to this study in which eight axes of RE are described, that structure the conceptual framework of this study (Fernández-Santín & Feliu-Torruella, 2017), which can help foster the development of critical thinking and other social abilities in the students, depending on the tasks or roles of the teachers (Jordan, Fazio-Brunson & Butler, 2019).

| Axes | Key elements |
|--|---|
| The environment as a third teacher (A1) | The literature mentions three simultaneous educators: the teacher, the student and the environment; as the aesthetics and the atmosphere of the classrooms must invite students to explore, experiment and investigate (Malaguzzi, 1995; Schroeder-Yu, 2008; Strong-Wilson & Ellis, 2007) |
| The hundred languages of the child (A2) | In RE schools, the arts are a vehicle to understand students' thinking processes, as the idea of languages goes beyond verbal communication, as are understood as the different ways in which children express themselves, including visual and body language, music, dance, playing and the plastic arts (Reynolds, 1998; Bennett, 2001; Fraser, 2006; Eckhoff & Spearman, 2009; Vecchi, 2013) |
| Long-term projects (A3) | These projects must arise from the children's interests and from their experiences, exploration and from the questions they have about the world that surrounds them as through these projects, students can co-construct knowledge by debating with their teachers and peers. (Katz, 1998; Loh, 2006; Swann, 2008; Casey, DiCarlo & Sheldon, 2019). |
| The teacher-researcher (A4) | RE teachers see themselves as researchers, so they document their work with students, who are also considered researchers, The teacher listens, observes and documents the work and learning process of the students (Gandini, 1993; Hertzog, 2001; Schroeder-Yu, 2008; Suffian & Nachiappan, 2019) |

| | |
|-------------------------------------|--|
| The image of the infant (A5) | Children in RE are considered powerful, competent, creative, curious, observant and full of potential and ambition prepared to explore and build their own knowledge by establishing social relationships (Malaguzzi, 1993; Bredekamp, 1993; Gandini, 1993) |
| Negotiated learning (A6) | RE is based on the negotiation of ideas, as these are linked to the context, thus, developing identities within educational projects. Students co-construct their learning through social interaction while educators foster discussions and negotiations for problem-solving (Gandini, 1993; Malaguzzi, 1993; Edwards, 2002; McClure, 2009) |
| Documentation (A7) | Documentation promotes communication and collaboration amongst students, teachers and families generating a meaningful dialogue and offering opportunities to showcase how students generate significance to the subjects, also, documentation is useful to make children's thinking visible. Through the documentation teachers are able to gain insight into the thoughts of the children, determine further investigation, create a history of the work and generate further interest (Moran, Deschrochers & Cavicchi, 2007; Salmon, 2008; Schoroeder-Yu, 2008; Filippini, in Turner & Wilson, 2009). |
| Social relations (A8) | RE provides strategies for students to build knowledge from their relationships with teachers and peers through cooperative work and projects, where children are an active social actor in the construction and determination of their social lives (Malaguzzi, 1993; Malaguzzi, 1995; Edwards, 2002; New (2007b). |

Table 1: Eight axes of RE, Fernández-Santín & Feliu-Torruella, (2017)

2.3 Critical Thinking and artistic education

There are numerous voices that defend the possibilities of developing critical thinking through the arts, some of them in contexts of non-formal education but whose ideas can be transferred into the classroom, as with the arts we can teach to think and to look (Burchenal & Grohe, 2007). Ingham (2011) argues that the possibilities that the arts offer to develop communication skills and critical thinking by allowing students to approach artworks and arts in a free manner, as promoted by the RE approach, fostering observation to promote critical thinking.

Critical thinking has been widely defined in educational research, authors such as Ennis (1985), Beyer (1985), Faccione (1990), Lipman (1997), Paul (1990), Paul, Elder & Bartell (1997), Santiuste Bermejo et al. (2001), Paul & Elder (2005), McPeck, 2016, Cotrell (2017), Paul & Elder (2019), which describe it as an active process of analysing options, combining ideas and taking mental risks in order to establish connections and evaluate the steps taken to arrive at reasoned conclusions and answers. Lipman, (1987) suggests that this kind of thought process includes analysing, judging, making hypotheses, being able to explain other cognitive activities and being capable to solve problems.

According to Jusino (2003) every person is capable of thinking based on certain natural biological, historical and sociocultural conditions. In addition, Florea & Hurjui (2015) consider it as an active, coordinated and complex process that is composed of thought processes that begin in an active accumulation of information, resulting in well-reasoned decisions. Duron et al. (2006) summarise it as the ability to analyse and evaluate information. For them, critical thinkers can set out vital questions and concerns formulating them clearly, and gather and evaluate relevant information using abstract ideas, thinking openly and be able to communicate effectively.

Brookfield (1987) states that critical thinking consists of three phases: 1) determine assumptions that guide decisions and actions; 2) verify the accuracy of these assumptions by exploring as many perspectives as possible; 3) make decisions based on our research. Also, Birgili (2015) lists the general characteristics that define critical thinking: reasoning, generating hypotheses, observing situations from multiple

perspectives and dimensions, being open to changes and innovations, observing without prejudice, being open minded, thinking analytically and paying attention to detail.

When talking about infants, Nicoll (1996) states that “from a developmental perspective, the process of growing toward being a critical thinker occurs very early in life. A necessary characteristic of critical thinkers is autonomy. As infants move into the autonomous stage of toddlerhood the seeds of critical thinking have the potential to grow” (p.2). For Adams (1999) is key to foster critical thinking from an early age as part of the curriculum on nursing education, while for Bean (2011), critical thinking can be developed through problem-based learning activities, as Gokhale (2012) claims that “collaborative learning fosters the development of critical thinking through discussion, clarification of ideas, and evaluation of others’ ideas” (p.30).

3. Methodology

This qualitative study uses a design-based research approach, as this is grounded on an intervention design and its experimentation in a natural context, to observe the effects in specific aspects and its applications using ethnographic research in education techniques and methodologies (Hoadley, 2002; Coob, 2003; Gros Salvat, 2007), as it observes the behavioural and developmental progress of capacities in the classroom through a pedagogic experimentation grounded on a conceptual framework developed by the Fernández-Santín & Feliu-Torruella (2017).

This conceptual framework provides a series of RE principles to support the design of activities in schools to promote the development of critical thinking by adopting the RE approach. Our study is focused on the implementation of the RE philosophy in the Atelier, using the arts as a vehicle to develop critical thinking,

experimenting with the practical application of the conceptual framework with a group of 27 two-year-old students in Barcelona, Spain during 35 weeks and also, with their families, which were involved in the learning process by collaborating in some activities, in order to gather empirical evidence to delineate good practices in the development of critical thinking in the early childhood .

The experimental reference centre is a pioneer in the use of early stimulation to foster critical thinking, as the school promotes autonomy, responsibility and cooperative work. The study was conducted by two well experienced teachers with 11 and 20 years teaching using the RE philosophy respectively, who are also trained in early childhood education and artistic and audiovisual communication.

Is important to note, as mentioned by Swann (2008) and Inan, Trundle & Kantor (2010), that as RE is not prescriptive, but inspirational and flexible, therefore the activities may not be able to be replicated verbatim and, the results of this experiment may vary according to the context or the adaptations made by each school in different contexts. Therefore, we only provide practical guidelines that can be adopted to develop innovative activities to foster critical thinking which educators can contextualise, creating their own unique activities following the axis and key elements of RE.

The literature review of this study is of an integrative nature, and follows the guidelines provided by Torraco (2005), in which relevant literature is used to generate further knowledge in a field, assessing experimental and non-experimental studies to understand a specific phenomenon in a comprehensive way (Souza, Silva, & Carvalho, 2010). As Torraco (2016) notes, integrative reviews may address “new or emerging topics that would benefit from a holistic conceptualization and synthesis” (p. 410). This

is our goal in this paper, as we aim at bridging critical approaches with emerging practices.

Also following the research guidelines provided by Glesne & Peshkin (1992) our study can be understood uses interpretive methods and ethnographic design, for qualitative data collection through participant observations, and analysis of the documentation - field-notes as recommended by Turner & Wilson (2009) and as described by Inan, Trundle & Kantor (2010), “examine, understand, and describe the culture of a particular case, a Reggio Emilia-inspired preschool” (p.1191) in this case in Catalonia, Spain.

Considering research ethics regulations, the anonymity of the participants has been guaranteed following the European guidelines for data protection. Therefore, the names used for teachers, students and their families are pseudonyms. In addition, the legal tutors of the minors have consented in writing the scientific dissemination of the data and results obtained during this investigation.

3.2 Fieldwork: Experimentation in an early childhood classroom

Studying this group of two-year-old children has been both challenging and innovative, thus this research offers opportunities to analyse the creative processes of infants, to understand how critical thinking is developed (Cobb et al., 2003). Therefore, the two teachers - researchers responsible for the Atelier, designed and planned the activities and carried out the observations, analysing as the emotional state of the students, its creativity, the interest the sessions and activities generated in the students and, their participation and their behaviour in concrete situations, alongside with the degree of engagement, which were recorded in the field diary and as audiovisual records (videos and photographs).

Children, and the observations of their behaviours, are the main source of information of our research, alongside with the fieldwork diary and recordings, since their voice is essential to understand the phenomenon studied. The experimentation aimed to obtain information on whether through the RE model it was possible to stimulate critical thinking from the creative processes in 2-year-old children.

The experimental project was inspired by the film *The Little Prince* (Donen, 1974), which is based in the novel with the same title by Saint-Exupery (1943). The teachers adapted the story through experiences in the Atelier, in which the students accompanied the Little Prince on a journey across different planets. In each trip, the children made contact with different languages and environments, such as mathematical, visual, plastic, literary, musical and corporal, alongside with social interactions through experimentation and the arts. This pedagogical experimental design, based on the eight axes of RE, became the instrument for gathering data and document the children's activities and project outcomes.

The data was collected using Richards & Lockhart (1998) guidelines to document and register the students' behaviour, their movements and their interactions with the materials and peers and the activities. Also, observations and data were extracted from the transcriptions of the films recordings made during the activities. The data was analysed using a thematic deductive-inductive approach, and furthermore, both the data and its analysis were validated through a quality review process of the coding by an expert external panel of researchers to ensure its viability.

4. Results

Our results are grounded on the analysis of the data obtained through observations made during the fieldwork sessions and are related to the children's behaviours. The use of

the eight axes (A1-A8) of RE (Fernández-Santín & Feliu-Torruella, 2017), allowed us to verify to which extent these are key in developing critical thinking skills in infants, assessing how they influence the processes of learning and knowledge construction, as through their practical application, we can present a series relationships established between them. Also, the analysis of the teaching diary and the review of the recordings, allowed us to detect a series of concepts that frequently repeated in the responses of the children during the experimentation .

During the observations carried out in the classroom, behaviours in the children's reactions were noted as related to 14 aspects that are relevant in the RE literature, which were recorded in the field diary as: observe, interact, investigate, discuss, share, manipulate, explore, explain, enjoyment, participate , emotion, experiment, play and create. From the observations, 6 codes were the most repeated and have shown as patterns: **enjoyment, participate, emotion, experiment, play and create.**

The two researchers obtained and reviewed the coding, but to verify the reliability of the categories, the results were contrasted by two independent researchers, obtaining excellent kappa coefficients in the six codes presented in the results of this study (0.933 in item 1; 0.836 in 2; 0.835 in 3; 0.935 in 4; 0.934 in 5 and finally 0.934 in 6). To exemplify the results obtained, we use identification codes. **Table 2** shows the relationships between the eight axes of RE (A1-A8) and the codes obtained in the data analysis related with the children's behaviours (see **table 2**).

| | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 |
|-------------|----|----|----|----|----|----|----|----|
| Enjoyment | | X | X | | | | | |
| Participate | | X | | | X | | X | |

| | | | | | | | | |
|------------|---|--|---|---|---|---|--|---|
| Emotion | | | | | X | | | X |
| Experiment | X | | | | | X | | |
| Play | X | | X | X | | | | |
| Create | | | X | | | | | |

Table 2: relationships between the eight axes of RE and the codes obtained in the data analysis

4.1 Relationship between the axes of RE, the key elements of critical thinking and the codes obtained in the data analysis

The conceptual framework (Fernández-Santín & Feliu-Torruella, 2017) provided us with a series of axes and the literature review with the core elements of critical thinking, which are hereby compared both with the codes obtained through the analysis of the data, towards presenting the key components of a curricular redesign in order to foster critical thinking from an early age.

- **Enjoyment:** The first code that has appeared in the children's behavioural observation, it has been to **enjoy**, which gained strength as the project progressed, students became familiar and acquired confidence during the sessions [*judging*]. In the sessions the planets were presented by a child and an adult related to each planet from the *Little Prince* that visited them. The decoration of the spaces (**A1**) had an immersive objective, aimed at exciting and surprising the students to enhance their participation in the activities, so they could discover the story and understand the environment through different languages, games and imagination (**A5**).

In the diary it was stated that «as the sessions developed and the children became acquainted with the procedures, they became more spontaneous during

the experimentations, enjoying more through the game». Thus, more and more frequently and enthusiastically, the children explained aspects related to the *Little Prince*, with the planets they visited, and the activities, games and experiments they carried out developing different languages (A2). This aspect can be seen with the reaction that Olivia had, since Irisina visited the students: She asked at the beginning of each session: «Will Irisina visit us?» we asked Olivia why she always asked the same question, she replied «it's just because I had a great time with her! »

- **Participate:** Another code that emerged is participation, and it is probably where the greatest variety of responses concentrates, since it takes different dimensions depending on the activities. The teachers created spaces and settings in the Atelier inviting the students to participate in the project (A1) . We noted in the field diary that «the design and creation of spaces is fundamental to ensure that children enter the project. We give special attention to aesthetics, generating beautiful, safe and serene spaces. They should be spaces that invite experimentation, research, imagination and play».

Although one of the concerns of the teachers, was to generate opportunities for expression, reflection and creative freedom, the participation of students varied according to the personal interest to the materials presented, allowing us to link participation with two axes: depending on how the child behaved (A5) and the different languages they developed (A2) ,also, as stated in the teaching diary, in relation to an activity on the dance planet: (A7) «At the beginning, all the students danced, but as the minutes passed, some children left

the activity and sat around the class looking at the dancing classmates. Those who decide to continue dancing laughed happily». During the project, the teachers told us how they customised the activities to gather responses and reflections based on the children's interest and *participation*.

- **Emotion:** Emotion played a key role in bonding with the families, by strengthening links with **A8**. The teachers explained that keeping families informed about their work in the Atelier, involving them in the learning process, increased participation, interest and family-school relations. Throughout the course, parents were asked to collaborate with some activities, «the families were promptly informed of the work in the Atelier: what we were working on and in what way». The teachers communicated the activities with the parents with photographs and videos, sharing sessions to create an emotional family-school bond (**A7**) . As the project progressed, the children interacted more without seeking the approval of the teachers, and felt more free when *creating* their jobs, expressing themselves *emotionally* in different ways (**A2**) .

During a public exhibition of the children's work, the families positively valued the opportunity to participate in their children's learning and admired the creativity, sometimes unknown, of their children (**A5**). For example, April's mother explained to the teachers that the family lived the whole project intensely, as she asked to be told the story of the Little Prince when coming home after each session, talking about what happened in the atelier.

- **Experience:** One of the teachers who carried out the project, described the Atelier as «one of the purposes of this space is to create opportunities for students to experiment and experience». This is related to the role of the environment as a third teacher (A1). After an exhaustive analysis of the video footage, we noticed the opportunities given to the students to experience their full creative potential and also, the great diversity of responses. In the recordings, we observed that Olivia, Martí and Júlia drew on the sand with their fingers; others, like Pol and Abril used the whole hand while Paula, Lucas and Martina appeared upright drawing with their feet. In addition, the students decided how long to spend in the activities, or who to play with, co-constructing and negotiating their learning (A6) .

Many of the characters that visited them posed a problem to be solved through attractive experimentations, in which they could *enjoy, participate, cooperate by playing* with the rest of the children, making plastic *creations*, allowing us to affirm the relationship established between this axis and the remaining seven ones.

- **Playing:** It was observed that the word play appears in almost every session, as one of the concerns of the teachers was that the students' learning was carried out through experimentation and play and, therefore, spaces, tools and materials were created to make learning possible, using the environment as a third teacher (A1) . Pol and Claudia, at the beginning of the sessions, often asked the teachers «are we going to play the Atelier?». From the videos and photographs, two types of game are observed: symbolic and kinetic (A4). In one of the videos they

appear playing with palm leaves and fruits, Martí and Ona imagining that the seeds were food, while Jan and Pau appear sitting on the leaves imagining they were cars. Others, like Júlia, appear playing movements with the palm leaves shaking them, making the fruits fall and fanning other children in the class (A3).

- **Creating:** Considering the arts as a vehicle to understand the thinking processes of the students, during the project and experimentation, a wide range of materials were available to the students, as noted in the diary «we presented in each session a diversity of materials towards waking up different kinds of interest among students, such as painting, music, stones, sand, projector, palm leaves, transparencies, brushes, markers, wax, paper, canvas, rope, etc.»

Through the use of these materials, students learn to relate, express themselves emotionally, experiment, play, enjoy and create without limits or restrictions (A5). When the students arrived at the Atelier, the teachers presented them the materials, without giving them clues about what to do with them, inviting them to discover and learn with each other, enhancing their creative expression and developing critical thinking.

During the first session, the students struggled to act on their own without seeking their teachers' approval. As noted in the diary: «some students asked how to classify each object but the teachers just observed and documented the activity». As the project progressed, the students carried out their creations without asking the teachers what was expected from them, and without comparing their creations with the rest of the classmates' work. As the teachers mentioned «we realised that, even being so young, children already have

problems acting independently. They are used to adults organising their learning that it is difficult for them to find their creative space».

5. Discussion and conclusions

The results present core elements that can help educators to redesign the curriculum in early childhood education to promote the development of critical thinking through the arts through the adoption of the RE philosophy as a pedagogical framework in the classrooms.

First, we observed the relationship of *participation* with the environment, as according to Strong-Wilson & Ellis (2007), the co-existence of three simultaneous educators (teacher, student and environment), makes key the creation of spaces using attractive materials to foster *participation* and interest towards the activities. Since, according to Schroeder-Yu (2008), the attention placed on the environment promotes the inclusion and *participation* of students and families in the learning process. So, it is important to curate the environment where creativity and critical thinking will be fostered, providing a wide range of materials, ideas and activities to the learners so they can co-create, experiment and negotiate.

One of the most successful elements in the project are the family-school relationships, as through these relationships, by using the arts as a method to represent students learning, we found out that the diversity of opportunities and materials for students to experience their full creative potential, offers a wide variety and diversity of answers and by highlighting the relevance of the work of the students, *emotional* bonds are created, which are decisive in factors in the *participation* and *enjoyment* (Schiller, 1995; Edwards, Gandini & Foreman, 1998; Wexler, 2004; Gilman, 2007). Therefore, it

is important to carefully design effective and open channels for communicating with the families, in order to create strong bonds between the schools and the families, so children feel supported to think critically and creatively.

According to Reynolds (1998), Fraser (2006) and Vecchi (2013), with *playing*, as one of the hundred languages of the child, we can identify two kinds: symbolic and kinetic, as means to generate social relations and, therefore, learning and negotiation, which are key to foster creativity and critical thinking. As Bredekamp (1993) and Malaguzzi (1995) state, children's creativity is limitless, as they are capable of generating great ideas, as long as the adult does not limit or coerce the creative process, therefore, the role of the teachers is to offer tools, materials and adequate spaces, alongside with a great diversity of proposals to foster spontaneity. Thus, it is key to train teachers in how to foster creativity and critical thinking, considering that children have a variety of languages in which they can express and demonstrate their learning.

According to González (2011) in relation to the proposals of New (2007a), Trowbridge (2010), Capace (2012), O'Hanley (2013), and Cottrell, (2017), the priority of the experiences are to stimulate the *creativity* of the students without restrictions so that they could think, experiment and draw conclusions freely in order to develop *critical thinking*, following guidelines of González (2011), who promotes *experimenting with the world around us* and fostering freedom, children are offered opportunities to become responsible for their actions and decisions, learning to self-regulate themselves and deciding, through *experimentation*, when and how they learn, overcoming the challenges presented by the teachers (Lepičnik-Vodopivec, 2012; Suffian & Nachiappan, 2019). In this case, it is worth noting that designing experimentation requires carefully assessing the curricula, as some experiments can help reinforce the

learning in a variety of ways, from language development to motricity and mathematical thinking.

Through outcomes of this research, which allowed us to gather empirical data, research, we present a guide for the adoption of the RE philosophy in different educational contexts to foster critical thinking, as we consider that, if stimulated from an early age and through playing, the ability to make decisions, and to negotiate together to obtain results by experimenting and reflecting (Casey, DiCarlo & Sheldon, 2019), critical thinking can be developed through the expression of the arts in different ways and languages, allowing us to rethink, from an innovative, simple and effective pedagogic activities in which , the role of the arts in early childhood education is key.

6. Recommendations

As advice and guidance for teachers and schools for the adoption of the Reggio Emilia approach applying Critical thinking, we provide a series proposals that can contribute to develop critical thinking for the early childhood classroom, by implementing an educational project following the RE approach, encouraging critical thinking, creating spaces and settings that stimulate and surprise students (A1), as well as presenting and using a wide diversity of materials offering students freedom to experiment, create, interact and express with them without restrictions and allowing children to question things (A1) (A4).

Is key to consider artistic education as a vehicle to understand the cognitive and thinking processes of children (A2) while observing and documenting the interests of the students (A3) (A7) and promoting projects based on problem solving tasks that

allow students to think critically (A3) by decreasing the active role of the teacher to encourage student decision-making (A4).

Also, is important to strengthen the autonomy and independence of children through experimentation activities (A5) by personalising children's learning (A5) adopting dialogical methodologies that allow debate, cooperation and assemblies among students (A6) and encouraging teamwork to enable the exchange of perspective and peer dialogue (A6).

Furthermore, is necessary to strengthen the documentation process of learning to facilitate the validation of hypotheses (A7), create exhibitions to share the learning of the students with the community and families (A7), collaborate and report periodically to the families, involving them in the learning activities (A8) and involve families in the learning process to develop critical thinking beyond the classroom (A8).

As tools for schools for curricular development in critical thinking through, the philosophical model of RE offers opportunities for both teachers and students to experiment, observe and investigate, but also to question themselves, as this model encourages the development of the children critical thinking, which can be stimulated by adopting the arts as a vehicle to enhance the cognitive development of the students.

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