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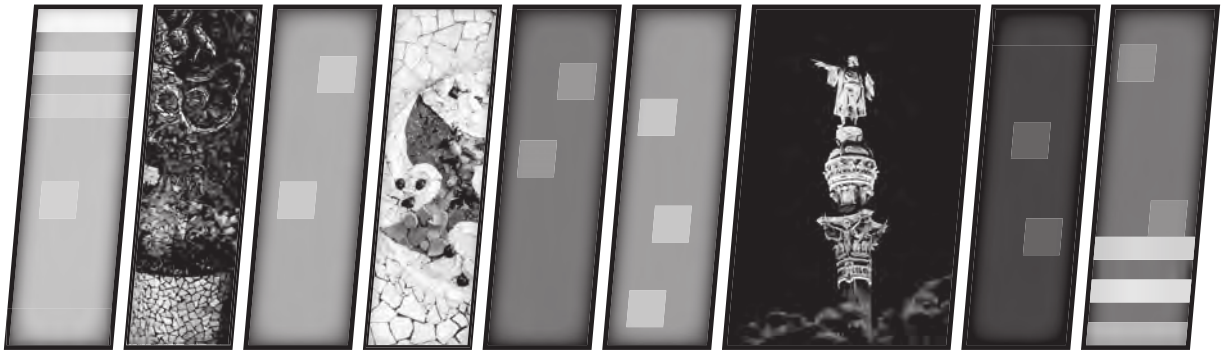

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"GOING OUTSIDE": DISCUSSING THE CONNECTION BETWEEN PEDAGOGICAL PRACTICES WITH DIGITAL TOOLS AND OUTDOOR EDUCATION IN EARLY CHILDHOOD AND PRIMARY EDUCATION

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Abstract

Technology has an important role in children's lives and education. Based on several projects developed with ICT, both in Early Childhood Education (3-6 years old) and Primary Education (6-10 years old), since 1997, the authors argue that research and educational practices need to "go outside", addressing ways to connect technology with outdoor education.

The experience with the projects and initiatives developed supported a conceptual framework, developed and discussed with several partners throughout the years and theoretically informed. Three main principles or axis have emerged: strengthening Children's Participation, promoting Critical Citizenship and establishing strong Connections to Pedagogy and Curriculum. In this paper, those axis will be presented and discussed in relation to the challenge posed by Outdoor Education to the way ICT in Early Childhood and Primary Education is understood, promoted and researched.

The paper is exploratory, attempting to connect theoretical and conceptual contributions from Early Childhood Pedagogy with contributions from ICT in Education. The research-based knowledge available is still scarce, mostly based on studies developed with other purposes. The paper, therefore, focus the connections and interpellations between concepts established through the theoretical framework and draws on the almost 20 years of experience with large and small scale action-research projects of ICT in schools. The more recent one is already testing the conceptual framework by supporting children in non-formal contexts to explore vineyards and the cycle of wine production with several ICT tools.

Approaching Outdoor Education as an arena where pedagogical and cultural dimensions influence decisions and practices, the paper tries to argue that the three axis are relevant in supporting a stronger connection between technology and the outdoor.

Keywords: Digital Tools, Pedagogical Practices, Outdoor Education, Early Childhood Education, Primary Education, Free Software and Culture.

1 INTRODUCTION

The School of Education from the Polytechnic of Viseu has developed several projects supporting ICT in education, both in Early Childhood Education (3-6 years old) and Primary Education (6-10 years old). From 1997, in collaboration with several other institutions, those projects had several impacts in schools and teaching and learning practices and were research oriented. From 2010, Open Lab ESEV was created to aggregate projects looking to promote, foster and support the use of Free/Libre and Open Source Software (F/LOSS), Free Culture, Free file formats and more flexible copyright licenses for creative and educational purposes in the ESEV's domains of activity.

The experience with those projects and initiatives (see under 3.1.) supported a framework, developed and discussed with several partners throughout the years and theoretically informed. Three main principles or axis have emerged: Children's participation, Critical citizenship and Connections to Pedagogy and Curriculum. In this paper, those axis will be presented and discussed in relation to the challenge posed by Outdoor Education to the way ICT in Early Childhood and Primary Education is understood, promoted and researched.

The paper is exploratory, attempting to connect theoretical and conceptual contributions primarily from Early Childhood Pedagogy with contributions from ICT in Education. The research-based knowledge available is still scarce, mostly based on studies developed with other purposes and experiences from other researchers and practitioners. The paper, therefore, focus the connections and interpellations between concepts established through the theoretical framework.

2 CHILDREN AND ICT IN EARLY YEARS EDUCATION

Based on Bolstad [1] and Shah and Godiyal [2], four main arguments to integrate ICT in children's education (3-10 years old) can be established. The first acknowledges the pervasive quality of ICT in children's lives. For example, children's early literacy and play experiences are shaped increasingly by electronic media [3]. But this presence happens from the micro-systems up to the crono-system [4] and so it has an effect on the people (family members, caregivers and teachers) and environments (physical and social) that surround young children. This also translates into expectations and opportunities meshed in a culture of ICT use. The second idea stems from the first one: if children are born into a technological laden society – culturally and in practical terms – and the educational institutions' mission includes empowering them and assisting them in becoming competent and active participants in their environments, developing technological literacy must be part of that mission. Connected to this idea, studies [5] highlight the need to ensure equal access to the opportunities that ICT represent for the future citizens. Access refers to both contact with hardware and software, and learning to use them, but also access to the culture and the possibility of participation that are connected to (and transformed through) technology [6,7].

A fourth idea congregates the contributions technology presents to learning and teaching in the early years education, strengthening many aspects practice such as children's learning and play experiences, practitioners' professional learning and development, and relationships and communication between schools, parents, and other people. The support for the development and integration of ICT into education policy, curriculum, and practice is not exclusive of the early years, since there is global support and interest across the whole education sector.

Our background for using Information and Communication Technologies in Early Childhood and Primary Education is based on Papert's [7] perspective of children driving the technology in self-directed and socially relevant ways [9,10], as mind tools [11]. The view of children as sharing a "participatory culture" [12], as the new thespians of a "collective intelligence" [13], requires from teachers and educators critical decisions regarding technology. In the conception of such critical perspectives, the children's experience and voice is regarded as essential [14-16].

These ideas are developed in the three axis presented next.

3 A FRAMEWORK TO SUPPORT ICT IN EDUCATION

3.1 Overview of projects developed since 1997

Most of the projects were part of action-research oriented initiates and have been analyzed before. A short overview is presented with some highlights.

3.1.1 Nónio/CBTIC: 1997-2010

Focused on Internet/ICT in Primary Education. The School of Education role was regional leadership for national wide projects (top-down approach). It's main activities were installing hardware, teacher training, and creating school websites, involving teachers and students in websites authoring and web-based teaching strategies (webquests, etc.). The School of Education also developed web repositories and was the regional center for the ICT Basic Skills Diploma (ECDL).

3.1.2 NetInfância (NetChildhood): 2004-2007

Focused on Internet/ICT in Early Childhood Education (some Primary Education). This was a smaller, local project embedded in initial teacher education. It had a strong focus on practices, supporting different innovations so to discuss and share knowledge through research (local/national/international). This innovation included: PlayStation/EyeToy, Digital narratives (Squeak), Making movies with VFX, Generative Art (Evolvotron), Music creation, Videoconferences and Collaborative storytelling. All these were activities developed with children.

3.1.3 Current projects

SOS Abstract (thinking), in collaboration with the School of Education of Porto. From previous work developed in Schoolsenses@Internet, the project deals with geo referenced multi sensory information and narratives, addressing the question "How can children and teachers use and develop tools

appropriate to dealing with multi sensory information?". Its emphasis on senses and sensors connects it with multiple representations and multiple views, also contributing to the learning of complexity.

Digital narratives in science education promotes the creation of narratives by children on topics selected and researched by them. Through small group collaborative work, children develop: script, models, scenarios, animation, sounds,... and create the narratives using, for example, Scratch or stopmotion.

Academia Dão Petiz is a City Council educational program promoting children's knowledge and connection to earth/life cycles. The School of Education is a partner, developing activities for children to explore multi sensory information and create websites and multimedia reports of the explorations of the wine cycle in the vineyards.

Eportfolios in Early Childhood Education promotes student teachers' research on their practices focusing on assessment and portfolios and family involvement. The studies explore technology's support to pedagogical documentation in participatory ways (children and families)

Free software applications (like MyPaint) are also explored in student teachers' research projects, focusing the appropriation of the software by the children and dimensions of their learning of/with the software. These are some of the contexts that allowed the development of the three axis presented next.

3.2 Children's participation

It is widely acknowledged that children's experiences when playing and learning with technologies can contribute to their learning, particularly when they are supported by adults who monitor and support activities, provide encouragement and praise for achievements, and assist children in managing their emotions [17]. Research about media and technologies in Early Childhood Education has stressed the importance of considering the ways in which children learn from other kinds of experiences and activities that they encounter in their early years, supporting the case for playful, positive experiences, with social meaning [9, 10; 18-21].

Constructionism [8] also places an emphasis on the role of social interaction and context, which can be increased when children use technology in hands-on activities, creating significant products for them and their families. When children are engaged in authentic tasks they create meaningful connections to the real world. Authentic learning activities typically focuses on real-world, complex problems and their solutions, using role-playing exercises, problem-based activities, case studies, and participation in virtual communities [22]. Authentic learning engages all the senses allowing students to create a meaningful, useful, shared outcome. They are real life tasks, or simulated tasks that provide the learner with opportunities to connect directly with the real world.

When children use ICT as mind tools to build their knowledge [11] in a new paradigm of multiple representations involving not only text, but multiple-media genres, they became engaged in critical thinking. Multiple representations and multiple languages can be explored with ICT tools to accommodate different learning styles a necessary ingredient to foster an inclusive education.

Children today live in a communication-rich environment. The models of communication they encounter in their everyday lives include a whole range of electronic and digital methods of communication [23]. Digital tools can be transformed in "the expression of ourselves" [24] and support a kind of communication that is "open source, free posting, decentralized broadcasting, serendipitous interaction, purpose-oriented". However, the "digital native" tag [25] does not represent children competences with ICT as it seems that many of the skills that new technology has actually enhanced are ignored by children and educators.

3.3 Critical citizenship

Critical citizenship is connected to questions of access, as expressed before. Access to tools, access to culture but also access to code. The concepts of free software and free culture are essential here. Free Software isn't software that you get for free or "gratis". There are many softwares you can download or get for free that don't qualify as Free Software. There is also Free Software being sold and bought. To better understand the concept, you should neglect the price and think about Free Software as computer programs distributed under a license that grants the user the freedom to run, copy, distribute, study, change and improve the software. As a way to avoid the ambiguity of the English word "free", some people prefer the term Free/Libre Software. According to the Free Software Foundation [26], Free Software is a computer program distributed under a license that respects the

following four essential freedoms: Freedom 0 - the freedom to run the program, for any purpose; Freedom 1 - the freedom to study how the program works, and change it so it does your computing as you wish. Access to the source code is a precondition for this; Freedom 2 - the freedom to redistribute copies so you can help your neighbor; Freedom 3 - the freedom to distribute copies of your modified versions to others. By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.

There are several arguments for using Free/Libre Software and many of them are critical for educational settings. For the Free Software Foundation [26], the main reasons are: a) “Schools should teach the value of sharing by setting an example”, b) social responsibility (“Educational institutions should not allow proprietary software companies to impose their power on the rest of society and its future”), c) “the school itself gains independence from any commercial interests and it avoids vendor lock-in”, d) “students are free to study how the programs work and to learn how to adapt them for their own needs”, and e) financial savings and the overall quality of several already available Free/Libre Software solutions for education.

To us, as citizens but also as educators, as teachers and researchers, the ethical grounds are particularly important [27]. We see using Free/Libre Software as a statement about the world we live in and how we choose to live in it.

A close concept in the ecosystem is Free Culture which identifies a social movement concerned with the limits imposed by overly restrictive copyright laws. “Free art, and a free culture, is of vital importance for a free society” [28]. Both concepts share a critical stance towards the control and dependence that arises from the notion of intellectual propriety in the digital world, with Free Culture extending the scope to the entire artistic and cultural production. For Lessig [29], today’s culture is a “permission culture”, “a culture in which creators get to create only with the permission of the powerful, or of creators from the past” (p. XIV), which means we need to decide “whether that information society will be free or feudal” (p. 267).

If we are discussing children's participation in the culture, discussions about Free Culture are crucial.

3.4 Connections with Pedagogy and Curriculum

To think ICT in Education one most focus on contents and contexts and not on digital tools. In formal settings, it is easier for educators to recognize the potential of ICT in pedagogical activities when there is an explicit comprehension of its relevance to the curriculum. This relevance can, sometimes, be overshadowed by the myriad of tools and resources that are available and ready-to-use. But the tools and the resources - although require learning in themselves - do not become part of the curriculum *per se*. neither do they substitute the pedagogical decisions of the teachers. A curriculum-focused approach is recommended [30]. In our projects, this has also meant not disconnecting children's experience in schools - which is focused on the curriculum - and their ICT experiences in school-based projects.

In a context of increasing accountability and rising academic expectations, the educational value of play has been questioned [31,32]. In Portugal, the connection between early childhood teacher education and primary teacher education is also a factor to consider in that erosion. Also, the three dimensions of early childhood pedagogy, specifically the articulation between intentional teaching and play-based environments, are often perceive as incompatible [33] or in opposition [34]. ICT connections to curriculum should not be interpreted as formalization of teaching strategies and children's activities. Playing with ICT is part of the curriculum [9;17], requiring that the same pedagogy that supports decisions of including play in the daily life of children are mobilized to decide about ICT.

In Early Childhood Education, recent approaches acknowledge the relevance of content knowledge for the learning of young children both at the level of adults' knowledge needed to support children initiatives and plan curricular/didactic activities and at the level of the knowledge children interact with in their daily context and routine. This is related to views on early childhood pedagogy that articulate three dimensions of the teacher/practitioner: a) learning environment or “backstage” (including the physical space and materials, time organization, groupings, social interactions and support relationships), b) tasks or activities presented and directed by the teacher (instruction), and c) interactions between adult and child focusing the child's activity, during play, for example [35-37]. Adult intervention is needed to incorporate all of those processes that occur within the classroom that aim to initiate or maintain learning processes and/or to be effective means to achieve educational goals [38]. When we think about ICT in Early Childhood contexts, we need to consider these several dimensions and both the adult and children's encounters with ICT and culture.

A thorough pedagogical base for ICT in education also mean that usual tensions and trade-offs between formal and informal learning, between the role of the school and the role of the family and the community, can be discussed in connection to other areas of the children's experience in school, instead of seen as a problem of its own.

4 OUTDOOR EDUCATION AND CHILDREN

In the last two decades, different authors and studies in favor of outdoor education have established arguments for a more prevalent use of the outdoors in education, specially in Early Childhood and Primary Education. These arguments range from the importance of environmental learning, closely connected to the outdoors, to the particular learning that comes from being in nature, to the contributions that the outdoors can give to all areas of learning by promoting real world experiences and contributing to children's well being [39].

In Portugal, outdoor activities and environmental learning have been more emphasized in the Early Childhood curriculum [39-40] although not with the same strength that in northern European countries. For example, the outdoor approach in the Swedish preschool's educational tradition can be understood as having different purposes, with opportunities for different kinds of meaning-making when children encounter nature. Based on previous research and steering documents, three characteristic grounds for outdoor activities can be found: (1) personal development and well-being; (2) care for nature; and (3) create knowledge about natural phenomena and processes [41]. In Nordic nations and other mainland European countries, nature kindergartens are an established form of Early Childhood provision [42]. The authors connect this to the consideration that nature offers qualities that feed human development, which isn't new but has seen growing recognition. The special contributions from nature to childhood in particular have been explored by several authors.

Nature and outdoor are not monolithic concepts. The interpretation of nature is itself cultural [42]. The notion of risk taking, for example, greatly influences the opportunities teachers provide to the children [43]. In the same way, the disconnection, sometimes opposition even, between outdoor education and ICT is a question of culture and educational thinking that can (and should) be contested. Stephenson [44] already challenged the idea that the outdoors is the environment for active physical play, by creating a more fluid connection between indoor and outdoor through prolonged access to the outdoors and indoors simultaneously, and by providing a range of varied learning experiences in both contexts. An approach to ICT that sees it as cross curricular, promoting children's participation and multiple languages and based on multisensorial information can find relevant relations to nature and the outdoors.

5 GOING OUTSIDE: IDEAS TO EXPLORE ICT

There are several examples of educational projects that use ICT in outdoor learning activities.

Our own SchoolSenses@internet [45] developed tools to support the elementary school community in creating geo-referenced multisensory data. The major idea behind SchoolSenses@Internet project was that geo-referenced multisensory data is an engaging way to motivate children and teachers in learning basic environmental concepts. Children created multisensory messages outdoors, and shared the messages in a virtual globe, where they could edit and comment the multisensory geo-referenced information.

The project LillyPad [46] investigated how mobile collaborative technologies can be designed to support and augment integrated inquiry processes both indoors and outdoors. Mobile collaborative tools supported students to switch their attention between physical activities in the field, digital interactions with a mobile computer and the collaborative interactions taking place in a group setting.

In "A New Sense of Place?" [47], children aged 9 to 10 used a GPS to create and explore outdoor soundscapes that were subsequently edited.

Children participating in Nature Talk [48] were able to record sounds and position information to create a virtual sound map (sounds were layered on GoogleMaps aerial photos).

All these projects share valuable concepts to Early Childhood and Primary education, connected to our three axis:

- Explore authentic learning activities
- Explore environmental awareness through multisensory information
- Explore space awareness through geo referenced activities
- Bridge the real and concrete to the virtual and abstract
- Foster collaboration to promote learning

ICT and digital technology can easily be used in outdoor learning experience. Mobile phones, tablets, digital cameras, GPS or physical sensors can add considerable value to collect and organize data in outdoor classrooms, and to support their publication using Web 2.0 tools. What are, then, the steps forward?

The first step is to acknowledge that ICT in education should connect with nature and the outdoors, recognizing children as a multiplicity of nature-cultures [49], hybrids, who need teaching and learning that extends their worlds and not one that creates disjunctures. This holds true to other axis of the curriculum but the emphasis on the outdoor and nature must not be understood as shutting out (or in) the technology. Nor the other way around: ICT does not need to be indoors. Promoting children's participation means listening to them as users of technology-related artifacts and related social processes. It also means providing them with the hands-on approach to learning that better suits them and respecting - and promoting - their multiple languages.

Freeing ICT from the indoors requires, at this time, creativity also in terms of technology use which entails adaptations and modifications. This is a strong reason to choose free software which allows for that modifications and the spreading of solutions. But in the long term, opting for free software in the educational contexts also connects to issues of access and participation. Owning the tools and the code are prerequisites for a truly open participation for the now young citizens. Decisions made by hesitant educators now can have a strong impact on the future of the children. Going out can also be interpreted in this paper as going outside of the comfort zone and making strong, ethically and educationally grounded decisions.

Finally, the pedagogy and the curriculum are seen here not only as supporting decisions but also as benefiting from the explorations that come next, though research of practices. We stand on the shoulders of giants in pedagogical terms, and that heritage should not be forgotten when discussing ICT in education. Analyzing decisions and practices based on the literature is what allows the meaning making that moves teachers' professional knowledge ahead. The several authors and ideas that we are starting to connect will certainly makes us go outside of what we know.

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