Introducing LUDI: a research network on play for children with disabilities

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Abstract. This paper presents LUDI, an interdisciplinary network of research centred on the topic of play for children with disabilities. The primary aim of the network is to ensure the theme is given the widest recognition as an independent field of research and intervention. Currently, the network comprises over 80 researchers and practitioners from 27 European countries. It is funded by the EU COST Programme through the means of an interdisciplinary Action started in May 2014 and lasting four years. The present contribution will discuss the scientific and social background and their implications that lead to the creation of the network, activities carried out during the first year of the Action and introduces the expected results of the ongoing activities.

Keywords. Play, children with disabilities, assistive technology

1. Introduction

Play is the most prevalent activity in childhood and has a central role in child development, fostering learning of cognitive, language and social skills [1], [2], [3]. Children with disabilities may be deprived from playing as a direct consequence of their impairments or because they do not have access to analogous forms of play in which they can take part [4], [5]. The topic of play for children with disabilities has given rise in the last decades to a large collection of studies of excellence in different countries but these research projects and their results have been confined to specific niches without exploring these areas of research from a fully interdisciplinary perspective. Examples of this include:

- experimental research in advanced technology, as in the case of social and rehabilitative robotics to facilitate the skills of play and the emotional involvement of the child in inclusive settings [6], [7], [8];
- studies related to the implementation of adapted toys dedicated to play for children with specific disabilities [9];
- theoretical research related to the identification of methods to support the development of play or to evaluate the skills of children with disabilities [10], [11], [12];
- studies concerning the design, the effectiveness and the social impact of accessible playground areas [13], [14].

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Those initiatives, however, still lack a common systematization thus making play for children with disabilities a not yet recognized area of research [15].
LUDI - Play for Children with Disabilities is an interdisciplinary international network of researchers and practitioners funded by the EU COST Programme through the means of an interdisciplinary Action (www.cost.eu/td1309). The network officially started in June 2014 and will last four years. The LUDI Action has the primary objective of spreading awareness of the importance of providing children with disabilities the opportunity to play. Given the importance of play for child development, it is necessary to ensure an equal right to play and to put play at the center of both multidisciplinary research and intervention practices directed at children with disabilities. To accomplish this, the LUDI Action will carry out three main tasks: a) collecting and systematizing all existing competence and skills: educational research, clinical initiatives, and using the know-how of resources centers and users' associations; b) developing new knowledge related to settings, technology (devices, services, strategies and practices) associated with the play of children with disabilities; c) disseminating the best practices emerging from the joint effort of researchers, practitioners and users.
Currently, the network comprises over 80 researchers and practitioners from 27 European countries.

2. Why a network on Play for children with disabilities?

Play is widely recognized as the fundamental activity for the overall development of every child. Not only it drives a major role in the acquiring of cognitive, socio-psychological and relational skills, but it is also necessary for children to experience new activities, to explore the physical environment and to broaden social relationships.
Play is spontaneous and voluntary and it has no extrinsic goals. It requires active engagement by players and the enjoyment depends on the activity itself rather than on the particular end to which children's effort is directed [16].
In children with disabilities, depending on the type of functional limitation, the spontaneity of play is often neglected and these children, instead of being the main actors of their own development, are many times exposed to play only as a mean through which they can accomplish clinical and therapeutic goals. Many educational and rehabilitation projects involve play activities that have an extrinsic goal such as the functional recovery of impairments. Children involved aren't engaged purely for the sake of play. These activities are thus "play-like" activities and not truly play activities.
To grant children with disabilities the full exercise of their right to play means focusing on the engagement connected with ludic activities as an end rather than as a mean. By taking into account "play for play's sake" activities, the purpose of the LUDI is to create general awareness on their impact in the quality of life of children with disabilities, and to initiate a process of cultural and social change that will break down the barriers that hinder the full exercise of their right to play and the realization of a true social inclusion.
The scientific grounding for LUDI, as Figure 1 shows, lies at the crossroads of three autonomous research areas: disability (impairments' types, functioning characteristics), play (play characterization and development, play assessment, right to play), and environmental factors (technology, contexts, play situations and scenarios). These three

areas also reflect the main domains of the ICF-CY [17] which enables us to describe and analyze how children and adolescents function within their life contexts [13, 14].

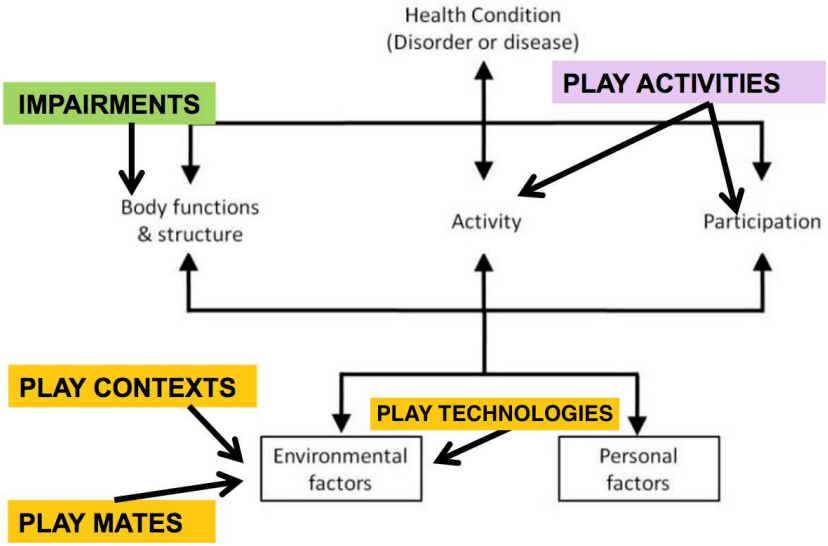

Figure 1. The three scientific areas of LUDI and the scheme of International Classification of Functioning, Disability and Health [18], as inspired by the work of Hollenweger [19].

The different types of impairments can be described within "body functions and structures", play activities can be explained within the domain of "activities and participation", while technology (devices such as toys or services such as play occupational therapy interventions) and play contexts are outlined within the "environmental factors".

The LUDI network is organized into four Working Groups (WG):

- WG1: Children's play in relation to the types of disabilities;
- WG2: Technology for the play of children with disabilities;
- WG3: Contexts for the play of children with disabilities;
- WG4: Methods, technology and frameworks for the development of the child with disabilities' play.

WG1 will provide the Action framework, including operational definitions of the main concepts around play and disability. WG2 will compile and distil existing knowledge on technology to support play for children with disabilities. WG3 will analyze the different contexts of play and identify current barriers hindering children with disabilities right to play. Finally, WG4 will build on the work of all the other WGs and propose methods, technology, and frameworks to support play for children with disabilities.

3. Early results

During the first year of activity, the WG1, which is dedicated to children's play in relation to the types of disabilities, has conducted a review and analysis of the most

relevant scientific literature on this theme, with the aim of providing a classification of types of play and a classification of categories of disabilities.

The first objective has been to share a definition of play, identifying the most effective and significant one for the LUDI framework, within the myriad of proposals developed in studies on childhood. LUDI adopted Garvey's definition: "Play is a range of voluntary, intrinsically motivated activities normally associated with recreational pleasure and enjoyment" [16]. The choice of this definition is consistent with the decision of leaving the so-called play-like activities out of the focus of the research. A much deeper attention is dedicated to the "play for play's sake" activities, too often lacking proper recognition as one of the primary needs in the case of children with disabilities.

A classification of types of play is crucial for the purpose of the network, but this requires the knowledge of a vast number of proposals available in literature and to take into account all the contrasting and sometimes overlapping perspectives. A detailed analysis of literature (e.g., [16, 17, 18]) suggested that types of play can be organized around two main clusters, one corresponding to the cognitive complexity implied by the different types of play, and the second one to the degree and type of social interaction in which the child is involved while playing.

The draft of the classification proposed is synthesized in Table 1.

LUDI Classification of Types of Play		
Cognitive dimension		**Social dimension**
Practice		Solitary
Symbolic		Parallel
Constructive		Associative
Games with rules (including videogames)		Cooperative

Table 1.The LUDI proposed classification of Types of Play

If it is necessary to share a classification of types play within such an interdisciplinary network, the same can be said for a categorization of types of disabilities. In the definition of ICF, disability is seen as a result of an interaction between a person (with a given health condition) and that person's contextual factors (environmental factors and personal factors), but neither the ICF nor the United Nations Convention on the Rights of Persons with Disabilities [23] provide an operational categorization of disabilities. As a source of interest, the WG1 analyzed the Organisation for Economic Cooperation and Development report concerning how students with disabilities and learning difficulties are categorized by different countries [24]. This work lead the WG1 towards the choice of a categorization that, on one hand, includes a small number of categories and, on the other hand, allows to take into consideration the severity of the impairment of children. Such classification serves the purposes of all the WGs involved in LUDI (e.g., as the basis of a bibliographic repertoire of the existing research projects and as a common language guideline to facilitate communication between professionals coming from different backgrounds).

The WG2 is dedicated to technology for play. Technology for play is here understood as the application of knowledge coming from different scientific areas to develop devices, services, strategies, and practices to support play. Technology for play devices range from simple toys like a ball to high-tech systems such as robot companions. It includes commercial products, whose characteristics are continuously evolving so that new devices are available on the market every few months, thus

making it not possible to have a fully comprehensive list, and systems developed under research projects, that in a large majority are built to address clinical and rehabilitation issues rather than the purely ludic activities that represent the main interest of the LUDI Action. The primary goal of the WG2 during the first year of the Action has been to develop a database collecting a vast number of examples of technologies to support play for children with disabilities that can inspire users, clinicians and developers, can elicit cooperation and foster discussion. The first step in this direction was dedicated to the development of a template aimed at gathering data for the database of play systems. The template has been defined in an iterative process so that the items included in the final version will reflect the feedback provided by the researchers involved in the gathering of data and also the inputs from WG1 concerning the categorization of types of play and of types of disabilities. Extensive research into the available play systems to support children with disabilities has been conducted by WG2 dedicating specific attention to the role played by technology devices and also stressing the importance of issues related to the accessibility and usability of those devices.

For each database entry, the following information will be collected: title, type of technology, description of the play system including manufacturer, reference, number of users involved, context of use, assessment methodology in relation to the intervention objectives. WG2 members have been asked to enter new records referring to the play-related research/interventions they are conducting or are aware of. Examples of such records are: a) the use of robots to promote and support play for children with disabilities; b) descriptions of occupational therapy interventions to promote play or to achieve a different functional goal through play for children with disabilities; c) children with disabilities use cases of toys (designed for all or with a specific target group); d) description of the development of accessible playgrounds. With the first database entries it is now possible to have a final assessment of the template developed, namely its ability to capture the characteristics of all technologies to support play for children with disabilities. Issues as different terminology used in different research areas, the use of lay-person language, and coherence between the different records in order to facilitate retrieving information from the database are now being analysed.

After collecting in the database a representative number of examples of technologies to support play, WG2 members will build on those examples and on the many available guidelines to design and assess technologies, coming from different areas of research, to produce a comprehensive list of guidelines to design and assess technologies to support play for play's sake for children with disabilities.

In the long term the database will not only represent an overview of the play systems available, but also an interactive guide that will allow for each record included in the database an exploration of the following characteristics: the most meaningful use cases, the outcomes and the methodologies chosen to assess the effectiveness of each technology. The information contained will be useful for parents, educators or clinicians that are looking for technology to support play for a particular child, as well as to researchers and developers that want to have an overview of the current applications. The database will also collect technology for play-like activities, as these examples can contribute to knowledge transference between different fields of interest, thus fostering new ideas for creating and implementing purely ludic activities.

The first step taken by the WG3, which is dedicated to the contexts for the play of children with disabilities, has been to undertake an audit of literature relating to the enablers and the barriers for disabled children's play according to specified contexts

that the WG3 identified as the most relevant for the scope of the network: at home, in educational settings, in built and natural environments. In general terms, the goal of this analysis is to assess the knowledge to date in this area, paying particular attention to the framing of research questions, to theoretical frameworks, to methodologies and, of course, to the key findings relevant to the LUDI objectives. The report summarising the review, to be drafted at the end of the first year of activity, will contain an annotated bibliography, a narrative account of research in this area, and will propose tools for identifying any research gaps or avenues for further research into barriers and enablers to play for disabled children.

The WG4, dedicated to methods, technology and frameworks for the development of the child with disabilities' play, has conducted during the first year an investigation on the users' (mainly children with disabilities) needs in relation to play. A bibliographic search revealed a limited number of studies addressing this topic so the WG4 has planned a pilot survey to be conducted in Sweden, Finland and Lithuania to investigate the users' needs in relation to play. In parallel, a project draft has been disseminated through the LUDI network to conduct local surveys on other European countries. The goal is to integrate the local results into a global report characterizing the users' needs in relation to play in Europe.

4. Conclusions

This paper summarizes the contribution to the field of Play for Children with Disabilities the COST Action LUDI has brought during its first year. Projects deliverables and scientific publications reporting in detail the effort of the researchers and practitioners involved in the network will be disseminated in the near future. The network will also elaborate on the products delivered separately by the different Working Groups and will integrate the information so that it can be accessible from a range of interdisciplinary perspectives. This will constitute a necessary step towards the long term aims of creating a novel and autonomous field of research and intervention on play for children with disabilities and of granting these children the right to play.

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