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Innovation in Early Childhood and Primary Education

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Abstract

Early Childhood and Primary education are in a continuous search of innovation for the quality improvement of learning experiences during everyday educational reality. A wide range of important ideas, views, suggestions coming from different disciplines, several theoretical standpoints, and diverse perspectives have been introduced over time. However, does innovation need to be a complex newcomer? This paper suggests that innovation lies behind the essentials of childhood, such as play and imagination. The paper seeks to explore play and imagination as critical aspects of a child's learning and development. *Conceptual PlayWorlds* as a collective model of practice for the development of play and imagination are introduced. The study suggests that quality learning experiences with advanced learning outcomes can emerge through children's imaginary play. An indicative case example of learning and development in Science, Technology, Engineering, and Mathematics is presented. The paper concludes with an overview of the essence and the qualities of a play-based pedagogy that can support everyday educational practice and inform policy.

***Keywords*:** early childhood education; early years; primary education; play; imagination; concepts; STEM; Conceptual PlayWorlds

1. Introduction

The core idea and the major anticipation that lies behind almost every initiative in Early Childhood and Primary education is the discovery of innovation for the quality improvement of learning experiences during everyday educational realities. At the same time that complex and usually hard to follow practices are introduced in the field, the child's leading activity and the teachers' major strength is neglected; this is play and play practices. Despite being "the elephant in the room" play is often underestimated as a teaching and learning practice and that is realized more as the child makes transitions within the school life beginning from the early years and moving towards primary education. The present paper is making the argument that innovation does not need to be a complex newcomer. The paper suggests that innovation lies behind the essentials of childhood, such as play and imagination. Play and imagination as critical aspects of a child's learning and development are explored. Conceptual PlayWorlds (Fleer, 2017, 2018, 2019) as a collective model of practice for the development of play and imagination are introduced. Conceptual PlayWorlds attempt to create developmental conditions that support children's wondering, imagination and concept formation all while playing. The study suggests that quality learning experiences with advanced learning outcomes can emerge through children's imaginary play. An indicative case example of learning and development in Science, Technology, Engineering, and Mathematics (STEM) is presented. We know from previous research (https://www.monash.edu/education/research/projects/conceptual-playlab/publications) that when STEM problems are introduced during children's play it results in children's sustained engagement in the activity setting and hence creates the possibility to study children's concept formation in a compressed manner. The example presented in this paper shows how play and imaginary play can create developmental opportunities for concept formation and conceptual learning and development. The paper concludes with an overview of the essence and the qualities of a play-based pedagogy that can support everyday educational practice and inform policy.

2. Innovation is the essentials: Play and imagination

In Vygotsky's s writings (1966; 2004), play is conceptualized as the experience of an imaginary situation that a child creates and lives through. Thus, play and imagination

are understood in a unity. Children's imaginary play stretches, transforms, and expands the child's overall reality in multiple ways. In line with Vygotsky's conceptualization, during their imaginary play young children:

a) change the meaning of the objects by giving imaginary characteristics and attributes to the objects that surround them (e.g., a carton may act in place of a spacecraft),
b) change the meaning of the action by pretending they are acting in a different way they actually do (e.g., they move their hands up and down pretending they are flying),
c) change the meaning of the space by giving imaginary dimensions, characteristics, and spatial relations to their surrounding space (e.g., a part of the room may be considered as the sea),
d) change the meaning of the time by experiencing again the past (e.g., pretending they are infants), by living through the present (e.g., making undo a decision and resetting a story), and by imagining the future (e.g., pretending that they are grown-up),
e) use diverse types of tools, signs, and artifacts such as drawings, gestures, technological equipment as well as particular forms of language,
f) make multiple connections with everyday life using and expanding their everyday knowledge and understandings, and
g) share abstract intellectual spaces, creating and building on collective imaginary experiences both with peers and adults (e.g., educators, parents).

Taken together, imagination and imaginary play is a critical psychological function and a complex process in the early years. Entering and living through an imaginary situation, young children can expand their experience (Zittoun & Cerchia, 2013) and their learning. They can shift from an actual, present, and concrete point towards an abstract, flexible, and more developed one. Through their imaginative play, young children construct, deconstruct, and reconstruct their understanding of their social and cultural environment as well as the surrounding natural, technical, and technological world.

Although play-based pedagogies are the pivot in several curriculums worldwide, a lack of systematic and efficient pedagogical models are available to step

the children and the teachers through playful learning. The following subsection introduces Conceptual PlayWorlds as an innovating model for learning and development through play.

3. Conceptual PlayWorlds: An innovating model for learning and development through play

Conceptual PlayWorld is a model of practice created to support teaching of STEM concepts through play in early childhood settings (Fleer 2017; 2018; 2019). A Conceptual PlayWorld can be inspired by a children's book or a fairy tale story. The drama enacted through the story helps children to develop empathy with characters and be motivated to learn and solve problems. Through play-based experiences within imaginary situations, young children form concepts.

There are five key pedagogical characteristics of a Conceptual PlayWorld (https://www.monash.edu/conceptual-playworld).

1. The first characteristic is selecting a story that engages children through emotionally charged scenarios.
2. The second characteristic is designing a space that becomes the imaginary space of the chosen story.
3. The third characteristic is planning the entry and exit into that space - children and adults decide upon the role they will take in the role-play of the story and join the imaginary situation.
4. The fourth characteristic is introducing a problem situation that needs a STEM concept for solving the problem.
5. The fifth characteristic is planning how the teachers will support learning in the imaginary situation based on the pedagogical positioning they will take, such as being with the children investigating, or leading an inquiry, or asking children for help.

The five characteristics of a Conceptual PlayWorld act as a flexible pedagogical model that can be used in early childhood settings, primary school settings as well as family and community settings (see research and practice examples here: https://www.monash.edu/education/research/projects/conceptual-playlab). The opportunities and the possibilities of adjusting the model in diverse social realities and

children's interests and needs are unlimited. A case example of the implementation of a Conceptual PlayWorld is illustrated in the following section.

4. An indicative case example: Forming STEM Concepts through play

This section illustrates how play can be dialectically interrelated with learning within everyday educational reality. A case example of young children's engagement with STEM is presented. Children were engaged with a wide range of STEM concepts as part of their participation in a Conceptual PlayWorld based on the story "We're going on a bear hunt" written by Michael Rosen. The story describes the experiences of a family as they go through several sites and locations such as a river or a forest in search of a bear. The Conceptual PlayWorld was organized as an educational experiment (Hedegaard, 2008); that is, as a planned intervention designed to create condense forms for children's development. Following the methodology of the educational experiment, the learning environment was designed by the collaboration between the early childhood teachers of an early childhood center in Australia and the research team. Following the methodology of the Conceptual PlayWorld, the early childhood teachers along with the children created an indoor space to facilitate children's imaginary play (Figure 1). The figure has been taken from Fleer, Fragkiadaki, and Rai (2020b) https://www.monash.edu/education/research/projects/conceptual-playlab/publications. The space was created to allow, inspire, and support children's explorations and interactions.

Fig.1 Creating the indoor space for children's imaginary play

The children and the early childhood teachers were in the role of the family members and experienced together the same imaginary situation of searching for a bear. Being within the Conceptual PlayWorld together they planned to visit several imaginary spaces such as an area with grass, a river, a muddy area, a forest, an area with snow, a cave, and a house. Each of these imaginary areas could create an opportunity for the children to explore diverse STEM concepts. The set of the STEM concepts available for exploration in line with each episode of the story is presented in the following table

(Table 1). An extended version of the table is published in Fleer, Fragkiadaki, and Rai (2020b) https://www.monash.edu/education/research/projects/conceptualplaylab/publications.

Table 1. STEM concepts that can be formed through children's imaginary play inspired by the story

The episode of the story	STEM Concept
grass	- Biological external characteristic of the plant (e.g., observing, describing, and documenting the figures of the plants in the indoors and outdoors spaces of the classroom) - The circle of life of plants (e.g., planting, observing, describing, and documenting the process) - Ecosystem (e.g., observing, describing, and documenting the small ecosystem that can be created on a plant)
river	- Floating and sinking (e.g., using a boat to cross a big bowl of water) - Design process (e.g., designing a boat to cross the bowl of water)

	- The kinetic energy of water (e.g., a watermill in a big bowl of water)
mud	- Dissolution (e.g., creating mud) - Spatial relations, counting, and measurement (e.g., playing with mud to follow a food recipe for a pretend lunch)
forest	- Light and shadow (e.g., playing with natural (sun) & artificial (torch) created light to create shadows)
snow	- Rendering and melting (e.g. creating and melting ice-cubes)
cave	- Statics, dynamics, and controlling material (e.g., building a cave with diverse materials)
house	- Biological external characteristic of the bear (e.g., observing, describing and documenting characteristics) - Hibernation (e.g., searching on the internet for information about the concept of hibernation) - Habitat and habits of bears (e.g., using a diverse resource such as the internet to learn more about what the bear likes)

The concepts presented above are indicative. Early childhood teachers had the opportunity to choose to work with one or more concepts during the period the Conceptual PlayWorld was implemented. They were also encouraged to add on this list in a way that aligned with children's interests and the elaboration of the imaginary play. Early childhood teachers were encouraged to use a scientific language to step the children through STEM-oriented experiences. The scientific narrative crafted by the early childhood teachers focused more on describing and explaining what and how was happening during the STEM experiences rather than using advanced terminology related to the content knowledge of each concept explored.

What is important here is that a rich learning environment was created for the children allowing deep and extensive engagement with the STEM concepts through play. The way the concepts are introduced here reflects meaningful as well as enjoyable experiences for young children. Being in an imaginary play situation, children have the opportunity to wonder, explore, learn, and reflect on the natural, technical, and technological world that surrounds them. The concepts can come in the service of play and respond to real-life needs for the children as expressed through their everyday play.

A continuum and a balance between advanced learning goals and play are introduced.

5. Towards a play-based pedagogy

As we have argued elsewhere that imagination and concept formation starts early in children (Fleer et al, 2020a). Infants even within their first 1000 days start to see the distinction between rolling, sliding, pushing, and pulling. These distinctions hint at children's capacity to imagine and distinguish between various actions from the very early years. Play emerges as a result of the dialectics between children's psychological functioning and the social and material conditions of their environment. Children's imaginary play developed through Conceptual PlayWorlds shows their developmental tendencies in a condensed form. The example presented in this paper showed how sustained engagement in these imaginative play situations can help in the learning of STEM concepts. Play needs to be seen beyond a mere pleasure-giving activity for children. It is as Vygotsky argued the leading factor for children's development in the early years and a critical factor as the child enters primary education. Being in the imaginary situation as a play partner, the teacher engages children in the collective act of imagining and learning. Taking a step further the Conceptual PlayWorld described in this paper helped in creating a collective imaginary situation that invited children to explore their thinking and hence also learn robust STEM concepts. Following a cultural-historical line the effort has also been not to see these imaginary engagements as one-off moments of imagination but a sustained historical engagement of children in developing their social situations of development. Children's concept learning thus is employed for supporting their imagination and future exploration. The transformative character of imagination is worth highlighting here as it creates the possibility for the children to be more aware of their actions and develop empathy in

the play setting. The study concludes by suggesting that a play-based pedagogy as illustrated through the Conceptual PlayWorld model can provide an innovative approach for teaching, learning, and development over the school life of children beginning from the early years and continuing during primary education.

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