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Kumpulainen, Kristiina

Multidisciplinary Digital Publishing Institute

2020-09-27

Kumpulainen, K.; Burke, A.; Yaman Ntelioglou, B. Young Children, Maker Literacies and Social Change. *Educ. Sci.* 2020, 10, 265.

<http://hdl.handle.net/10138/348829>

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Editorial

Young Children, Maker Literacies and Social Change

Kristiina Kumpulainen ^{1,*} , Anne Burke ² and Burcu Yaman Ntelioglou ³

¹ Faculty of Educational Sciences, University of Helsinki, Siltavuorenpenger 5A, 00014 Helsinki, Finland

² Faculty of Education, Memorial University of Newfoundland, St. John's, NL A1B 3X8, Canada; amburke@mun.ca

³ Department of Teaching and Learning, Faculty of Education, Brandon University, Brandon, MB R7A 6A9, Canada; nteloglou@brandonu.ca

* Correspondence: kristiina.kumpulainen@helsinki.fi

Received: 4 September 2020; Accepted: 7 September 2020; Published: 27 September 2020



Introduction to the Special Issue

Although making—that is, playing, experimenting, expressing, connecting, and constructing with different tools and materials towards personal and collective ends—has characterised the everyday activities of many children and adults across cultures for ages, there seems to be no doubt that novel digital technologies and media are transforming and re-mixing more traditional maker activities, with new opportunities for communication, collaboration, learning, and civic engagement. Despite increasing research evidence on the educational potential of maker activities, less research attention has been given to young children's digital, art-based, multimodal making as they create opportunities for their agentic, creative and civic engagement [1,2]. Oftentimes, the risks and threats of digital technologies and media for young children's healthy development have dominated the discussions, with a limited focus on children's digital opportunities and participation rights [3]. Moreover, how children's transformative engagement manifests itself at the intersection of new and old technologies requires further investigation.

This Special Issue is motivated by a need for greater attention to research on children's agentic, creative and critical engagement and learning in the context of various maker activities. The articles illuminate what kind of engagement, learning opportunities, identities and (in)equalities are being formed and reformed in the children's maker activities involving various technologies and the social futures that are being built in and through these activities [4]. In doing so, the issue addresses the transformative potential of maker activities for social change in the lives of children aged 4 to 14 years old. We understand maker activities as broadly referring to children's hands-on engagement in creative and interdisciplinary projects relevant to children's lives, affording participants opportunities to create, play, and experiment with a range of novel digital technologies, but also with more traditional technologies and materials or hybrid combinations of non-digital and digital tools [1]. We approach children's agency in its various multimodal manifestations as children make, create, propose questions, suggest, challenge, refuse and/or ideate. Further, we regard making and agency as relational, occurring in relation to others—with other human and non-human beings—in sociocultural contexts [5].

The articles of this issue position children as producers and authors within the wider culture in the context of maker activities [6–9]. The studies discussed move beyond maker activities based on highly individualized values that foster the production of artifacts for their own sake with little relevance to or impact on children's lives in their communities. Instead, the articles discuss maker activities based upon participatory, critical, and ethical action, enabling children to engage in, learn, and make a collective change on issues that are pressing to themselves, their families, and/or their communities. The articles illuminate how making activities of children in different (maker)spaces situated in children's homes [10] (Peppler et al.), an early childhood center [11] (Burke and Crocker),

schools [12,13] (Brownell, Kenrick et al.), a public library [14] (Skåland et al.) and outdoors in green spaces [15] (Kumpulainen et al.) create opportunities for children's engagement, learning and agency, as well as how social and cultural resources frame maker activities and learning opportunities. Further, some of the articles in this issue show how maker activities have potential to demystify technology for children and give them agency over digital tools and self-expression. Together the studies also respond to the need to research and develop the critical competencies of children that can inform their maker practices with various tools and materials, and that enable their civic participation in activities that involve 'making' [16].

Our conceptualization of children's maker activities discussed in this Special Issue draws on the notion of maker literacies, which links together understandings of maker activities, digital literacies, and children's agency [17,18]. Maker literacies stand for children's playful, creative, and agentic engagement supported by a range of technologies and media [2]. They position children as active, creative, and critical investigators of digital technologies and media for personal and social change across formal and everyday settings, online and off [16]. Maker literacies direct our attention to children's multimodal design and production, creative, and critical thinking, problem-solving, communication, and collaboration [8,19]. A focus on children's maker literacies also points out how children can and should be seen as important co-participants and change agents in efforts for social change both at the level of interactions and relationships as well as at the level of cultural and social institutions.

The article by Cassie Brownell "*Keeping walls down instead of up*": *interrogating writing/making as a vehicle for Black girls' literacies* addresses themes of young children, maker literacies, and social change in a Midwestern U.S. elementary public school [12]. The author analyzes two vignettes of young Black girls' maker group projects that followed a six-week unit on immigration issues in a grade three classroom. Using the Black Girls' Literacies Framework developed by Muhammad and Haddix [20], Brownell explores multiple strands of the participant identities (multiple, connected to identities, historical, collaborative, intellectual and political/critical) that situate their maker literacies. The two vignettes shared in this paper offer insight into how young children can employ maker literacies in place of more traditional writing to demonstrate knowledge and discover empathy for the immigrant experience, particularly with regard to the recent US presidential campaign to erect a wall on the US-Mexico border. This article is unique, not only because maker literacies are used to develop socio-critical skills by young children, but also because of the particular participant background and perspective (Black, female, US-born third-graders) of the focus group represented in the data. During the course of the project, the girls' lived experience framed the co-construction of digital video and artefacts related to the immigration experience. Role-play, which was inspired through the making of artefacts is, however, cautioned by the author as potentially problematic in the development of cultural sensitivity to actual realities of immigrants, or other marginalized groups. Overall, the article clearly demonstrated how young children are capable of reaching emergent understandings of social issues and systemic inequalities, and effectively sharing their knowledge through maker activities as a precursor to social change through education.

In their article, "*Making at Home: Interest-Driven Practices and Supportive Relationships in Minoritized Homes*" Kylie Pepler, Mishael Sedas and Maggie Dahn address maker literacies and social change in the everyday lives of minoritized youth [10]. The authors argue that although research knowledge on the possibilities of maker education for promoting young people's interest-driven, consequential and transdisciplinary learning is on the rise, existing research has mainly focused on settings that serve youth from dominant groups. The study responds to this research need by investigating to what extent and under which conditions youth from an urban, under-resourced community engage in maker practices in their everyday lives. Using the model of connected learning [21] to their research data stemming from a youth survey and interviews in Chicago, the findings of this study revealed how the home setting created an important site for the youth's participation in interest-driven, low-tech maker activities. Here, intergenerational support emerged as pivotal for the children's engagement and identity building in relation to making as parents and other family members provided

access, co-created, collaborated, taught, and encouraged youth to make, and hence supported youths' developing identities as makers of things. The findings of this study speak to the importance of recognizing home settings as important sites for fostering minoritized youth's learning opportunities. The article argues that it is these home-based maker practices and networks of support that also formal education needs to better capitalize for ensuring connected learning for every youth.

Responding to the urgent need to bring awareness to HIV and AIDS education as one of the major health literacy-related challenges in a Ugandan context, the article, *Closing the HIV and AIDS "Information Gap" Between Children and Parents: An Exploration of Makerspaces in a Ugandan Primary School*, by Maureen Kendrick, Elizabeth Namazzi, Ava Becker-Zayas and Esther Nancy Tibwamulala [13], powerfully explores the potentials of using multimodal forms of representation in makerspaces with young children to create a more open dialogue with parents about culturally-sensitive information regarding HIV and AIDS. The authors discuss the significance of makerspaces "as spaces of inquiry and new learning, spaces that provide opportunities for makers to think and create in all modes" (p. 193) by providing detailed observations about how Grade 5 students (aged 9–10) in a Ugandan residential primary school engaged in a makerspace using billboards as public service announcements. The authors illustrate that multimodal literacies and visual methodologies, afforded through the creation and exhibition of billboards, enabled these children to become active agents of social change, and provided them opportunities to engage in open, authentic and critical conversations with their parents about HIV and AIDS.

The article by Gro Skåland, Hans Christian Arnseth and Palmyre Pierroux "*Doing Inventing in the Library. Analyzing the Narrative Framing of Making in a Public Library Context*" [14] focuses on the ways in which creative making was framed in a public library setting in Oslo to introduce school children (from grades 4 to 7) to inventing. In their study, attention was also given to investigating how the library educators supported the children's creative making and the resources they drew upon in framing the maker activity with a specific interest in storytelling as a cultural resource. Informed by sociocultural theorizing on imagination and creativity, and Goffman's [22] concept of framing, the analysis of the video data of the participants' interactions and supplementary ethnographic notes revealed three distinct and intersecting frames through which inventing was acted out in the children's making activities in the library setting. The authors describe these frames as the invention frame, exploration frame and narrative frame. The authors point out that these frames should not be examined in normative ways but rather they need to be examined in relation to what the participants and institutions in question want to achieve. In addition to generating new empirical research knowledge on maker literacies, young people and social change in the context of a public library, the study demonstrates the power of frame analysis for understanding what is going on in maker activities, which frames become dominant resources for sense-making, and how opportunities appear for children's agency that exceed dominant institutional frames.

The article by Kumpulainen et al. addresses young children, maker literacies and social change in the context of "*Children's augmented storying in, with and for nature*" [15]. In specific, guided by a relational ontology and scholarship of new literacies, the study focused on investigating how a novel augmented storying tool, *MyAR Julle*, acted as a material force for elementary-school children's maker literacies outdoors in nature. The maker activities in this study were framed by a pedagogy that emphasized children's wonder, imagination, and multimodal and embodied interactions with nature. The data corpus comprised the children's narrations of their augmented stories in nature, their augmented story artefacts, and video/observational data from the children's construction of stories outdoors in nature. The findings of the study revealed how augmented storying enabled the children to enact living and imaginative inquiries into themselves as well as other human and non-human beings through playful, affective, sensuous, identity, cultural, and critical literacies. Augmented storying in nature invited the children to immerse with the Julle character and with their own experiences, knowledge and values, and with nature in ways that many of the key notions of (eco)literacies were enacted into being. These literacies also pictured socio-ecological futures and change, evidencing the children's critical

thinking, participation, and sustainable action. In all, the study contributes to research knowledge on the educational potential of augmented storying for children's maker literacies in, with and for nature. It shows how augmented storying can elevate children to the roles of investigators, authors, and change agents rather than being mere receivers of adult information and advice on the natural world.

The article by Burke and Crocker, "*Making' Waves: How Young Learners Connect to Their Natural World through Third Space*" addresses themes of young children, maker literacies, and social change in an early childhood centre [11]. Through the application of Oldenburg's third space theories, makerspace, relational value, and child-centric educational theories, Burke and Crocker noted that young children take control of their learning experiences to shape their emotional, sociocultural, and educational consciousnesses about the conservation of the environment. The qualitative case study included early childhood educators, pre-service teachers, and young children who all worked together over six weeks within a makerspace to explore ocean-sustainability and conservation. The third space setting of a makerspace encouraged children to creatively interact and explore conservation concepts through playful making. The makerspace activities increased children's concern and care for nature voiced through the children's actions. The authors conclude that the consideration of the setting that children learn in is one of the most important components to a child in their learning journey. Findings show that when young children had the freedom to experience and develop their own conservation-mindedness in a third space that is a makerspace, they developed empathetic relationships that helped connect them to the natural world and the organisms living within the ocean. Burke and Crocker argue that "these two components of our research—the physical and the emotional—are not mutually inclusive, but when connected affirmed the success of a third space's ability to foster within it the deepest and most valuable learning experiences for its participants."

This collection of articles emerged from an international conference called *Makerspaces for Young Learners: Exploring Digital Technologies through Education*, held on 6–8 May 2019 in Canada. The conference, which featured activities and research focused on maker literacies, digital literacies, and maker education was hosted by the Memorial's University Faculty of Education and Public Engagement Office, and funded through Canada's funding body Social Sciences Humanities Research Canada (SSHRC). The SSHRC connections gathering hosted a teacher education conference called *i-Make: Exploring Digital Literacies through STEAM Education*. This partnership between Memorial University's Faculty of Education and Public Engagement Office offered Canadian teachers an opportunity to engage in dialogue with researchers in the area of maker literacies, some featured in this Special Issue about how maker education, which merges the arts and sciences together, can build relationships between families, schools, and communities. This event saw participation from both International and Canadian researchers. Over 12 speakers came from European, Canadian, and US universities. Many of the presenters' papers are shared in this Special Edition. This conference marked the first time a group of International researchers came together for workshops, group discussions and activities all focused on the theme of maker literacies, digital literacies, and maker education. The keynote speaker, Dr. Kristiina Kumpulainen, from Finland's Playful Learning Center, University of Helsinki, brought together researchers, teachers, educators, policy makers, and parents for her talk, *Playfulness in the Early Years and Beyond: Learning Stories from Finland*, which considered the educational potential of makerspaces to promote young children's maker literacies and civic engagement. This Special Edition is inspired by her talk.

Conflicts of Interest: The authors declare no conflict of interest.

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