Visual Research to Study the Digital Literacy and Multimodal Practices of Romanian Pre-School Children

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Abstract. The purpose of this research note was to highlight opportunities offered by visual research to collect direct empirical data from pre-school children about their digital literacy and multimodal practices. We have also presented some interesting findings obtained from a visual research conducted among 4- to 6-year-old Romanian children. The issued research is part of broader research titled *Digital Literacy and Multimodal Practices of Young Children from Romania.* The mentioned research was part of the EU COST Action IS1410 involving similar endeavours from over 30 countries (Bakó, 2016: 146). In our visual research, we have analysed 36 drawings belonging to 18 pre-school children. The topics of the drawings were: "My favourite digital devices" and "My preferred digital applications". The content and formal analyses of drawings showed that pre-school children were aware of the digital devices in their environment, but they were not experienced in using various digital applications. Their emotional relationship with digital technology was not strong either. In conclusion, we have found results similar to previous research on the digital practices of young children.

Keywords: pre-school children, digital literacy, multimodal practices, visual research, drawing analysis

1. Introduction

Young children live in an extra-rich media environment, where parents – many of them also digital native – have smart phones, tablets, laptops, and other digital devices. Children aged from birth to eight have access to and use a wide variety of technologies from their birth. Many children access online sites or applications to play games, watch videos, visit virtual worlds, or just to draw and paint (COST Action IS 1410, 2014: 5). The everyday use of digital technologies is the norm even for young children under eight (Sefton-Green

et al., 2016: 3). Some authors complain of a vision of a lost childhood, where outdoor, natural, and spontaneous kinds of play appear to be lost in the digital metropolis, and young children meet the world of adults too early (Sefton-Green et al., 2016: 10).

There are serious concerns in the public and academic domain about how young children adopt new technology and the digital environment in their everyday lives. It is obvious that young children's daily routines, their learning, the followed norms and assumptions about how they should grow up are changing (Sefton-Green et al., 2016: 6). The most frequent question addresses the balance between opportunities and disadvantages of using new technology. Children's engagement with age-appropriate applications and games on tablets can develop their knowledge and skills in multimodal communication (Kucirkova, 2013 in COST Action IS1410, 2014: 6; Jaros, 2016). On the other hand, little is known about the level of awareness, digital literacy, and multimodal practices of young children as well as about the risks of using new technology at this early age.

New knowledge is required on the issues like young children's access to and use of digital devices such as smart phones and tablets or other gadgets in home or community spaces. Empirical research is also needed in relation to the role of digital literacy and multimodal practices in promoting learning, or rather development in this age-group (COST Action IS 1410, 2014: 7).

However, it is not easy to conduct research with children. Young children's general level of development, the cognitive, emotional, and social skills characteristic of their age influence the ways they can be included in research as informants. Teenagers are accepted informants in social sciences research, but pre-school children have only been considered reliable research subjects since the 1990s (Ólafsson et al., 2013: 20; Einarsdóttir, 2007; Hill, 2005: 62). Data collection involving pre-school-aged children research has relied on the observations of parents, educators, and the researchers themselves (Morrow, 1996). However, in the last two decades, an increasing number of studies involved pre-school-aged children as informants and active participants of the research.

In this research note, we focus on visual research as a way to collect direct information from pre-schoolers on their digital literacy and multimodal practices. We present genuine empirical data indicating the applicability of visual research for the study of digital literacy and multimodal practices of pre-schoolers. We consider young children reliable informants and research participants, and henceforth we introduce some findings of our visual research conducted with 4- to 6-year-old pre-school children from Romania. We will also mention the limits of this research method which could point to the need for further development of the method in practice.

2. Researching Pre-Schoolers' Digital Literacy and Multimodal Practices

Adults acknowledge with admiration the almost naturally appearing digital skills of young children, but the issue is much more complex. Obviously, children born in the 21st century grow up in media-rich homes, but existent researches (Chaudron, 2015; Velicu–Mitarcă, 2016; Sefton-Green et al., 2016) do not confirm young children's high-level digital literacy and their dominant presence and participation in the digital world.

In most homes today, there are touchscreen devices – tablets, smartphones, touchscreen laptops – which facilitate the digital device use of young children. Researches prove that mobile devices, specifically tablets and smartphones, are some of the favourite devices of young children (Velicu–Mitarcă, 2016; Chaudron, 2015). Analysing the digital habits of Romanian families, Velicu and Mitarcă (2016: 4) have found that smartphones are the privilege of the parents, while the children receive their personal tablets as gifts at a very early age. Children most often use the tablets on their own. Chaudron (2015) reported the same results on a European level.

Pre-school children most often play videogames and watch video clips about games or cartoons. Sometimes they watch cartoon channels online. Pre-school children are also active in content production, they like making and watching photographs and videos about themselves or their family and friends (Velicu–Mitarcă, 2016: 4). Young children rarely use online communication channels (i.e. Skype, WhatsUp).

Young children know a lot about how to operate touchscreen devices; the online applications on mobile touchscreen devices appeals to their visual and tactile skills. Children are not as skilful in operating laptops and desktops as adults would expect. Young children imitate adults and their peers, but they are actually not very competent to participate in the digital world. Parents consider touchscreen devices instruments of entertainment, and tend to ignore their educational-instructional possibilities. For this reason, parents limit the use of digital devices, and therefore children spend relatively little time online. Young children do not even understand the difference between online and offline. Parents often restrict the online activity of pre-schooler children as a measure of discipline (Velicu–Mitarcă, 2016; Chaudron, 2015).

Due to their age developmental characteristics and because young children often use digital devices on their own (Chaudron, 2015; Velicu–Mitarcă, 2016), they are more exposed to online dangers – such as seeing inappropriate photos and videos, harassment by strangers, etc. – as they do not recognize the risks and do not possess the necessary knowledge and digital competence to handle them.

3. Visual Research To Study Pre-Schoolers' Digital Literacy and Multimodal Practices

3.1. Challenges of Doing Research with Pre-Schoolers

Researching young children raises ethical and methodological issues we have to address. Considering their level of development (physical, cognitive, emotional, and social) and the way of learning, traditional research methods are not very efficient to study the expression of what young children know and can do (Guddemi–Case, 2004: 3). In addition, every child has a family background, cultural and social experiences, and so every child needs a unique observation.

Ethical principles that apply to adults are the same for children, but there are also additional considerations. Researchers have greater responsibility toward children because children are vulnerable in their interaction with adults, and there is a power inequality between the adult researcher and the child participant (EUKO, 2010; REG, 2016).

3.2. Visual Research as an Innovative Data Collecting Method to Study Pre-Schoolers' Digital Literacy and Multimodal Practices

The age characteristics of pre-school children limit the research possibilities (Greene–Hill, 2005: 4). It is difficult to gather data from pre-school-aged children with any kind of cognitive methods for they do not know yet what they know, and therefore they often do not understand the questions they are asked or cannot give meaningful answers (Greene–Hill, 2005: 4). They might also not want to answer some questions. Researchers have also found that small children answer meaningless questions as well – usually "no" – because they want to comply with the researchers' expectations and can be easily influenced (Greene–Hill, 2005: 9). The attention of pre-school children fluctuates, they do not have the patience for longer conversations (Ólafsson et al., 2013: 45; Greene–Hill, 2005: 17). Building trust is also important, otherwise the child will not be honest (Greene–Hill, 2005: 17). The limits of imagination and reality are still blurred at this age, and therefore it is difficult to decide the boundary between them. Researchers have also realized that children often lie, which researchers fail to notice (Greene–Hill, 2005: 10).

In working with children, it is preferable to use indirect methods instead of direct ones (Einarsdóttir, 2007: 199; Kuhn, 2003). Young children have a great need for moving, and in their activities they imitate adults in their immediate environment and their peers. For this reason, the appropriate methods for data collection are drawing, role-playing, having children complete concrete tasks,

playing with objects, and trials and practising (Guddemi–Case, 2004: 2; Greene–Hill, 2005: 14; Einarsdóttir, 2007: 199).

One of the most widespread data collection methods in doing research with children is drawing (Vályi, 2013: 39; Ólafsson et al., 2013: 82; Thomson, 2008: 3). Drawing is a traditional technique in psychology and psychotherapy, increasingly applied during the past 15–20 years also in other types of research on young children (Literat, 2013: 86; Ólafsson et al., 2013: 21; Thomson, 2008: 3). Moreover, it can also be applied across various cultures since visual expression has mostly the same characteristics in each culture. However, the drawings also bear cultural specificities, which are worth keeping in mind (Literat, 2013: 89).

4. Methodology

4.1. About "Digital Literacy and Multimodal Practices of Young Children from Romania"

During the period of December 2015–May 2016, we conducted an exploratory research[1] among 4–6-year-old Romanian children about their multimodal practices and digital literacy. The aim of the research was to develop theoretical knowledge and to increase empirical data regarding the topic.

We addressed the following research questions: the role of digital technology in young children's everyday life; the use of digital technology among young children's media practices; young children's access to and use of digital devices; young children's emotional attitude towards digital technology; young children's preferred digital devices (smartphone, tablet, console, or computer) and adopted multimodal activities (games, applications); young children's level of digital literacy; adults' attitudes toward the relationship between young children and digital technology.

We implemented the research in kindergartens of two Transylvanian settlements. One kindergarten was situated in Cluj-Napoca (Cluj County) and the other one in Miercurea Nirajului (Mureş County). The kindergartens were financed by the local government. Cluj-Napoca is the seat of Cluj County and is a very populous city having around 400,000 inhabitants. Miercurea Nirajului is a small town in Mureş County, having around 5,500 inhabitants.

In the research, 18 children participated, between 4 to 6 years of age, and one of their parents as well as the educators of the two kindergartens who were close to the selected children.

In selecting the children participants, we aimed to achieve diversity regarding the place of residence, the socio-economic situation (SES), and gender. From the

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kindergarten of Cluj-Napoca, we selected 10 children: 5 girls and 5 boys. From the kindergarten of Miercurea Nirajului, we selected 8 children: 5 boys and 3 girls. All children's families had middle SES based on the parents' educational level and occupational status. All families had their own homes.

We collected qualitative data in the same way in both kindergartens using the following methods:

– Visual research – we asked the kindergarteners to make two drawings: a) their favourite digital device and b) their favourite digital application; during and after the drawing activity, we asked them to interpret their drawings;

– Interviews – a) we interviewed children regarding their digital practices in the presence of their kindergarten teachers, b) we made interviews with one of their parents about the children's digital practices at home and the level of their digital literacy, and c) we made interviews with the kindergarten teachers about the children's digital skills and digital devices used in the educational activities;

– Participant observations – we observed each child using a tablet for 30 minutes.

In this research note, we present just part of the full research presented before. We outline the design of the visual research and some empirical findings obtained from the analysis of drawings made by the Romanian pre-school children from our target group.

4.2. About the Visual Research

We used projective drawings (Vass, 2013: 20) as part of our visual research to explore the pre-school children's perspectives about the digital world and to evaluate the importance of digital devices and practices in their daily routines, or rather the level of their digital literacy. The reality of children's life manifests through the drawings (Kuhn, 2003). We did not intend to perform the psychological profile of the children from the sample.

In the research process, children drew freely without any indication telling how to draw, so they could draw anything they wanted to and how they wanted to in order to better express their ideas and feelings regarding the digital world (Vass, 2013: 20). In both kindergartens, children were given the same instructions and used the same kind of paper and pencils. They were drawing during the kindergarten programme. At the first occasion, the topic of their drawing was "My favourite digital devices", while at the second occasion it was "My favourite digital application". Children drew one picture for each of the related topics. During and after both drawing activities, children explained what they were drawing.

4.3. Analysing Criteria of Drawings

To analyse children's drawings, we used content and formal analysing criteria. To develop the set of analysing criteria for decoding children's drawings, we selected some criteria from the "Seven Step Configuration Analysis" model formulated by Zoltán Vass (2013: 21), which is a psychological method to interpret projective drawings. According to Vass (2013: 20), projective drawing means that the picture is prepared freely without direct influence by the researcher.

In order to understand the content of drawings, we applied intuitive, global, and item analysis. Intuitive analysis means that the researcher uses intuition to find the core meaning of the drawing and to describe it in one essential sentence. The global analyses let us define the level of integration and harmony of the drawings. The item analyses allow us to determine symbols and unusual items present on the picture.

The formal criteria according to which we analysed the children's drawings were: the use of space on the page and the positioning of the picture; the quality of lines; the size and proportions of the picture; the level of detailing; the use of colours and contours. The formal analysis of drawings would have enabled us to reproduce the psychological profile of the pre-school children from the sample. However, we did not intend to establish such kind of psychological diagnosis.

5. Key Findings

In what follows, we will present the findings from analysing 36 drawings of 18 pre-school children from Romania according to the set of criteria presented above.

First, we will present the content, and then the formal characteristics of the drawings. The content of drawings reveal the children's thoughts, ideas, knowledge, and perceptions in association with digital devices and digital activities. The formal characteristics of the drawings reflect the children's emotional attitudes and experiences with the digital world.

5.1. Content Analysis of Pre-School Children's Drawings

The intuitive, the global, and the item analyses (Vass, 2013) of drawings revealed which digital devices and activities were known to the children, or rather how they perceived the digital phenomenon.

At this age, children's drawings convey a viewer-centred information about the depicted object. At this developmental stage (4 to 6 years), pre-school children draw what they know, think, and feel about the expressed object, merely the real components and details of the represented object. Pre-school children have the

intention to represent reality in their drawings; even so, it is difficult to decide the boundary between fantasy and reality because they use symbolic drawing. At this age, children draw what is important for them about/of the represented object. Children's drawings are in the pre-schematic developmental stage, when children depict the objects from their environment, but drawings do not have an inner organization or schema. The emotional connection is important at this age; children use plenty of colours. It is also usual to use just some favourite colours.

5.1.1. "My Favourite Digital Devices"

The first series of drawing were about the favourite digital devices of the pre-schoolers. Analysing the objects represented we could observe differences on the pictures of children from Cluj-Napoca and Miercurea Nirajului.

Six of the ten children from Miercurea Nirajului included digital devices on their drawings: one smartphone, three tablets, and two desktop computers. The other four drawings contained elements of games played on digital devices or elements which were apparently not connected to the digital world.

Six of the eight children's drawings from Cluj-Napoca contained digital devices. Three children drew smartphones, two children drew tablets, and one child drew both devices. Two children drew cartoon characters from cartoons they had watched on digital devices.

The type of the most frequently represented digital device on the drawings gives hints that the children from Cluj-Napoca are at an advantage regarding their use of touchscreen mobile digital devices. Six of them drew touchscreen mobile devices, while just four children from Miercurea Nirajului drew the same type of devices. As drawings are expressions of children's real life, we interpret the higher frequency of the touchscreen mobile devices as the manifestation of richer personal experiences with such devices in the case of the children from Cluj-Napoca.

5.1.2. "My Favourite Digital Application"

The subject of the second series of drawing was the most used digital application by the children on the digital devices. The component items of pictures from the second series of drawings indicated that digital activities were less known and less familiar to the children. Just a few kids drew application icons or characters from cartoons and online games; most of the young children repeatedly depicted the used digital devices. The representation of application icons or other identity elements from games and cartoons was a rare case.

Five of the ten children from Miercurea Nirajului drew digital devices again (three tablets, one smartphone, and one desktop computer) and three children

drew characters known from games played on digital devices. Two drawings lacked any symbol of the digital world.

Seven of eight children from Cluj-Napoca also drew digital devices (three tablets, two smartphones, two tablets, and smartphones). One child from Cluj-Napoca drew a cartoon character.

To conclude, children are highly aware of the presence of digital devices in their environment, but they have less experience of the applications that can be utilized on digital devices. Based on the drawings' analysis, we could note the modest exploit of these devices. There is no major difference between the children from Miercurea Nirajului and Cluj-Napoca in this respect.

Little can be said about how integrative and harmonious the drawings were because only a few elements appear on them. If elements other than the devices also appeared, then these were the children themselves, members of their family, or characters of the games they play on the devices. Drawings contained no unusual elements. The drawings of the children from Miercurea Nirajului contained few elements, while some of those from Cluj-Napoca contained several elements. With more items on the picture, there were confusion and lack of integration on the drawings.

5.2. Formal Analysis of Children's Drawings

The formal analysis of the drawings revealed the pre-school children's emotional relation to the digital world. We looked at the quality of lines, the use of space and the positioning of the picture on the page, the size and proportions of the picture, the level of detailing, and the use of colours and contours.

5.2.1. The Quality of Lines

Nine out of the ten children from Miercurea Nirajului had a constant and normal pressure on lines while they were drawing their favourite digital device. Four children out of ten used soft lines in the second drawing, the one about the favourite digital application.

Among the drawings about the favourite digital device of the children from Cluj-Napoca, we found one drawing with soft lines. We found two drawings representing the preferred digital applications with faint and uncertain lines.

The soft lines indicated uncertainty and lack of self-confidence regarding the subject of the drawing. Young Romanian children had more confidence in drawing the digital devices because they lived in media-rich homes with digital devices around them. But many of them lacked confidence when it came the turn of used applications. They used just a few applications, so using the devices meant for them handling tablets or smartphones in a simple way.

5.2.2. The Use of Space, the Size and Proportion of the Pictures

The use of space showed a great deal about the children's relation to the subject of the drawing. In the first series of drawings, the Cluj-Napoca children all placed the drawing in the centre of the sheet, which claimed the control of the subject. In the second series of drawings, seven children placed the picture in the centre of the sheet and one child on the left side of the sheet. Left dominance of the drawing means lack of control and uncertainty.

Five of the ten children from Miercurea Nirajului drew their favourite digital device in the centre of the sheet, four drew at the bottom of the page, and in one case the drawing was placed partly outside the sheet. Drawings at the bottom of the page mean uncertainty, while drawing placed partly outside the sheet means inhibition. In the case of their favourite application, four children from Miercurea Nirajului placed their pictures in the centre and six at the bottom of the sheet.

As for the size and proportion of the pictures, all Cluj-Napoca children filled the entire sheet with their drawings, while four children from Miercurea Nirajului drew small-sized pictures. Small-sized drawings indicated uncertainty and an inferior importance of the represented object.

From this perspective, we should note the differences between pre-school children from Cluj-Napoca and those from Miercurea Nirajului. The use of space on paper and the size of both the represented digital devices and the digital applications undeniably indicated a lower level of importance and interest in the usage of digital devices as well as practice in multimodal activities among the pre-school children from Miercurea Nirajului.

5.2.3. The Level of Detailing

Five of the ten children from Miercurea Nirajului drew a detailed image of the digital devices and five of them a sketchy one. In the case of depicting the preferred digital applications, there were only two detailed drawings and eight quite sketchy ones.

Seven out of eight children from Cluj-Napoca made a detailed picture of their favourite digital device. For the favourite application, there were six detailed and two sketchy drawings. In the case of the second series of drawings, the Cluj-Napoca children often represented the icons of the applications as displayed on the device screen. This indicates that they are aware of the opportunities offered by digital devices although they have not used them consciously.

In all eighteen drawings, the shapes were adequate and the representation recognizable. As anticipated, the images were often sketchy, stereotypical, simplified, and schematic, containing few details, which can be typical for 4- to

6-year-old children. However, the variety of shapes, creativity, and individuality in the drawings is already present in the case of favourite drawing topics.

The detailing of the pictures highlighted a higher interest in the digital world of the children from Cluj-Napoca as their drawings were more detailed, containing more relevant elements.

5.2.4. The Use of Colours and Contours

Colourful, filled-in drawings signal the familiarity with the subject and a positive attitude towards it, as well as self-confidence. Contour drawings signal uncertainty, unfamiliarity, and averseness.

When drawing their favourite digital device, four children from Miercurea Nirajului made rich-coloured drawings. Six of ten children drew contours with less colours. In the case of their favourite application, two of them drew colourful drawings and eight drew contours with less colours.

Seven of the eight children from Cluj-Napoca made colourful drawings and one drew contours with little colouring. As for the second series of drawings, there were six highly coloured and two contour drawings.

As for the first drawing in the Miercurea Nirajului group, five children used cold colours (blue, green, purple, black), three children used a mixture of cold and warm colours (blue, green, yellow, orange, red), no colours were used on one drawing, and contrasting colours on another one (black and red). Similar results have been found for the second drawing: five children used cold colours, three children used mixed colours, and two children used warm colours.

In the case of the children from Cluj-Napoca, for the first drawing, five children used a combination of cold and warm colours, one child used only warm colours, one child used a single colour, and one child used only a lead pencil. As for the application, three used a mix of cold and warm colours, three used only warm colours, one child used contrasting colours (red and black), and one used only a lead pencil.

The use of colours refers to emotional states and indicates children's emotions towards the represented topic. The use of cold colours indicated a rather rational or negative attitude. The drawings using both cold and warm colours indicated cheerfulness and balance. The use of warm colours indicated energy and interest. Contrasting colours indicated emotional ambivalence.

The children from Cluj-Napoca compared to those from Miercurea Nirajului used more colours and less contours to represent the digital devices and applications. And yet, considering that children like colours, especially vivid ones, the use of colours seems poor in the case of the pre-school-age children in both settlements. In the drawings of the Romanian pre-school children, contours were much more prevalent than colours, which refers to the poor emotional relationship with the

represented topic. The comparison of the two groups of children revealed a more favourable emotional attitude of the Cluj-Napoca children, in whose case the emotional attitude to the topic was more positive and balanced.

6. Discussion and Conclusions

Under eight years, children need preparation and guidance to learn and develop themselves in our recently fast-digitalizing society, where a high level of digital literacy and good digital practices would lead to integration and competitiveness.

Yet there is a lack of knowledge regarding the digital literacy and multimodal practices of children under eight, which could help parents and educators to define principles for a beneficial guidance in the digital world. Researchers have been formulating the need for empirical data in order to better understand the young children's ways of learning and developing in the 21st-century information society.

However, it is not easy to conduct a research with children under eight years of age. Young children's general level of development influences the ways they can be included in research as informants (Ólafsson et al., 2013: 20; Einarsdóttir, 2007; Hill, 2005: 62).

In this research note, we have underlined the opportunity offered by visual research to collect direct information from children under eight years of age. We have also presented some findings about the digital practices of 4- to 6-year-old Romanian children from their own perspective.

The results of the visual research of the 4- to 6-year-old Romanian pre-school children fit well with the previous findings in the literature and also confirm our research results using direct data gathering methods with adults connected with the children under study.

As expected, the analyses of the drawings of young Romanian children show that the *use of digital devices is an important but not dominant element of their lives* (Chaudron, 2015: 7). The content of the drawings indicate that Romanian pre-school children grow up in media-rich homes, where they are in a daily contact with a wide range of digital devices (Chaudron, 2015: 7). Children are familiar with the digital devices, but their emotional relationship with these are weak. They practise just a few multimodal activities; this scarcity is also indicated by the plain content of the drawings. Children sketched almost the same pictures at both drawing tasks although first they had to paint their favourite digital devices and secondly their preferred digital activities.

It is important to note that the features of drawings of young children from the big urban settlement of Cluj-Napoca and the small town of Miercurea Nirajului appear to suggest different digital practices. These results confirm the previous

findings in literature that users in urban and rural areas have particular digital-usage habits. In our research context, this means that the young children's parents have different digital practices and various emotional attitudes toward digital technology. Accordingly, parents' digital habits have influence on children's digital practices (Tőkés, 2016). The children from Cluj-Napoca seemed more positive and self-confident about using digital devices and applications. This interpretation appears to be well sustained by the formal analysis of the pre-school children's drawings. The drawings of the children form Cluj-Napoca were characterized by normal pressure lines, pictures positioned in the middle of the page, with proportional subjective sizes. They also used less contours and more colours in their drawings. Many children from Miercurea Nirajului drew small-sized pictures, positioned at the bottom of the page, used contours intensively and less warm colours.

We are aware that visual research has its limitations too. One disadvantage is that the interpretation of drawings is very subjective, so the attitude, knowledge, and experience of the researcher influences the results to a great extent. There is also problem with the reliability of the drawings because the boundary between reality and fantasy is still blurred in the 4- to 6-year-old children's minds and drawings.

In conclusion, we have presented genuine empirical data, which revealed the applicability of drawings in studying the digital literacy and multimodal practices of pre-schoolers. Our study provided considerable insight into the effectiveness of visual research. We have also mentioned some limitations of visual research, which could point to the need for further testing and development.

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