MULTIMEDIA IN PRESCHOOL: AN ADDITIONAL OPPORTUNITY TOWARDS EQUAL OPPORTUNITIES IN EDUCATION

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Abstract

The objectives of this practice-based project are fourfold. Firstly, it investigates how multimedia literacy of preschool children (3 to 5 year olds) can be stimulated. Secondly, it aims at understanding the influence of multimedia literacy on their world exploration. Do children exhibit a higher level of wellbeing, involvement, active language skills, social competence, self-regulation, creativity, artistic expression and dealing with audiovisual materials while exploring the world? Thirdly, the potential of multimedia to support the children's personal development is assessed, with particular emphasis on young children with extra needs. Finally, the project aims to reduce the technological fear experienced by preschool teachers, as well as students and lecturers in preschool teacher education, through increasing their understanding of multimedia literacy.

Keywords: preschool, multimedia literacy, practice-based research project, linking teaching and research innovation

1   INTRODUCTION

Today's world is very different from the one in which educators grew up. For the present generation of children (digital natives) electronic means are evident. The dominance of language literacy has disappeared; society becomes ever more 'multimedia-rich'[1]. Education needs to adapt to this changing environment [2, 3]. In accordance to Bottelberghs (2010) [4], the project doesn't focus on the technology of audiovisual materials, but rather on the **creative processes** and the **development of talents** achievable by using a multimedia setting. While using different media (including audiovisual means) throughout their education, young children discover and develop their communication skills.

2   MULTIMEDIA LITERACY IN PRESCHOOL

2.1   Multimedia as a means of communication for children

Images and sounds increasingly determine our lives. We are surrounded by sounds and images: on the street, in stores, on television, in movies, in newspapers and magazines, but also on the computer, the game console, mobile phone, I-pod, I-pad,…We live in a full screen environment and still we are thinking and acting from a 'literary' tradition.[5]

Our view on images and sounds in education is often limited. At school, images are mainly used in a primarily illustrative way rather than as a medium for children **to express themselves and communicate**. We can say the same concerning sounds. Sounds are often parts of songs and games. In this way we also use them as illustrations rather than as means for interactive listening and communication.

We would like to let go of the idea that multimedia is a purely technical device (and thus also of the idea that mostly technical competencies in handling multimedia be paramount in education). For us, multimedia literacy is a new culture in which children can express themselves and create something new by using the new media.[6]

2.2 Multimedia literacy a task for education in preschool

An important task for today's educators is making children **multimedia literate.** In the first place this means stimulating children in active participation by using the new media to express themselves, to develop their talents and to communicate in order to be more en better oriented to the world. Therefore their viewing and listening skills must be sharpened and optimized. It also means making children alert to their intuitive viewing habits in order to help them discover communication strategies of the media, stimulating them to develop a critical sense towards the new media in order to deal with contemporary culture.

In our project we are seeking for a practical interpretation of this definition: not focusing on technical media, but rather on creative processes and talent by using a multimedia setting. If we start working at multimedia skills at an early age we believe children will grow in media awareness in their further lives.

3 RESEARCH DESIGN

3.1 Critical multimedia setting

3.1.1 Design of the critical multimedia setting/vision

We believe that if teachers include the media in education for several years, children will **develop media literacy**. We can agree that children need to discover their talents by exploring various materials (clay, face painting, pencils, paint, costumes, recorders, video camera, camera, voice recorder …) These all contribute to children developing their communication, expression and talents. But we believe that currently some of the materials/media (the more focused audiovisual materials) are still insufficiently integrated in preschool. Since there is a lack of audiovisual materials in most classrooms, our focus in this practitioner research is on '**audiovisual learning'** and more specifically we shall focus on sound and image. We choose not to focus on the technical side but rather on the creative processes, communication and talents by using **a multimedia setting.** The audiovisual component remains as a **means** (a way to explore the world) and **not as a goal**. [7]

For our critical media setting a quiet area in the classroom was chosen. In that area children can explore the different audiovisual materials (recorders, video camera, camcorder, camera, CD player with headset, voice recorder, laptops, suitcase with items/gadgets to create 'sounds' with, beamer, dictaphone, overhead projector, NO music and no music instruments …) and discover its possibilities. Children can do this very independently. In this corner several activities will take place. They focus on direct/conscious listening/watching, expression and communication.

By building the setting in a specific corner of the classroom we were able to make video recordings of the children and use these recordings afterwards for observation purposes.

3.1.2 First try-outs of the critical multimedia setting

During a four week initial test phase final year student teachers participated in this 'multimedia corner' in the classroom. They offered a set of different 'multimedia-rich' activities to a group of children with extra needs.

Some examples of activities: children discover different sounds while playing with materials; they make a sound with materials like a straw, a comb, a box, a ball, a little stick, …; children search the school for a funny or stunning sound and record it; they try to find a suitable noise for the incidents in a story; children are cameraman or photographer; … In these rich activities children get stimulated to listen very carefully, to become aware, to explore, to establish and to communicate.

In this multimedia setting the competencies of young children can be observed. To interpret the video-images of the different activities we developed a first version of an observation framework that focuses on wellbeing, involvement, entrepreneurship, language, art education and audiovisual work. We noticed that even though the children are quite young, they are very handy and careful with the audiovisual materials. Some children with extra needs do well in exploring these materials. Some children exhibit a high level on the process variables wellbeing and involvement, and also on the other competencies mentioned in the observation framework. Apparently these observations indicated positive evolutions (a fragment of a 'multimedia-rich' activity in Fig.1). Nevertheless the question arose

whether this was caused by the presence of an extra teacher in the classroom, by the offer of audiovisual materials, or by a combination of both.

During the first research year, some try-outs of the multimedia setting were performed in a class of 23 three-year olds for a specific group of children with extra needs. Marie is a child of three. She is rather silent and behaves inconspicuous in a larger group of children, she doesn't talk much. She likes to participate in activities but is often silent and barely communicates with other children.

From the beginning Marie was attracted by the activities in the audiovisual area: she was very fascinated by the laptop where she discovered Tuxpaint, she also liked to work with sounds and camera, she liked to use the camcorder. When she is outdoors recording soundscapes with headphones and voice recorder we can see that she is definitely amused. She's trying to communicate with the other child in the group by pointing out several things. On top of her enthusiasm for these activities, we noticed over time that Marie was more communicative and showed more expression.

In this try-out setting in Marie's class, two teachers were active in one class: the regular classroom teacher and a student teacher. The question arose whether the progress that Marie achieved was influenced by the new audiovisual material or if it was the consequence of having an extra teacher in the classroom.

Figure 1: Case-study Marie

3.2 Quantitative observation method

To distinguish the impact of the audiovisual material versus the presence of an extra teacher in the classroom, we designed a cross case observation method. In the **observation design** we also had to take the following facts into consideration:

- This study is performed with **student teachers** in the role of extra teacher. Each year new final year student teachers participate in this project. It takes a lot of time to immerse these newcomers in the multimedia literate world. Each student teacher also has his own leadership style. To minimize this problem we will work with written **protocols**: for every measurement the student teacher and class teacher have to follow the same steps and give the same guidance to the children during the different activities.

- This project works with very **young** children (3 till 5 year olds). Each child develops differently. There is no time and money to follow these children for several years. We also want to see whether children with **extra needs** experience more or less support when audiovisual materials to communicate and express themselves are offered. To solve this problem we try to select children with the same profiles using the **TRF** (Teacher Report Form) [8] and **CBCL** (Children Behavior Checklist) [9] (= quantitative measurement).

- Because TRF en CBCL only score some of children's characteristics, we used **qualitative observation lists** (see below) to have a more holistic view on the behavior of the children.

- To see whether the effect of offering more 'multimedia-rich' activities also lasts longer than the duration of the activities themselves, we used both **short** and **long-term measurements**.

These considerations led us to the research design choice shown in Fig.2.

	STEP 1	STEP 2	STEP 3		STEP 4	STEP 5
WHAT	TRF and CBCL	**Pre-measurement using protocols** These measurements are analyzed using qualitative observation lists	**Intervention using cross design** Condition 1: - Without extra teacher - Without audiovisual input Condition 3: - With extra teacher - Without audiovisual input	Condition 2: - Without extra teacher - With audiovisual input Condition 4: - With extra teacher - With audiovisual input In each condition we follow: - 8 children of 3 years old: 5 with extra needs and 3 control - 8 children of 5 years old: 5 with extra needs and 3 control (children with extra needs are selected in step 1) Holistic video analysis will be used to score wellbeing, involvement, ... during activities	**Short-term observation using protocols** These measurements are analyzed using qualitative observation lists, TRF and CBCL	**Long-term observation using protocols** These measurements are analyzed using qualitative observation lists, TRF and CBCL
WHY	To select children with same profile	To score the starting competencies of the selected children	Intervention in different classrooms to see the impact of audiovisual materials and extra teacher in different conditions.		To see the short-term influence of the intervention on the behavior (qualitative and quantitative)	To see the long-term influence of the intervention on the behavior (qualitative and quantitative)
WHEN	October 2011	November 2011	2 to 3 weeks between January and April dependent on stage period of students		Just after last intervention	2 months after last intervention

Figure 2: Research design

We are aware that there are still **some issues** in the observation design:

- The chosen sample of children is not so big, but there are not enough FTE's to solve this problem. However, this study can be indicative of the need to make use of more multimedia literate activities.

- The evolution of different (age and needs) children in the different conditions will be compared, but each child in itself is different. The time span of this project and the belief that once a child finds his means of communicating and expressing himself, he hopefully is launched in finding further ways of communicating and self-expression (see case study of Marie), make us confident that this design is most appropriate.

- The intervention only takes 2 to 3 weeks. This is indeed a very short time span but the necessity of implementation of this project in the learning trajectory of final year student teachers makes it impossible to lengthen the time of intervention.

3.3   Qualitative observation method

During the first year of this research, a first version of an **observation instrument** for observing the skills and talents of young children was composed. This observation framework focuses on the following aspects: wellbeing, involvement, entrepreneurship, language, art education and audiovisual work and was based on different documents [10,11,12,13,14]. A first try-out of this observation instrument showed that not all **variables** were easy to score, especially the linguistic variable, entrepreneurial, artistic education and audiovisual work offered difficulties. This was caused by three factors: firstly the list of items did not include all variables sufficiently and we noticed some variables were not really integrated, secondly the behavioral indicators for each variable were not sufficiently decrypted and thirdly we realized that the guidance of the teacher in the 'multimedia-rich' activities was too strong so there was not enough freedom for the children to be able to take initiative in exploring. Moreover, observing and scoring the different variables seemed very time consuming.

To meet these shortcomings, we developed a second version of the instrument. This new observation list is mainly based on the observation instrument of Laevers (2006) [15]. In this observation instrument, the following six variables are emphasized: wellbeing, involvement, active language skills, social competence, self-regulation and creativity. The topics artistic expression and dealing with audiovisual materials were added to the instrument. For all these variables we formulated specific **behavioral indicators**. For these descriptions, we used the document "*Procesgericht kindvolgsysteem voor kleuters. Toelichting bij de competenties*" of Laevers (2001) [16] as starting point.

Figure 3 shows a screenshot of one topic in the observation instrument.

Creativity				
- *Can think of original ideas for possible targets and initiatives* - *Put resources and materials to optimal goals / initiatives to achieve* - *…*				
1	*2*	*3*	*4*	*5*

Level 1: Very low level
Competence is far below the average level of peers.

Does not choose to work with new (for him / her unknown) materials. The choice of materials is tedious and not always effective for the intended purpose. Looks at the work of the teacher or other children without their own inspiration to speak. …

Level 5: Very high level
Competence is far above the average level of peers.

Uses new and unfamiliar material on its own, unique and inventive way. Uses a variety of materials and is able to use them effectively to the intended goal. …

Figure 3: A screenshot of one topic in the observation instrument

At this moment (second research year), we are finalizing this observation tool. To verify the **reliability** and the **usefulness** of the instrument, children have been observed and scored on the mentioned competencies by different observers. In a first phase, eight observers (six student teachers and two researchers) scored a selected child independently on the mentioned variables. Afterwards observers discussed the individual scores given in order to achieve a compromise score. In this way we learned to use the observation instrument and we became attuned to each other. In a second phase, groups of two or three observers scored other children. In small groups, the same approach was used. All these scores were statistically processed. Both the reliability of the scores on the different variables and the reliability of the individual observers were analyzed. Preliminary results show us that the reliability of the competencies language skills, social competence, creativity and artistic expression is legitimate (intra class correlation >.60). The process variables wellbeing and involvement (.22 and .38) and the competence self-regulating (.48) are more difficult to achieve a consistent scoring. Furthermore the reliability of the two researchers is promising (intra class correlation >.67). The variable 'dealing with

multimedia material' could not be scored at this moment, because the post-measurements are not analyzed at this moment. In a third phase, the already observed video clips were scored again by the two researchers to confirm or reconsider the compromise score of each variable. This score is the ultimate expert score.

The followed approach produces a practical guidebook and accompanying video clips for preschool teachers to work with the observation instrument in the classroom.

3.4   Multimedia literacy and preschool teachers: a survey

Next to the research mentioned above, we collected the ideas of preschool teachers about multimedia literacy. Our survey is based on the quantitative survey of Goegebuer *(*2004) [2].

In this project we restricted the survey to focus on three topics: perceptions and opinions about audiovisual education, infrastructure and resources, and teacher competencies.

3.4.1   Perceptions and opinions about audiovisual education

We noticed that teachers define the more technical and digital resources as multimedia. The more artistic and less technical means such as paint, costumes, music instruments and clay materials scored significantly lower. Although these less technical materials are also instruments for expression and communication.

Most teachers view working with multimedia as a combination of teacher and child **using** the multimedia materials (the more technical and digital resources) **together**. We find relatively little evidence for the contribution of the child himself. Only one person indicated that the children through those means can start their own creative processes. Remarkably, no one brings up the argument that multimedia tools also can be used as a way of communication between children. Many preschool teachers have the opinion that (1) working with audiovisual media is **too technical and difficult** for young children and (2) the **means are** also **expensive,** so constant aid of the child using these materials is necessary. Unfortunately in most cases this means that the teacher strongly leads the activity with less freedom of expression for the child. A small group of teachers finds audiovisual means in the classroom **unnecessary**.

On the other hand preschool teachers want to stimulate children to make more use of common technical materials like TV, internet, computer and photo camera. The usefulness of the lesser known or less available media (see below) like Mp3, iPod, Ipad, GSM, GPS in preschool classrooms is questioned by teachers. Only a small group of teachers thinks that the use of a GPS equipment and a mobile phone could be interesting in the classroom.

3.4.2   Infrastructure and resources

Almost all preschool classrooms in Flanders have the possibility to use TV/VCR/DVD, CD, computer, CD-ROMs, photo cameras, paint, painting and drawing materials, costumes, objects that make sounds, musical instruments, clay material. Two thirds have internet access in the classroom, 98% has internet access somewhere in the school.

Audio-video camera's, Ipod, MP3/MP4 players, GSM / GPS are available in less than half of the classrooms.

3.4.3   Competencies of teachers

Teachers feel most **competent in the use** of audiovisual material as a visual support and provide **illustrations** for learning. They rarely use audiovisual media as a creative means of expression for children. 90% of the teachers want to implement an audiovisual corner in the classroom. 56.8% also indicate that more attention for audiovisual learning in practice is needed. Yet they also want to have further training about this subject. **The technical aspect does not really scare teachers off**. Most teachers (+/- 70%) believe that there is enough material available in the classroom and school.

Most teachers look at audiovisual learning as a challenge for themselves and the children in their class. Still, the high costs and lack of space in their classrooms are perceived as obstacles. The

audiovisual goals are also perceived as too ambitious by a lot of teachers. However some respondents state that the survey inspires them to start using more audiovisual materials in the preschool class.

These results show a large consistence with the results of the comprehensive research of A. Goegebuer (2004) [2] in Flanders (Belgium) on the topics 3.4.1 perceptions and opinions about audiovisual education and 3.4.3 competencies of teachers. Although many years have passed by and audiovisual technology develops very quickly, in education it seems to take quite some time **to implement these new means as tools for expression and communication**. In both surveys about 50% of the teachers find themselves not sufficiently familiar with the developmental objectives and targets that include audiovisual training. In both surveys a large group of teachers agree that more attention should be paid to audiovisual learning in the teacher education courses.

Compared to the results of Goegebuer in 2004 we see a progress in infrastructure and resources. 75% of the teachers indicate that there is enough audiovisual equipment and infrastructure at school. Goebebuer's survey showed only 45%.

4 PRACTICE-BASED RESEARCH IN REALITY

4.1 Linking teaching and research

4.1.1 Training NPO Aifoon

From the start of this research project final year student teachers have participated. Through literature review and supervised by the NPO Aifoon student teachers gradually learned more about working with audiovisual input and in particular with sound. Because most people are often more familiar with images, the focus of Aifoon is mainly sound. Aifoon is an arts education organization that is sound- and listening-centred within audiovisual communication. Specific to their way of working is that Aifoon starts from the **communicative power of the sound world**. Each interpretation of a sound is valuable, there is no correct or wrong solution. The same sound can be observed in many different ways and facets. One person listens to the source, the other listens to the rhythm, the strength of the sound, … One person enjoys the sound, another recognizes it as a funny sound, still others experience it as something more frightening. Moreover, any interpretation opens a new world [17]. This vision of Aifoon (that there is no correct solution, that it is not about an objective, verifiable knowledge) often motivates people to speak. After 2 days of immersion in the world of sound, the students translate the acquired knowledge and experiences to activities at preschool level, mainly of sound and listening, but also translating their experience in some activities with images and looking.

4.1.2 Training in observation skills

In this project, researchers and student teachers together looked at video clips of 'multimedia-rich' activities that students have supervised in the audiovisual corner. First, they observed the talents of children using the observation instrument and afterwards, they focused on the teaching style of the student teacher. By discussing the individual scores given to a variabele of one of the competencies in the observation list, they tried to achieve a compromise score. In this way the student teachers learned to observe closely and to use the observation instrument. After a while they all became attuned to each other. The group also discussed the teaching style of each of the students on the video clips. This was a learning experience for them: they got inspired to improve their teaching style and interactions with the children.

4.1.3 Difficulties experienced with involving student teachers in research

Involving student teachers in research is very **interesting** as well as **restrictive** and **time consuming**. By participating in research, student teachers sharpen their information and research skills. They learn to view things in a broader perspective and gain more insight into the goals we pursue in teacher education and, more specifically, in this study. Within the research, the student teachers take their tasks very seriously. They are highly motivated. Working with student teachers can eventually lead to a faster implementation of innovation into the workplace. A disadvantage is that each academic year, the new final year student teachers must become familiar with the research project. We experienced

this as a very time intensive and delaying factor in the research itself. The necessity of implementation of this project in the learning trajectory of final year student teachers makes it also impossible to choose the lengthen of intervention time.

4.2   Linking practitioners (preschool teachers) and research

The preschool teachers participating in the study are **connected** with the Leuven University College (KHLeuven). The class teachers in condition 4, in which student teachers act as an extra preschool teacher and offer 'multimedia-rich' activities to a small group of children, are former students of KHLeuven who had participated in the elective course "working with audiovisual means in preschool" in their final year of studies. It is important that they subscribe to our vision of good preschool education and in particular to the way of working with audiovisual means. Moreover, it makes sense that they can properly supervise the students when needed. It is obvious that there is a close cooperation with the preschool teachers in condition 2. The preschool teachers in condition 2 had the most difficult task: besides the whole class management, where children play in different corners, they also supervised the 'multimedia-rich' activities in the audiovisual area.

An important task consisted in **reducing the anxiety** about working with audiovisual materials. More experienced preschool teachers did not grow up in the digital world and experienced more difficulties with the technical aspects of audiovisual materials. They put the focus more on the **technical aspect** and the **results**. For example, they found it very important that the children took beautiful pictures and video images. For us the process is much more important. We want to see what the children film, which pictures they take, what ideas they want to perform … From experience we know that good communication about vision and expectations is very important.

The involvement of preschool teachers in the study has both **advantages** and **disadvantages**. One advantage is their experience in practice; they can indicate which activities are possible in practice. Another long term advantage is the increased possibility to gradually introduce innovations into the workplace. However, we have noticed that student teachers seem more open to following the concrete instructions. Preschool teachers tend to give their own interpretation to the written protocols, which makes it more difficult to control the influence of the teacher style.

5   FIRST RESULTS

5.1   First results of the video analyses

5.1.1   First results of the video analyses in order to validate the observation instrument

It takes a lot of time to develop **an observation list for 'multimedia-rich' activities with young children**, which is reliable, valuable and not overly time consuming (see 3.3 Qualitative observation method). This final list consists of 8 topics: wellbeing, involvement, active language skills, social competence, self-regulating, creativity, artistic expression and dealing with audiovisual materials. For each variable, there are concretely described behavioral indicators.

The followed approach resulted in a **practical guidebook** and accompanying video clips for preschool teachers to help them work with the observation instrument in the classroom.

This observation tool will be used to screen the competencies of children during the pre-, the post- and the long-term measurement where we tried to cancel the impact of the teacher by following written protocols.

5.1.2   First results of the video analyses in order to screen the multimedia setting

In addition to observing the talents of children, we will use the observation framework of Laevers (2006) [15] in a more holistic manner. We want to gain more insight into **the audiovisual setting** (the teacher style, the talents and behavior of the child, the context; the content of the activity, the purpose of the activity and the cognitive operations needed to perform the activity) to find out if the audiovisual input offers a (positive) trend in children's behavior in terms of the variables we mentioned above. This approach should result in a practical guide with good practices, suggestions and pitfalls in working with 'multimedia-rich' activities in preschool.

5.2   Good practices

At the end of this research project, we strive to produce a **practical guide with good practices** of audiovisual activities for children in preschool. Primary objective is to support young children in their emergent media literacy. The practical guide will also consider lots of suggestions and pitfalls in working with audiovisual materials.

Good practices consider following objectives:

1. Audiovisual activities should give children a large period of time to **discover and experience** the possibilities of the materials and this in a very independent way. By allowing young children to create their own sounds and images they get a better view on audiovisual creations.

2. Audiovisual materials are always used as means to help children in discovering and exploring the world in order to develop an active role in media literacy. Audiovisual education in schools must be more than the use of audiovisual media for illustration. Activities should allow children to use different audiovisual **means to express themselves and to communicate**.

3. In education, appropriate attention should be given to developing skills and understanding of viewing images and hearing sounds. In activities children must get the opportunity to reflect on sounds and images (media), so they can discover the difference between the real world and the depiction of that world: **importance of reflection.**

4. Audiovisual training in education should not be limited to merely technical dealing with audiovisual media. The use of audiovisual means as a way to explore the world so that young children discover the link between their audiovisual creations and their own environment. The **emphasis is on the process rather then on the product**. It helps children grow up to be active participants in media.

5. Good practices help children to **consciously listen** to sounds and **consciously look at** very simple audiovisual messages.

In Figure 4, we give an example of a good 'multimedia-rich' activity.

An audio activity with a suitcase with gadgets to make sounds with:

Children start experimenting with objects, a zen moment where we search for sounds , children start looking for their own sound with the objects. Then they may experiment with the dictaphone and headphones, they can start recording their own sounds, again there is a zen moment focussed on 'learning how to listen', they listen to each sound that is made by the others and they reflect on it. Later on they can make a larger soundscape with all the sounds or by combining them with pictures or drawings.

Figure 4: A practical example of working with sounds (3-5 year olds)

5.3   Implications for policy

To promote the use of audiovisual materials in preschool, more **financial resources** are needed. For schools, audiovisual means are still quite expensive to purchase. Although young children are very careful with the materials, these objects can always break. This risk can frighten preschool teachers to (let children) use these audiovisual materials. School **insurance** may have to be reconsidered so more expensive but developmentally rich materials can be used in schools.

Further training for preschool teachers is very important. Indeed, more experienced preschool teachers were not raised in the digital world and need to explore this world and all of its possibilities. Here the focus must be on the communication process rather than the technical aspect. In accordance with this, there is a major role for the institutes of teacher education. It is important that all oncoming teachers will learn about and experience the technical and communication possibilities of audiovisual materials (in relation to preschool education). In the Leuven University College (KHLeuven) Department of Teacher Training, we try to address this concern mainly through the mandatory course "Multimedia" in the first year and the final year's elective course "Working with audiovisual means in preschool". We hope this way of working with audiovisual materials becomes more widespread in education.

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