PEDAGOGICAL METHODS IN THE SEEDS PROJECT

CONTENT

INTRODUCTION

The project "Social Entrepreneurship Empowering Development in preSchools" (SEEDS) is a two year project, running from September 2018 to October 2020, and funded by the European fund Erasmus+ Strategic Partnerships for School Education.

The main goal of the project was to develop pedagogical methods for preschool education, to support early learning of relevant skills like entrepreneurial mind-sets, digital media and to insure social inclusion of all children in this learning. SEEDS aims to equip children from an early age, with the seeds for the development of an entrepreneurial compass in interplay with digital media. This compass starts from the individual as a citizen and builds on their particular skills and competences to enhance the four points of the compass; critical reflection, collaboration, co-creation and agency.

SEEDS has developed a preschool pedagogy, described through a collection of resource materials that contain the SEEDS pedagogy, educational guidelines and principles, methods (the present document), best practice and a concrete toolkit with digital media resources. The resource materials were developed based on activities across local experimenting communities in the 4 partner countries; Germany, Italy, Cyprus and Denmark.

In this document, we introduce two pedagogical methods, the experimenting community and the change maker pedagogy, which have been the fundamental work methods of the SEEDS project.

THE EXPERIMENTING COMMUNITY

The experimenting community is a group of people experimenting together. The reason for being together is to try out, to play and experiment with everything from paper over robots to mobile phones. When you are in an experimenting community, you ask questions and look for answers. That means that you look for and find ways to establish a new pedagogical practise together with the children in your pre-school or kindergarten. You do not only copy an existing way of using a learning tool as it might be suggested by the producer of the tool. You try to find new ways of using this tool.

PLAYING AND EXPERIMENTING TOGETHER

Let´s say you want to use a Bee-bot. That is robots the size of a hand, that is meant to be programmed to roll forwards and turn left or right in small steps on at mat with a grid, that can be placed on the floor. The first question, you can ask the children and yourself is "What does this

technology do?". There are probably manuals and ideas for activities and games to follow and probably videos online to watch to see how it can be done. In these pre-defined activities both purpose and methods are most likely demonstrated. But soon you can start to do something more and end up asking the question "What do we want these technologies to do?". You can for example remove the Bee-bot from the mat and ask the children to find out how it moves around on different surfaces, even ones where the bee-bots manoeuvre with difficulties. When you do this, you and the children both find the limitations and the possibilities in using the Bee-bot and you are on the way to find new uses for the Bee-bot. Maybe you and the children can make new games, where the bee-bot has to move around in new surroundings. The point is not whether you make something very unusual or expensive, but that you do an experiment together with the children, you are responsible for.

The "we" in the question "what do we want these technologies to do?", are you and the children. But it could be many more than that. This experimenting community can consist of all kinds of people. In a kindergarten or a pre-school it is at least the children and the pre-school teachers or the pedagogues. But researchers, neighbours, family, people living in the local area and others can also be part of an experimenting community. There are in principle no limits to whom it might consist of, as long as everybody gets the possibility to take an active part. It is not easy to say how many people an experimenting community consists of, but it will in practice often be the group of children, you work with and then some you invite to be part of the community for a shorter or longer period of time.

Children playing and you playing together with the children is a part of the experimenting community. When children play, they are capable of something quite interesting. They can both copy and change, when they play. That means they can play the same play in the same way for years and years and they can change it on the spot if needed. That means, they can both do the games with the Bee-bots as intended by the producers and they can change it. They can both understand and use the rules, when the Bee-bots are used on the mat with the grid and they make new rules up, when using the Bee-bot on the mat in new ways or outside the mat on the floor or any other surface.

When you as a pre-school teacher or a pedagogue work with play, then you work with the notion of culture. It is a term open for many understandings, but you can say, that it has to do with how people do what they think is important in their everyday life. They try to make meaning through the actions, they do. In this case children have a play-culture, where they play together in certain ways and they make the rules for this themselves. In the experimenting community the children and the pre-school teacher or the pedagogue make meaning though experimenting. It is of the outmost importance for those who participate in such a community to experiment, as the community unfolds both its culture and life itself.
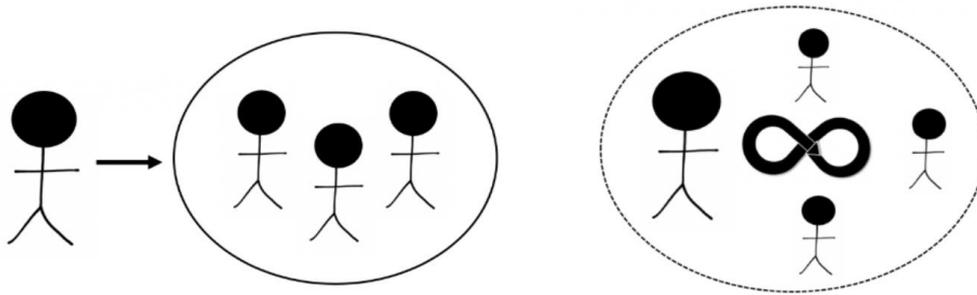
Figure 1: The Experimenting Community

The first figure shows two ways of teaching. To the left the pre-school teacher or the pedagogue is outside the process, he or she initiates. The children in question are the ones, who are part of the given process. Knowledge and competence is directed towards the children from the pre-school teacher or the pedagogue. He or she has all the knowledge and competences needed in the given project, experiment or activity.

To the right in the figure the pre-school teacher or the pedagogue is part of the process and the questions asked in the given project, experiment or activity. The pedagogical principles and methods are not formatted around the delivery of a given answer, but are intended to be a way to ask questions and possibly find answers. The pre-school teacher or the pedagogue ask questions, that her or she might not know all the answers in advance.

The reader will notice that the arrow in the left side has been replaced in the right side by what looks like the number 8 lying down. The arrow is still there but has another function. It has no end and has in principle no beginning. It is an infinity figure that demonstrates an ongoing process around the desire to know more and being able to do more. It is also a process, where all involved might have something to show and share. Everybody might also have something they know or want to know. The pre-school teacher or the pedagogue probably has something to offer, so he or she does exactly that. The idea is simply that the more the pre-school teacher or the pedagogue makes one or more child know and do, the more the child or the children can make the pre-school teacher or the pedagogue know and do. Everybody involved can in principle know and do more than before. The pre-school teacher or the pedagogue are central to the experimenting community, so his or her position is explained more thoroughly in figure 2 below.

THE PARTICIPATOR

The roles of the pre-school teacher and the pedagogue are somewhat different in the experimenting community than you might expect. Basically you are inside the community and part of the process. You might not know all the answers and not all results. The questions you ask are in that sense real questions. You are much more than a facilitator guiding the children. You are a Participator, as you participate in the process. This you can do in four different ways. You are still the guide, who makes sure everybody has a chance to participate. You are also the master, as you might know more about what the subject in question, than the children do. You are even an agent, who wants to be part of the group on a personal level and make the local culture function.

But as you are taking part of processes in an experimenting community, where you don´t know all of the answers, you are first and foremost the participant. The one who as an adult and a responsible pre-school teacher or pedagogue leads the experiments without knowing the results in advance. Your knowledge of and your abilities to use any given technology or media or what to do with a challenge is based on you working from the inside, but it also changes what you know and is capable of. During the lifetime of an experimenting community, you get to know more and more and is more and more capable of experimenting.
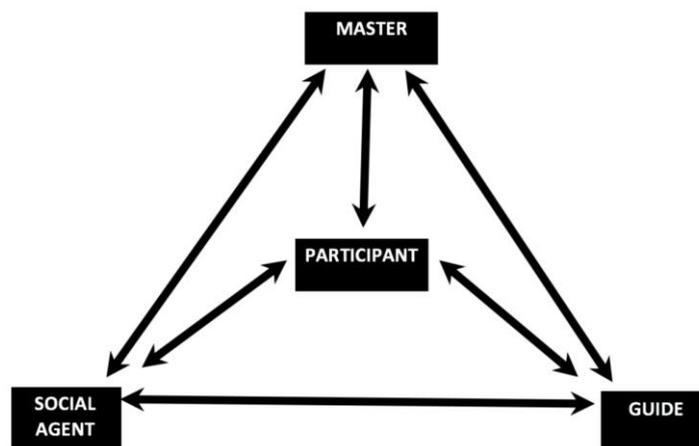
Figure 2: The Participator (Thestrup 2020)

This figure has gotten the title "the participator". It is not an already existing word in english, but has been made as a direct reference to the facilitator as a pedagogical position. The facilitator is not directly involved in the questions asked in the given pedagogical process, but the participator is. He or she is deeply involved in asking both questions and looking for possible answers from that perspective. It means something for him or her to for example know more about how to play and experiment with a given technology, tell an important story or find a way to use social media.

But as the reader will notice the participator as a pedagogical position as more nuances, than the above around being participating in the search for activities and answers. Her or she might actually know more or be capable of more than the children or others in the experimenting community. Therefor he or she is also the Master. Notice that some of the children in some situations might

have a similar position. But the participator might also act as the guide, the one that takes care, that everybody in the group gets the opportunity to be an important part of the common process no matter who this person is or what starting point he or she might have. Finally, he or she is also a social agent, which is the one who is more personally involved in the process that is going on. He or she is as a person part of a local culture, which exists when the experimenting community is activated. So her or she acts to make the community thrive and grow and continue to examine the areas of interest important to the group of people involved.

THE OPEN LAB

The way the experimenting community works is through what is called open laboratories. The open lab is open in three different ways. First of all it is open to the combination of digital and analogue materials and tools. Paper is not more important than mobiles nor the other way round.

Secondly it takes place in an exchange between the physical and the virtual. The open lab uses the internet to seek for information and inspiration, contact and communication. The open lab works both as a physical place inside the kindergarten or the pre-school and extends itself into a virtual place using chatrooms, social media or online games like Minecraft. Returning to the example of the Bee-bot, that could mean, that the pre-school teacher and the children uploaded images or videos on how one could use a Bee-bot and looked for others, who did the same. On Minecraft one could build buildings and landscapes together, which then again cloud be used as inspiration for buildings and landscapes, the bee-bots has to move through in the local kindergarten and pre-school.

Thirdly and finally the open lab is open to investigate other ways of using Bee-bots, than the pre-school teacher and the children had thought of. In practice it is a process of opening the lab up towards the world and a pedagogy that understands itself as part of a network. If the pre-school or the kindergarten start up with having no actual or any important contact with the outside world through the internet, then it takes time to establish all that and even enter a continuing dialogue with someone else.
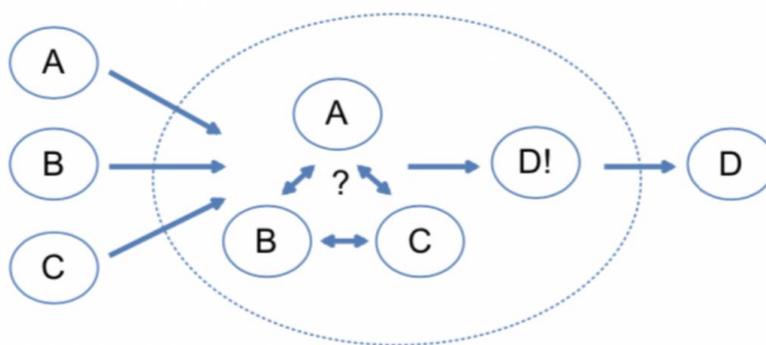
Figure 3: The process in the Open Laboratory (Thestrup & Robinson 2016)

The third figure below has to do with the process, the experimenting community and the participator conducts. The open laboratory is essentially a laboratory, where any media, any material and any narrative can be used and the use of them can be transformed into a new common practice for the community. The openness has to do with that everything in the lab is considered equal to each other. No technology, media or narrative has the upper hand, but can all be transformed be each other and actively transform everything else. The same goes for the encounter between analogue and digital. This encounter is no longer seen as an encounter, as digital and analogue is intertwined in what one could call a digital materiality. Body and screen are interconnected. Finally the open laboratory is also open to inspiration from the internet and to enter co-operation with other groups of people around the world and even establish platforms of creativity together.

A, B and C to the left represents an already existing practice around one or more technologies, media and narratives. It is the participants in the experimenting community, who carries this existing practice into the open laboratory. It might be one, they themselves conduct inside or outside the community. The laboratory can be of a more permanent nature, or more ad hoc and partly being unfolded online.

When entering the open laboratory itself, the exiting practices might be challenged, but in principle this goes for the technologies, the media and the narratives themselves. New narratives might be told, new communication- and production platforms might be established and in principle new technologies might be constructed or a combination of it all. The big letter D with the exclamation mark represents this new practice and the moment the open laboratory for one reason or the other is closed down, the big letter D represents the new practice, which now is becoming the next everyday practice. The one that the whole or most of the community uses until the next time the open laboratory is started up again.

STARTING UP THE EXPERIMENT

How does one do an experiment? It would be cool to have a fancy expensive lab with all the latest high-tech gear. But it is not needed. The local nursery, kindergarten or pre-school can all be existing and important places to make experiments. It would also be cool to have the latest robot, the latest 3D-printer or the latest mobile phone to investigate the future technologies. And of course, if you can cooperate with a company, a lab or other schools to get your hands on such new stuff and some

support on how to use it, then that is absolutely fine. But it is not necessary. Your starting point can be somewhere else.

Like any other activity, you plan, you think of your children in your pre-school, the space, you have and the time at hand. Do you have a space on the floor, where you can do your activity? Do you have a shelf or a box, where you can store stuff until nest time you or the children are going to do something about it? Do you have some designated time to prepare, carry out or reflect upon it all? Do you have someone to ask, books to consult, videos on the internet to be inspired by? What do your children, you work with, know about the subject in question already, and what might their reactions be?

All the questions above are the questions, you probably would ask anyway no matter the activity. So that is probably not new to you. It might be new to do an experiment and talk about it with the children, but even that you probably have done before. Basically when you do an experiment you ask the question *What happens if…?* Children can do this as well. If they pour water on some dirt and change it into mud with their hands, you could say, that they are curious and try find out something through an experiment. If they press the buttons on top of a Bee-bot, a small robot, they are trying to find out, what it can do and in that sense is conducting an experiment. My guess is that you have seen children do stuff like this before.

Any technology, digital or analogue, is a tool to do the experiment. Anything can become tools to do an experiment: robots, crayons and branches from the forest.

There is no problem in following instructions from a manual, when you start doing an experiment together with some children. If you use an Ozobot, new crayons or a strange rotten branch picked up in the forest, you can ask this question to yourself and the children as a help*: What does this technology DO?* The robot can follow a black line, the crayons makes broad lines in different colors and the branch can easily break into smaller pieces.

When you have done, what the people behind the manual proposes, you can start asking another question: *What do WE want to do with this technology?* Here you look for other options based on what you and the children would like to examine. What happens if the robots follow a red line? Or a thick black line? What happens if the crayons are used for making an area and not a line? What happens if the branch is used as a mobile phone with a long antenna as part of as role-play? Or the pieces of the branch could be used as a part of a labyrinth, where the robots move around depending on the colours.

The moment when the last questions starts to become important is when you ask the children to do something different from before or see if something new happens. You could simply ask the children to use other colours than black or a mix of different colours just to see what happens with the movements of the Ozobot. They might come up with this idea themselves, and if they do, you can encourage them. This is not wrong to do. It just gives another answer than the manual and that

is the very moment, when you and the children start to find out you want to use the technology for. The same goes for the use of the crayons and the use of the rotten branches.

THE CHANGE-MAKER PROCESS

The experimenting community is, in this project, firmly anchored in a new and innovative pedagogy called the change-maker pedagogy. Articulated by an entrepreneurship researcher, Sara Sarasvathy, it was developed from research into entrepreneurship education, and describe different levels of activity that can support the development of an entrepreneurial mindset by finding solutions to problems in a dynamic between an individual and collective perspective. It has never before been tested with preschool teachers or with young children. This pedagogy has been developed at Aarhus University over a period of 4-5 years with higher education students and teachers in professional development courses. One of the central elements of the pedagogy is being able to work flexibly, open-endedly in experimenting communities. The change-maker pedagogy is illustrated in Figure 4 below.
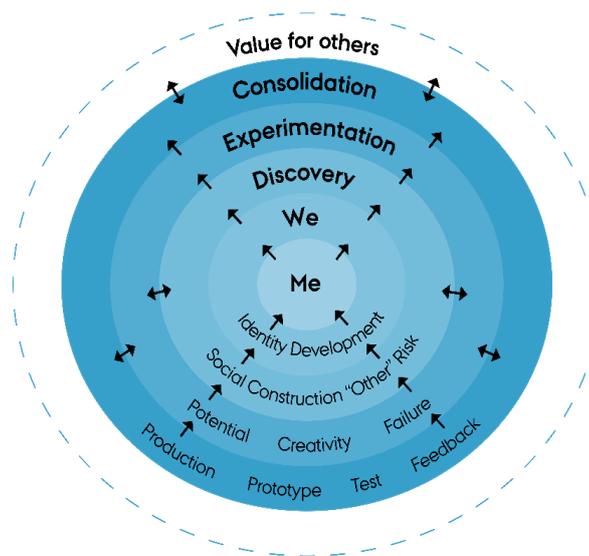

Figure 4: Change maker pedagogy

When learning takes place, the individual is always at the centre of their learning. It is from the individual that motivation to learn comes and meaning making with respect to linking to what prior knowledge the individual has.

ME is therefore, the centre and starting point for learning that incorporates entrepreneurial competences and mindset.

Children in preschool have knowledge about the world, they have skills and competences and the teacher works to develop these in learning situations that allow for growth. Often in the preschool, the teacher will make assumptions about what the child can do, what they know already and sometimes about what they are able to do. Presenting the teachers in the project with this model was challenging. For many of the teachers however, this model made sense. They understood that children are not all the same, they are not all good at the same things, or capable of achieving the same progress. Some children take longer to learn something than others. Some children are capable of doing some things (climbing trees) and not of others (cutting with scissors). This model allows for difference and it allows for a process that is guided, not by the teacher, but by the individuals themselves.

Prior to the training workshop the teachers had been asked to reflect on who they were and what they were able to do, how they used their expertise and motivation in their professional lives by requiring them to make a video prior to the workshop. They had already begun the change-maker process and were thinking about what it was possible to do together, in collaboration with others. This is the next step in the process, collaboration and working with others WE. And it is at this stage that the Experimenting Community becomes visible.

The next stage WE is about involving others in learning.

This stage brings together a group who are basically interested in the same things and asking questions about that. When groups work together, they are constantly articulating and reflecting on their own understanding in relation to the others in the group. It is here that community is established, that identity is constructed and challenged, sometimes even threatened. This is why there will always be space for movement between who I am, in relation to who I am as a member of the group. This is the reason for the arrows showing movement back and forth between ME and WE.

For the teachers in the project WE was not only who we are as an institution, but when they met at the training workshop they found out that WE could also include the national groups as well as the international group called 'SEEDS world'.

The following phase is the discovery phase. This can overlap with the experimentation phase, but can in some cases come prior to experimentation.

The discovery phase is characterized by asking, observing and even trying out the limitations of different methods, materials and digital tools. Their common interest in digital media and technology meant that there was a further claim to creating experimenting communities. In the discovery phase the group explores and investigates a problem or a situation. There will be a focus on

- *what resources and technologies* are used,
- *who are involved, their skills and expertise as well their relationships* with each other,
- *where the practice takes place*, in a particular context and lastly,
- *how the practice happens* in the given situation.

When they were asked to combine their models together into a SEEDS world the teachers began to investigate what the different technologies could do, who the different people were and what skills others had to learn from these. They had to develop relationships with each other over a short period of time, socializing, sharing and asking questions.

The next phase is experimentation.

The experimentation phase is where the teachers and children begin to experiment with what could be done with a combination of different methods, materials and digital tools that has not been tried before. They had the common 'problem' of creating a SEEDS world in practice.

The final phase is consolidation.

In the consolidation phase there is room for testing and trial. The problem is solved when the group as a whole agrees that the solution works for them. This is when value is created for the individual and for the community as a whole. This means being able to experiment, seek new and innovative ways to solve the problem and to test potential solutions together.

The experimenting community moves back and forth in the change-maker model, creating value for themselves and others through all the phases. It can happen online as well as offline, synchronously as well as asynchronously in the ongoing construction of flexible meeting places. Discovery and experimentation might all take place through using materials, tools and space in the open laboratory and end up in a new consolidated everyday practice. During all phases, the experimenting community plays and experiments on both an inner and an outer cultural arena.

There is potential for the participants to act and reflect both in the local physical space but there is also potential to widen the community to allow for the development of an interactive global community of practice. They search for questions and answers for themselves and for others, and

in this search, they are open to new ideas, understandings and actions, that might inspire the transformation of their own practice as well as that of others. In fact, the very change is the point.

The final definition for an experimenting community is not only that it has the experiment at its core, but also that it reaches outside itself to relate and make experiences together with others, which can result in sustainable solutions. The participants in a change-maker pedagogy search for change through actions together with others even on a global and intercultural scale.

WANT TO READ MORE?

On the SEEDS website (www.seeds-project.eu) you can find more resource materials from the SEEDS project. For example, you can find best practice examples that elaborates examples of how the SEEDS methods have been used in praxis. You can also learn more about the developed SEEDS pedagogy or find recommendations for how to implement the SEEDS pedagogy.

SOURCES

Dittert, N., Thestrup, K. & Robinson, S. (exp. 2020). The SEEDS pedagogy - becoming an experimenting community using a technology based toolkit: FabLearn Europe 2019 special issue, International Journal of Child-Computer Interaction

Dittert, N., Robinson, S., Thestrup, K. & Knudsen, J. (2019). Supporting creativity and collaboration: Considerations for the development of a technologically enhanced toolkit for kindergartens. Published in FabLearn Europe `19, FabLearn Europe '19, Proceedings of the FabLearn Europe 2019 Conference, Article No. 9, Oulu, Finland — May 28 - 29, 2019, ACM New York, NY, USA ©2019, table of contents ISBN: 978-1-4503-6266-5 doi>10.1145/3335055.3335064, located 28.08.2019 at https://dl.acm.org/citation.cfm?id=3335064

Robinson, S. (forthcoming 2020). Ethnography – a key to engaging students in societal change: Springer

Sandvik, K. & Thestrup, K. (2018). Skolen som makerspace. I Møller, H. H., Andersen, I. H., Kristensen, K. B. & Rasmussen, C. S. (red.). Leg i Skolen: Unge Pædagoger

Thestrup, K. (forthcoming 2020). Den deltagende og eksperimenterende pædagog, In Cecchin, D. & Nørgaard, V. (red.). Pædagogens kompetencer i bevægelse: Academisk Forlag

Thestrup, K., & Pedersen, L. H. (2019). Makeative Makerspaces - When the pedagogy is makeative. In A. Blum-Ross, K. Kumpulainen, & J. Marsh (Eds.), *Enhancing Digital Literacy and Creativity: Makerspaces in the Early Years*. London: Routledge.

Thestrup, K. & Robinson, S. (2016). Towards and entrepreneurial mindset: Empowering learners in an open laboratory, in Papadopoulus, P., Burger, R. & Fana, A. (ed.). *Innovation and Entrepreneurship in Education*. Emerald Group Publishing, p. 147-166 (Advances in Digital Education and Lifelong Learning, Vol. 2).

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