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Basics for education and training of pedagogical professionals in the digital age

Train and educate pedagogic professionals, strengthen teams, encourage leaders

Co-funded by the Erasmus+ Programme of the European Union

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Content

Preface

Alongside climate change, globalisation and new mobility, digitalisation is one of the megatrends of today. However, the term „megatrend“ does not refer to a future change that will become relevant soon and to which we must slowly but surely adjust. Rather, these trends are developments that have influenced individual life and society as a whole for a long time and will continue to do so. The example of digitalisation makes this particularly clear: for some decades now it has been changing daily routine, professional life and the way people communicate and obtain information.

However, digitalisation is affecting private and public life. According to numbers provided by the tertiary sector, 83% of employees work with digital support. This process no longer refers exclusively to traditional computer-based occupations, such as IT or marketing. An increasing number of employees in education and social services are also affected by digitalisation. In the area of childcare, work with digital media is often limited to communication (e-mails), external presentation (websites) or documentation of educational and development processes (children‘s videos). However, digital media and devices are an integral part of daily routine for most families and are therefore also part of children‘s lives and experiences. On the other hand, successful participation in society increasingly requires technical and digital skills (cf. Pietraß 2018). This means that pedagogical professionals cannot ignore current developments, such as the change from a purely analogue to an increasingly digital world, in their pedagogical work. Their task is to introduce children to the responsible use of digital devices and media. The prerequisite for this is that pedagogical professionals themselves deal with these topics and develop appropriate media skills.

Media pedagogy has meanwhile taken a permanent place in the training of pedagogical professionals in the early pedagogical study courses as well as in advanced and continuing education. Nevertheless, it cannot be assumed that pedagogical professionals are sufficiently prepared for the competent accompaniment of children in the digital age. This applies in particular to skilled workers whose training or studies have already taken place somewhen in the past and who have not attended regular training on this subject. In addition, media pedagogy is usually limited to the acquisition of knowledge about today‘s media (systems) and their critical but passive usage. Active design skills in the media field, which are a prerequisite for the responsible use of digital devices and technology, are still rarely acquired in media pedagogical seminars or training courses. Currently, in most European countries, pedagogical professionals lack didactic methods and approaches as well as teaching and learning materials that support an age-appropriate, active and creative use of digital media on the basis of discovering and researching as learning methods. (cf. Thestrup 2013).

It is precisely these action-oriented media skills that enable people to develop from pure consumers to producers who actively use the media to implement their own ideas and projects. Creativity and the ability to solve problems are among the key competencies of the 21st century and are therefore an important prerequisite for being or remaining fit for the future. Training and further education of pedagogical professionals on the subject of digitalisation should therefore not concentrate exclusively on media pedagogical aspects.

Against this background, the European project „Digital media competence for educational staff in early childhood education“ was launched in 2015 and funded by the European Commission within the Erasmus+ programme over a period of three years.

The international project team consisted of six partner institutions from four European countries.

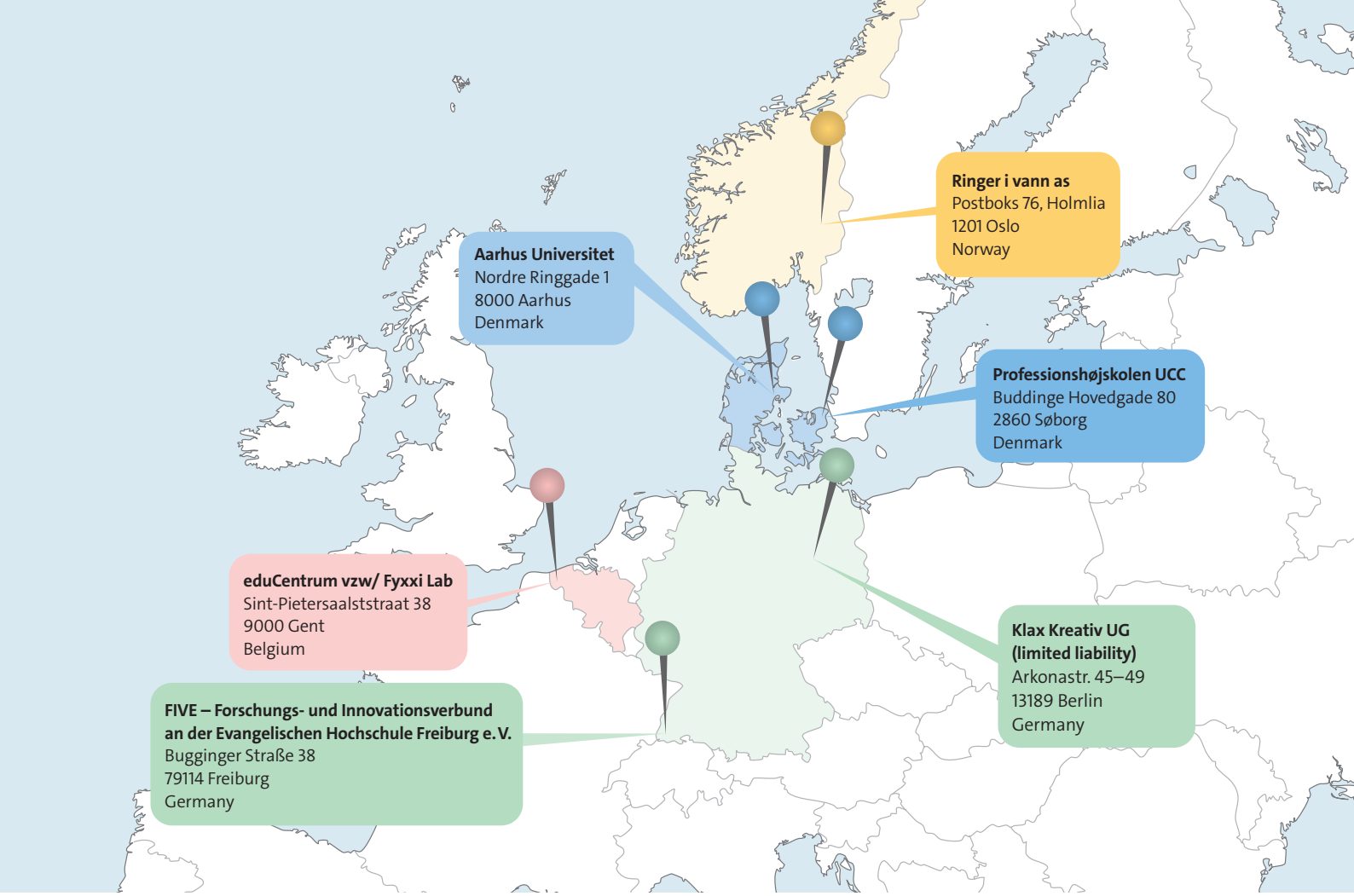


Figure 1: Project partners participating in the "Digital Media Competence for Educational Staff in Early Childhood Education" project.

Klax Kreativ UG (limited liability), Germany

Participants: Antje Bostelmann, Gerrit Möllers

Klax Kreativ UG (limited liability) is an affiliate of the Klax Group. Since 1990, Klax has been operat-ing an increasing number of day nurseries, kinder-gartens and general schools in Berlin, Brandenburg, Lower Saxony and Sweden alongside institutions dedicated to providing vocational training and fur-ther education to education staff. Klax Kreativ UG (limited liability) offers further education, training and certification services at the Institute for Klax Pedagogy.

Ringer i vann, Norway

Participants: Tom Rune Flogstad, Grete Marie Helle

Ringer i vann has been active in the field of organ-isational development and quality improvement of early childcare services in day nurseries and schools since 1987. The company aims to achieve continuous improvement at these institutions. It also writes specialist articles and guides for schools and kinder-gartens.

Professionshøjskolen UCC, Denmark

Participants: Steen Sondergaard, Frank Stoevelbaek

University College Copenhagen (UCC) is one of Den-mark's main providers of teacher and social educa-tion training courses. Ongoing networking with Eu-ropean partners forms the basis of UCC's efforts to improve the quality of degree-level education, vo-cational training and research. Besides student and personal mobility, UCC is dedicated to research and development at Nordic and European educational institutions.

FIVE – Forschungs- und Innovationsverbund an der Evangelischen Hochschule Freiburg e.V., Germany

Participant: Dr. Michael Wünsche

FIVE e. V. is an independent, registered charitable association that is structurally interlinked with the Protestant University of Applied Sciences Freiburg. At the university, FIVE functions as an institute for applied research. It offers professors of the uni-versity an organisational framework for realising high-level empirical research projects with practical relevance. Over a period of more than 30 years, FIVE has developed into the largest social research insti-tution at any German university of applied sciences thanks to its extensive research performance.

EduCentrum, Belgium

Participants: Isabel Allaert, Hans de Four

EduCentrum is a Belgian non-profit organisation with an emphasis on ICT and STEM. Fyxxi, the larg-est project of EduCentrum, focuses on education in STEM/ICT during and after compulsory schooling. The Fyxxi Lab welcomes children between 5 and 16 years old. It allows them to practice innovative learning methods and apply technical skills in a classroom full of STEM/ICT tools.

Aarhus Universitet, Denmark

Participant: Klaus Thestrup

The Aarhus University is Denmark's largest university. The centre for didactic development and digital media (TDM) at AU aims to promote research and knowledge-sharing activities in the fields of open education, innovative education and educational technology. The centre conducts its research by ex-perimenting with educational designs, integrating existing technologies into innovative educational practices and developing new educational technologies.

To the origin

We began by assessing the needs of children and educators for the acquisition and delivery of action-oriented media literacy, as well as the degree and quality of current use of digital media and tools in nurseries in the participating countries. At the same time, we showed each other our previous pedagogical practice in the use of digital media and tools and discussed our experiences. This was an intense process as it took us a long time to fully understand each other: What is meant by the term education in the various European countries? What is behind the term kindergarten and where pedagogical professionals in early childhood education are getting a high quality education? We also had to struggle with stereotypes. Eventually we reached an agreement on the definition of education and that it should be understood as an overall social package, a fundamental conviction expressed in the Danish term „Danelse".

Our findings we have summarised in chapters 1 and 3. Chapter 2 „Digital education - a definition" summarises the results of our discussion on terms such as „digitalisation" and „education" from a European perspective. It is precisely the process of our mutual understanding that has made it clear to us how important a precise definition is for the current discussion.

The comparison of the social debates in our countries was important and interesting. The debate on the protection of children in digital media in Germany was unusual for the other European partners. Nevertheless at the end of the project these debates could also been observed in the Scandinavian countries. Hence, our discussions on the shifting baselines of society's educational tasks in an increasingly digitalised world were marked by American, Danish and German scientific debates.

By combining the current scientific discussion in our countries and the experiences we have made so far, we were able to deduce methodological-didactic competencies (Chapter 4). From our point of view they are important for pedagogical professionals as they offer education in daily routine in kindergarten and develop professional competencies for teaching digital media competence (Chapter 5). These competencies were the basis for the development of the learning objectives for our training and its concept for pedagogical professionals.

Based on our joint project work, we developed and tested a training course for pedagogical professionals who would like to integrate digital media into everyday kindergarten life and who like to learn methods that actively engage children with digital tools without them being pure consumers of digita media content. Chapter 6 describes the content, methods and proposals for the development of training courses.

We integrated the experiences from the application of the training course as didactic & methodical approaches to an existing training curriculum for pedagogical professionals in early childhood education. Chapter 7 includes the proposals for the integration of training content in digital media education into existing training programmes-curricula and didactic planning.

By further accompanying the participants and thanks to the evaluations conducted during the project, we were able to identify obstacles for the practical transfer of what they had learned in the kindergarten. At the same time we developped suggestions on how this can be handled proactively in order to increase the chance of successful implementation in pedagogical daily routine. These suggestions are presented in Chapter 8.

The project team hopes that many educators in as many countries as possible will benefit from our findings and suggestions.

1. Challenges of Pedagogics in Times of Digitalisation

Reports on the living conditions of young people in Europe (cf. BMFSFJ 2013) contain current and far-reaching descriptions of the conditions of awakening. In this context, particular reference is made to the development and relevance of digital media:

> „Nothing has probably changed the lives of children and young people in the last two decades as fundamentally and lastingly as the developments that have taken place - and are still taking place - in the field of electronic media and the associated communication possibilities in comparison to „earlier" times. Mobile phones, smartphones and computers plus the Internet now accessible to almost everyone are fundamentally and persistently changing and expanding the possibilities of universal communication - not only for adolescents, but for them far more as a matter of course, and above all right from the start, as „digital natives", i.e. without their own experience of difference" (ibid. 55).

In addition to the possibilities of communication, access to and density of information and entertainment are cultural characteristics of digital media which must be emphasised (cf. Siegler et al. 2011: 338). Such a mediatisation of growing up poses clear challenges to child and youth welfare services (cf. ibid.: 14). Especially with regard to competent support and promotion of childhood educational processes by educators and teachers.

Another challenge for professional pedagogics is the so-called „digital inequality" (ibid.: 394). This corresponds with social developments as well as increasing social and economic inequalities in two respects: on the one hand with regard to access opportunities, on the other hand with regard to usage behaviour (consumerist vs. reflected). „Digital inequality" begins in childhood, especially in the influential family context. Thus the task of day-care centres is to take into account the target group-specific direction of learning opportunities in the field of digital media.

The political and cultural publicity is currently discussing the use of digital media primarily as a question of choosing new technologies (computers, iPads, etc.) and new digital tools (mindmasters, Prezi, PuppetPals and educational games, etc.). However, digital media are already an integral part of children's everyday lives, especially due to the media influenced growing up of children (cf. vbw 2018). Therefore digital media have a special significance in early childhood education institutions, especially with regard to culture, education and learning (cf. Wünsche/Kink 2016: 17ff.).

Against this background, it makes sense to treat the use of digital media in institutions of early childhood education as a new educational project in the context of which a digital culture for institutions of early childhood education can be created. The focus of education and training should therefore be on empowering pedagogical professionals to challenge the traditional agenda of child day care facilities and their educational goals and to support new ways of organising and structuring facilities and educational work. In this way a new value base and a new media culture can develop in the educational institutions. In view of the most important results of current studies and the evaluation of the project's own surveys, it becomes clear that the early educational institutions that are already dealing with digital tools and media are trying to implement them meaningfully in daily practice and see themselves at the beginning of this longer-term worthwhile process.

2. Digital Education – A Definition

Never again a person can learn as good and intensively as during childhood. Which is why e.g. Resnik (2017) advocates for making the kindergarten a learning model for people of all ages. If one approaches the concept of education from the point of view of the digitalisation of our society, these points appear important:

- Innovation
- Creativity
- Learning objectives for children and adults in the areas of technology, programming & media understanding

Through digitalisation the focus of educational work is shifting. In addition to the desire to learn, the spirit of discovery and the joy of experimenting, children now also need the ability to reflect, judge and organise. At a time when unsafe and unvalidated knowledge is being disseminated, it is becoming increasingly difficult to orientate. What is true? What can you rely on? What is a fact and what is just a story? The capabilities to answer these questions quickly need to be learned. This requires the skills to criticise and sort information. This will be at the heart of education.

This educational approach will not succeed without basic technical knowledge, one's own experiences and self-motivated learning processes. Against this background, what skills and competences do children and adults need to acquire in order to prepare and be prepared for a responsible life in a digital world? In recent years, this has been summarised under the term "key competences for the 21st century" (cf. e.g. http://www.p21.org/our-work/p21-framework. Last accessed: 13.02.2019). This includes:

Creativity and problem solving

- the willingness to try something new
- to be able to question and change one's habitual thinking and behaviour
- to find one's own points of view and explanations
- to test hypotheses
- to be able to adapt to changing requirements and challenges

Soft Skills

- the assumption of responsibility for oneself and others
- plan and carry out tasks in groups
- agree on and adhere to rules
- empathise with others
- meet different needs
- be able to react appropriately to different perspectives
- to be able to constructively contribute with own skills

Learning competence and self-organisation

- be able to evaluate oneself
- reflect on one's own learning success
- be able to motivate and exert yourself
- agree on milestones, coordinate them and proceed in a targeted manner
- taking responsibility for one's own learning
- set personal goals
- develop initiative
- recognise mistakes and difficulties as learning opportunities

Tolerance and Openness
- recognise and overcome one‘s own prejudices
- accept diversity
- tolerate opinions
- address different positions

i-Competence
- appreciate own achievements
- deal with feelings, needs and behavioural patterns
- recognise potentials, strengths and weaknesses
- overcoming fears
- trust oneself

Digital organisational competence and ability to judge
- deal creatively, critically and consciously with media and technology
- using media learning opportunities responsibly for one’s own learning path
- be able to find, select, assess and question information
- know technical contexts and modes of operation

In order to acquire such skills and competencies, pedagogical professionals and children need opportunities in which they can learn project-based and together. Learning by trial and error awakens the spirit of invention and motivates children to break new ground independently. This “maker mentality” can be described with the different phases of a creativity process, as it is described, for example, in the approach of “challenge-based learning”: IMAGINE - MAKE - LEARN - SHARE.

This is not about turning all children into programmers. Rather, they are given individual access so that they can acquire digital skills and use digitality as a creative tool. Pedagogical professionals are faced with the task of teaching children these skills so that they can become designers of the digital world. This does not only involve awakening children’s enthusiasm for technology and programming. The aim should rather be to introduce children to the creative use of digital technologies in a playful way and to enable them to design their own projects and ideas.

It is obvious that pedagogical professionals will initially acquire these skills and competencies by themselves. Therefore it seems important to sensitise them to an understanding of learning and education that differs from the traditional understanding of learning that they know from their own biographies. This learning and educational model is often described as co-constructive learning.

3. Challenges for Pedagogical Professionals in the Digital Age

In the context of digital change, the co-constructive[1] and accompanying attitude of pedagogical professionals appears to be an important prerequisite for independent learning. The time of the omniscient adult giving lectures is over. Adults are arrangers of learning settings, learning co-players and sometimes also initiators of game impulses. Therefore it is also the goal of the education and training of pedagogical professionals to change the use of digital media, the professional self-conception and the pedagogical attitude in everyday pedagogical life.

3.1 Learning and Researching Adults

Just like children adults grow into the digital society. Thus devices and techniques can be new for adults too and therefore can be tried out and learned together with the children. Learning rooms should therefore not only be available in the children's rooms. It is important to give pedagogical professionals the opportunity to try out and tinker on a regular basis. To get to know new materials and to test their usefulness time and space for experiments is required. In order to understand, for example, how a drawing is transformed into a multidimensional object with the help of a 3D printer, it is important to be able to understand the content and practical aspects of this process. The practical implementation thus creates confidence in dealing with digital media. (New) materials, devices and techniques can be experimented with in makerspaces or workshops. They offer space for exchanging experiences.

Figure 2: The independent construction of robots helps to understand the manufacturing process and to be able to deal with any technical problems that may arise in everyday pedagogical life.

1 In Germany, Wassilios E. Fthenakis (cf. Fthenakis 2003) has had a lasting influence on the concept of „co-construction" and made it usable for educational practice.

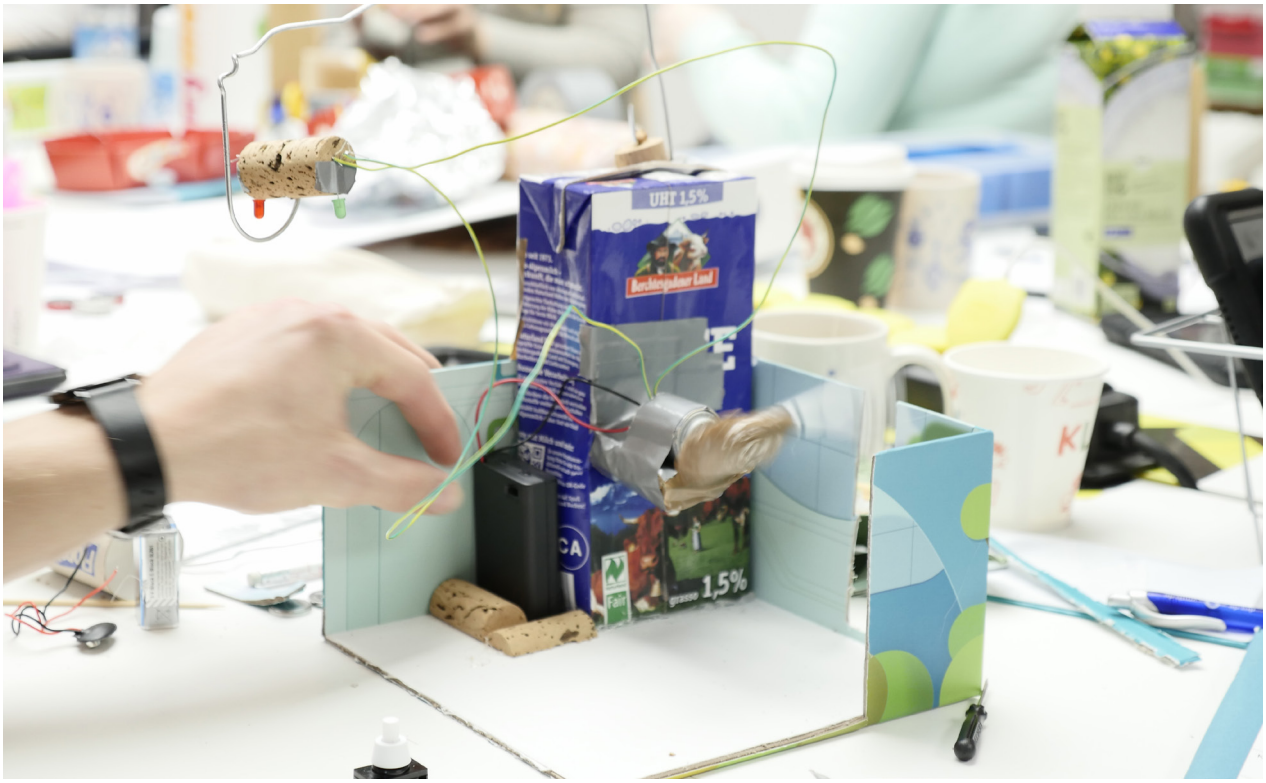


Figure 3: Building electric circuits

Figure 4: Pedagogical professionals experiment and exchange ideas on digital media.

Pedagogical professionals also need a certain pedagogical attitude. In our practical observations we have noticed how little the hands of the pedagogues obey the new resolutions. Instead of watching the children and waiting to see what happens next, the hands are always in the middle of the action and intervene more or less carefully in the pedagogical context. Children are placed at certain points on the play carpet. Things are taken out of childrens hands and returned. A child who struggles with a difficult activity can often expect it to

be done by the adult before the child even has to make an effort. Therein the critical eye and reflection of the pedagogues are needed.

3.2 Good learning Guidance in the Digital Age

> „The role of the teacher is to create the conditions for invention rather than provide ready-made knowledge.“ (Papert 1980)

How to become a co-player and a learning facilitator if you have been practicing for years on helping, teaching and instructing children? What can pedagogical agency look-a-like due to new requirements? Regarding that we found some principles during the development of our education and training programmes: Basically, children are familiar with examining, experimenting, imitating, thinking and hypothetising. Many educators are uncertain about how digital technologies and tools work and how children can best be involved in educational practice (cf. Frøkjær/Søndergaard 2017). It is often observed, that instead of playfully try out and explore digital technologies, teachers merely teach children how to use them.

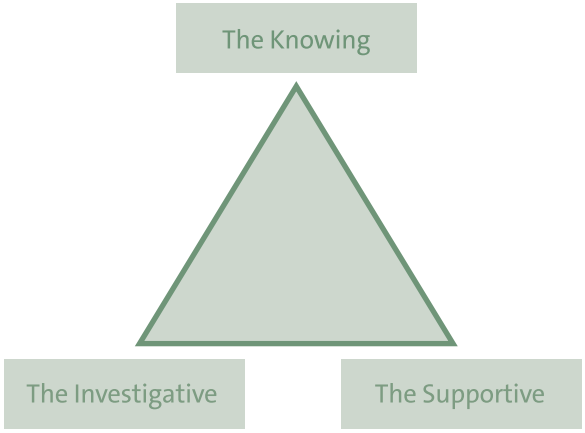


Figure 5: Educational Positions

According to Christensen et al. (2018) it is helpful to take the following positions in order to be a good learning guide:

- to plan pedagogical procedures without pre-designing everything.
- to apply pedagogical principles to help children gain knowledge and experience.
- to cultivate teamwork, also with children.
- Didactic considerations for co-playing and co-researching.
- to train oneself to keep the children’s questions flowing, and not to prevent that with quick answers.
- always bring new interesting things for children to explore.
- staying in dialogue with children.
- to acquire the ability to combine traditional pedagogical methods with new possibilities. Aesthetic education, telling stories, games and exploring nature remain the focus of the kindergarten.
- to integrate digital media into the daily routine of the kindergarten and to make them useful accessories of the kindergarten life.
- to practice to share one’s own thoughts with parents, teammates and children. Also or especially if they are critical of generally valid opinions and attitudes

Currently, adults are realising that by far they can not teach and communicate all knowledge which today's children require for the future. Therefore it is worth questioning the work of educational institutions: How are learning processes structured in kindergarten and school? Do children learn how to acquire knowledge by themselves and how to develop learning tasks simply out of curiosity?

The digitalisation of the daily life is part of today's childrens reality and at the same time an important challenge for educational professionals. It requires them to adopt a modest attitude towards their own knowledge and to take responsibility for the success of the educational process. What sounds almost impossible describes the field of tension that has always accompanied the interaction between children and adults. Characteristics of good learning guidance are:

- **Design Relationships**
  Learning works out when people doing things together. Learning processes need discussion and reflection. Learning is a discursive process that takes place in exchange with others. It is therefore important that children work on a task together with other children and pedagogical professionals. Good relationships are necessary for this.

- **Listening to the questions and ideas of children**
  From their questions and ideas it can be deduced where children stand in their knowledge. Learning is best when new knowledge comes up against existing knowledge and can build on it. Pedagogical professionals who know what children have already learned can plan the next learning step more easily

- **Discover or intentionally design learning arrangements**
  Pedagogical professionals provide a stimulating environment that invites to explore. They walk with their eyes wide open and let the children participate in their discoveries and vice versa.

- **Being prepared**
  The material should be ready and the room well prepared. The learning environment should be designed so that independent and exploratory learning is possible.

- **Planning and reflecting together with children**
  It makes sense to divide a task into steps, to think carefully about what to find out, how to proceed and whom to ask. Pedagogical professionals talk to the children about their research steps, give them appreciative feedback and convey recognition and security.

- **Impulses instead of instructions**
  It is important to hold back with instructions and encourage thinking for example by asking questions. Fantasy, meaning, experience and language competence play a decisive role in learning processes.

- **Playing is learning**
  The opportunity to play requires temporal and spatial resources. Educators must be aware of this in order not to be able to restrict these resources

- **Transforming children's rooms into learning laboratories**
  Children need a variety of approaches to explore the world. Children's rooms should therefore function as learning laboratories that stimulate and allow a wide variety of experiments.

In the end, it is a question of the didactic approach of pedagogical professionals which need new considerations and pedagogical thoughts. These are most likely to arise through exchanges with other pedagogical professionals, through attempts to redesign everyday life, through experiences in dealing with new materials and through projects that succeed or sometimes fail.

Against this background, competence models and goals for education and training in the digital age can be formulated. For this purpose, we draw on current debates based on competence formulations (cf. Fröhlich-Gildhoff et al. 2014).

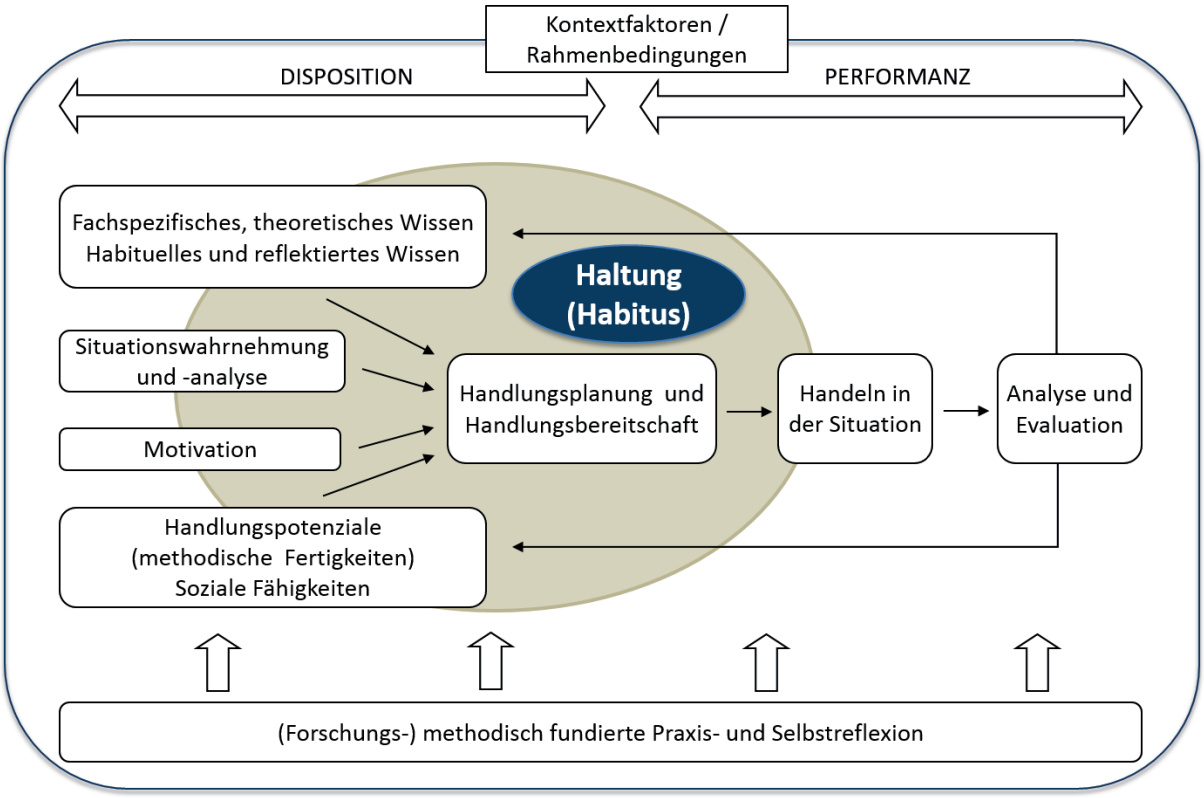


Figure 6: Competence model for early childhood education professionals (Fröhlich-Gildhoff et al. 2014: 22)

Fröhlich-Gildhoff et al. emphasise the agency guiding effect of orientations and the necessity of a "methodically founded ability to reflect and self-reflect (...), which is thus an essential motor of pedagogical agency competence" (ibid.: 23). This model distinguishes between personal and professional competence, which do not necessarily have to be identical, and the potential changeability and further development of professional attitude - despite all stability.

The European Qualifications Framework (EQF) provides the basis for the formulation of learning objectives. The EQF identifies three levels of learning outcomes:

(a) Knowledge
(b) Skills
(c) Competencies

Against this background and in accordance with Baacke's (cf. 1997) four dimensions of media literacy, the education and training in digital media literacy conceived in our project context for pedagogical professionals in early childhood education sets out the following learning outcomes:

Figure 7: Learning Outcomes of education and training in digital media competence

Knowledge (Theoretical and factual knowledge)	**Skills** (Cognitiv/Applied)	**Personal Competencies** (Responsibility/Autonomy)
Media Studies		
The Educator...		
knows different types of media and media systems.	independently operates technical and digital devices as well as programs.	evaluates media (contents) according to their usefulness for certain purposes.
has basic technical knowledge in dealing with digital media.	can prepare and impart theoretical knowledge about media and media systems for children.	actively deals with current developments in the field of media and media systems.
knows aspects of media law.		
Media Criticism		
The Educator...		
knows that media content is always tied to interests.	questions media content critically whether it is true.	is independent and critically aware of media content.
knows that media are used according to target groups.	distinguishes sources of information with regard to their credibility and objectivity.	continuously reflects the effects of certain media (contents) on one's own attitude / opinion.
knows the problematic influences of media on an individual and social level.	encourage children to deal critically with the media.	
Media Use		
The Educator...		
knows different ways of using media (receptive / creative) and their meaning.	can specifically search for and find relevant media (contents).	uses different media in pedagogical daily routine meaningfully and responsibly.
knows what criteria it uses to select the right medium or media system for its project and its target group.	Can arrange the selection of media (systems) according to the learning needs of the target group.	motivates various target groups to use the media in a way that is appropriate for their target groups.
	uses media in a variety of ways (receptive / creative).	ensures that it behaves responsibly and respectfully when dealing with media and digital networks.
	creates stimulating learning environments with the help of diverse media (systems).	
Media Design		
The Educator...		
knows various techniques for the creation of media products.	works creatively and constructively with media.	implements its own goals and positions with media.
recognizes the action-oriented aspect of media design.	uses different techniques for the creation of media products correctly.	works cooperatively and solution-oriented with others on media projects.
	uses media as a tool to create a product or to implement own ideas.	reflects the difference between consuming and producing media use.

4. Didactical and methodical basics

The discussion of the teaching and learning methods to be used in education and training has shaped a large part of our joint discussion. While there are many overlaps between the terms, a real understanding between the approaches of the project partners has actually only developped through the practical exchange. For this it was helpful to experience the teaching and learning methods through practical work in makerspace at the partner meetings and to reflect together.

The three methods presented in the following show many similarities and overlaps. Also the discussion of the methods is not new. We find, however, that these methods are becoming more urgent due to the new technical possibilities and the use within the framework of makerspaces.

4.1 Challenged-Based-Learning

According to the "Intrinsic Motivation Principle of Creativity", people are most creative when they are motivated by their interest, pleasure, peace and challenge by a task/work rather than by external pressure or coercion (cf. Hennessy/Amabile 1998). It is an open result for editing and solving the challenge. Educators can co-work with children to find solutions. This encourages children to show creativity, to face challenges that are important to them and to follow their own interests. This results in the following key factors for learning with digital media:

- motivation,
- meaningful and personally challenging tasks,
- relevance,
- creativity,
- applicability,
- own ideas and contributions
- experimental and creative use of digital media

The basic idea of „challenge-based learning" is that daily problems trigger learners' interest and encourage them to apply new knowledge in a problem-solving context.

„Challenge-based learning"
- to learn from experience or "learning by doing".
- creates opportunities for learning groups to explore meaningful questions and challenges for which they collect information and think critically.

The „Challenge-based-learning" is structured in three phases:
- the challenge phase, which serves to describe the problem, formulate the objectives, set a time frame and identify the children's competencies that will contribute to the work and the solution
- the problem management phase, in which ideas are developed as to how this problem can be dealt with and solved.
- the implementation phase, in which solutions are tried and tested and then presented.

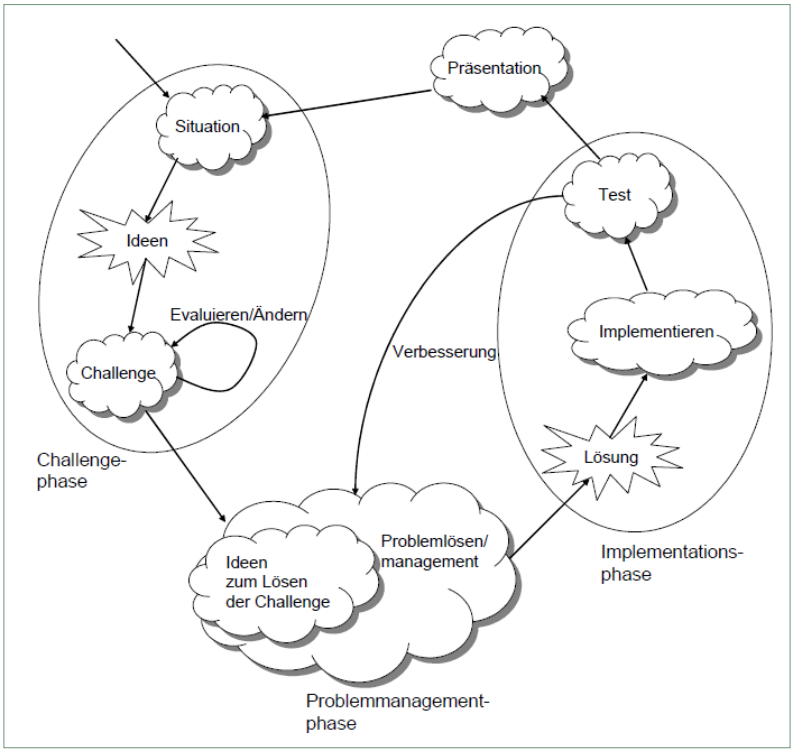


Figure 8: Challenge-Cycle for creative learning (Schubert/Schwill 2011: 369).

4.2 Active, playful forms of learning in the kindergarten

The high proportion of active, playful and creative forms of learning in kindergarten is of great importance for learning processes. Resnick (2017) finds a characteristic "creative learning spiral" (ibid.) in pre-school areas, which he uses as a model for school and lifelong teaching and learning processes. The various characteristic phases of a learning spiral (or learning cycle) are illustrated in Figure 9.

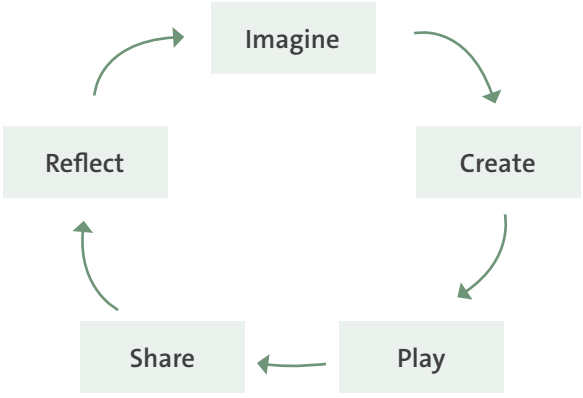


Figure 9: Characteristic phases of a learning cycle (Resnick 2017: 10)

According to Resnick, this learning cycle is to be understood as a lifelong process. In terms of further education and training in digital media competence, this means that educational professionals learn to combine various 'traditional' elements (storytelling, creative design, etc.) and technical possibilities within a continuous learning spiral.

Children learn by facing the world that surrounds them. They acquire knowledge and develop skills by sharing experiences with other children and by observing the phenomena of our world, making assumptions and testing them. In this context, project learning is an important learning method. Children's interests and questions are taken up by educational professionals. Together, they form assumptions on the questions, investigate them over a longer period of time and thus find answers. New questions and interests arise along the way.

Finding questions together and handling them is the basis of modern learning concepts. Question- and research-based learning can be found in many pedagogical approaches, e.g. the method of the Future Classroom Lab or self-organised learning. In a didactics guided by questions, children learn to appreciate the value of the group as a pool of diverse knowledge and different opinions. In a very practical pedagogical context, children work together on tasks and present products that have been developed in a joint effort. By strengthening their ability to work in groups, their democratic ability is also strengthened.

Pedagogical professionals accompany learning and ensure that learning paths and results are reflected. This task results in specific requirements for the actions and pedagogical attitude of the skilled workers. They advise by providing support and enrich learning through targeted impulses.

As learning guides pedagogical professionals consider themselves in the role of fellow researchers, are involved in the children's learning and enjoy discoveries and learning successes together with children. They reflect on their actions and consider the children's learning as part of their own learning process. In order to be able to optimally accompany the children's learning processes, they provide space for their own experiences.

4.3 Action Learning

In "Action Learning" (cf. Støvelbæk 2019: 32f.) in kindergartens, pedagogical professionals develop their pedagogical practice by experimenting, observing and reflecting on concrete everyday situations. In this way, guidelines for practice are developed, new practical experiences are gathered and reflected upon. All with the help of different theoretical concepts.

By working with Action Learning, the pedagogical professionals actively participate and with particular steps in the strengthening of children's learning. Action learning also contributes to the development and learning process of children in their lives. By initiating measures, pedagogical professionals teach on how to relate their actions to the daily work of the children. Educators participating in an Action Learning programme must be interested in reviewing, changing or developing their practice.

Action learning is all about learning and developing practice within applied practice. Through the curious search for discovery, questioning becomes a concrete starting point for work. By focusing on goals, implementation and evaluation, Action Learning can be an instrument to create educational development, promote reflection and develop individual pedagogical practice.

The Action Learning approach is divided into five phases: Question, agency, observation, reflection, processing and exchange of experience.

Phase 1 – Question

„Action Learning" is based on questions of everyday practice. In order to ensure motivation and personal responsibility for one's own path, it is important that the participants themselves are amazed and curious. Questions can arise in many situations, but it is also about how new technologies can be integrated into daily work.

Phase 2 – Agency

Questions form the basis for the subsequent initiation of agency in everyday pedagogical life. Agency can be understood as investigations, activities or experiments that have not been tested or researched before. Activities

can be an opportunity to reach the questions core. Nevertheless a specific problem can also be solved by carrying out experiments.

Phase 3 – Observation

In the next phase, systematic observations of the actions and activities are carried out. In order to ensure the quality of the observations, certain procedures must be followed. The observations can be written down in a logbook. Photos, videos, sound or interview recordings can also be used for documentation.

Phase 4 – Reflection

The aim of a reflection is to exchange experiences deliberately, to become aware of one's own knowledge and to develop new options for practical work. A reflective interview is a structured conversation in which the participants analyse and discuss the identified questions and the actions taken together according to the help of a mentor. The discussion ends with the choice of a new action that can help the participants to make the phase of questioning even more meaningful.

Phase 5 – Process and exchange of experiences

During and after "Action Learning" the participants and the mentor evaluate the cooperation. Evaluate which development and practical experiences the participants have gone through and reflect these experiences in order to exchange them with colleagues or other persons.

5. Expertise: Integrating Digital Media Literacy in Kindergartens Daily Routine

For more than 5 years, educational institutions have been considering how to deal with the digitalisation of our everyday lives in their educational routine. Apart from the discussion about whether and for how long children are allowed to hold a portable screen (e.g. tablet), there is no significant educational guideline in many European countries. In some countries, especially Scandinavia and the Benelux, the first step has been to supply the facilities with technical equipment. Copenhagen has provided each kindergarten with a box filled with a tray, laptop, robot, minibeam and so on. Some kindergartens have purchased 3D printers. Other kindergartens also visited FabLabs or used the services of libraries that had purchased technology in the meantime.

If one visits the kindergartens in these countries today, mostly the tablets are find in the hands of the pedagogical professionals. The same observation applies for learning robots. With Lego Education and Lego WeDo, Lego has made an advance into educational institutions. Nevertheless, the result of digitisation efforts in early education is not really convincing. In many countries, the facilities simply lack a powerful W-LAN. But even where this is available, the digital tools are far too often unused.

It needs adults who are trained in the use of technology and digital tools. And who are also able to recognise the social changes driven by digitalisation and to process their findings. In this way, they can develop educational offers that help children to cope with social change and develop skills that enable them to shape their own future responsibly.

At the same time pedagogical professionals must be able to explain these developments to parents and to assist them as consultants. Pedagogical professionals are the first point of contact when parents ask themselves which digital media are useful for their children and which are not.

5.1 The Levels of Digital Media Literacy

In Europe there are numerous educational programmes for early childhood education that describe the skills a kindergarten child should acquire. However, the important learning fields of digital media literacy, the acquisition of which is of great relevance at kindergarten age, are missing to varying degrees. In the context of the education and training of pedagogical professionals in early childhood education on the subject of digital media literacy, it is important to know these developmental steps and to promote them with suitable educational offers.

There is currently a worldwide discussion about the competencies that today's children need for a future life in a digital world[2]. Against this background, we have discussed various competency areas. Our aim was to find and establish practical relevance in the various competency models. Too many competencies are not suitable for applied education as too much complexity is created. This is rather confusing than inspiring. We therefore agreed on a summary of the existing competence models in three areas.

2 The focus is on acquiring key competencies in the areas of cooperation, innovation, self-reflection, communication, knowledge acquisition and information technology (see 21st century skills, in: https://ucc.dk/konsulentydelser/skole/it-i-skolen/21st-century-skills. Last accessed: 05.09.2019).

Production Literacy

Whether it's taking photos of insects and compiling them into an insect book, recording and explaining an experiment, illustrating and speaking about a friend, using mini beamers to transform the movement space into a jungle. All of these activities, however, have a consuming component, which is shown by the fact that children use a device without understanding how it works. In this context, they remain "users", i.e. pure users who are at the mercy of the technical device and are restricted in their own ideas by its functions. We should therefore go one step further. It is therefore a matter of understanding technology in such a way that one can use it for one's own purposes. Developing your own ideas and being able to realise them by yourself, this experience strengthens children's self-esteem and self-confidence. This means developing design competence for the digital world as well. This self-determined approach is particularly important in order to prevent children from becoming passive consumers.

Hence, in this area there is a need to train producers instead of consumers. It includes the maker mentality as well as the fact that game-playing is an important learning act. Our findings on working with creativity processes in kindergarten are also important. Those who want to develop and implement their own ideas must be able to operate machines. Even today it is easy to operate machines if one is able to understand and use computer programs. Machines are controlled by computers. That is why we have assigned programming to this area.

Technological Literacy

The area of technology requires that kindergartens include technical knowledge in their educational goals. Basic laws of physics, electric circuits and mechanical principles should be the goal of joint research activities between children and educators. The fact that kindergarten children have to acquire basic knowledge about electricity is probably included in most educational programmes. Nevertheless, in many kindergartens today there is still no material for building electric circuits. Questions like "How does the picture get into the printer? What is a QR code? What does a chip or printed circuit board consist of?" are worth being treated in preschool. Even many adults do not have this knowledge. For this very reason it makes sense to go on discovery trips together with the children. It is one thing to get something explained about electricity and technology. It is another thing to build your own electric circuit to get to the bottom of things by trying them out, tinkering and puzzling, e.g. with electric circuits that are simply glued to paper with copper tape. Experience-based learning through discovering is a very successful process of knowledge transfer, which is especially useful in kindergarten. The children are curious and full of confidence in the success of their ideas. The children therefore need materials and opportunities for their own testing, for example with robots like the Ozobots, Beebots or with Dash. The Ozobots move on drawn lines over paper. With the help of color codes, which are also drawn, they change direction or glow in different colors. A Beebot is a robot insect that is programmed with arrow keys.

Information Literacy

The truth plays an important role in people's lives. Truth provides orientation and is the basis for the cohesion of a social group. The dawn of the Internet and social networks has irritated our society. The excess of available information, the truth content of which is difficult to validate, combined with manipulation and seduction, poses great challenges to educational institutions in particular. Therefore, we consider it important to supplement the educational goals with the topic of judgement and responsibility. Media literacy alone is no longer sufficient. The influence of globally networked information systems, which in addition to their opacity are guided by economic and political interests, calls for a reorientation of our information behaviour and the associated social skills.

Information literacy therefore refers to the ability to provide and generate information. Children experience that information is just a mouse click away - yet they don't know exactly who provided and distributed the information. They need to learn to independently assess the quality of information on the Internet. Pre-school children are particularly fascinated by the Internet because they deduce from the way adults inform themselves that the Internet stands for truth. Who actually writes the Internet? What do I have to learn so that I can later become an Internet writer? These are questions from five-year-olds. Such questions must be answered and so it is an important task of the kindergarten to educate preschool children about search algorithms and to disenchant the Internet as a "truth institution".

This discussion is being conducted at a very general level. The degree of operationalisation varies from country to country, but is in no way sufficient to make the requirements for implementing the new task clear in professionals daily work. Professionals therefore need supporting structures. This has prompted us to use the structure of the existing „learning steps“ by adding competencies and criteria from the three areas identified by us: innovation (production literacy and coding), technology (technological literacy) and information literacy[3].

3 „Learning steps“ are a supporting structure for the daily work of pedagogical professionals (cf. Bostelmann 2014a and 2014b). They support the skilled workers in keeping an eye on the development and acquisition of competence of each individual child. Learning steps create transparency by showing the children which learning topics they have to deal with. They represent a kind of promise the professionals make and emphasises: „You will be able to or have understood this by the end of the semester“. „Learning steps“ are a simplification of the learning and competence development process. Hence, these processes become clarified for all participants.

Goals of learning steps for digital media literacy in kindergarten

Step 1

You can sort things by similarities.

You can sort things by size.

You recognise and distinguish patterns.

You can add simple patterns.

You can shape clay, dough or other soft materials.

You can stack bricks on top of each other.

You can switch simple technical devices on and off.

Step 2

I know geometric shapes and can go on with simple patterns.

I know something about how technical equipment and vehicles work.

I know the safety rules for handling technical equipment (universe).

I can tell you something about photographs.

Step 3

I can distinguish numbers from other characters.

I can create complex patterns on my own.

I can create an object.

I can build a simple electric circuit.

I know which things attract magnets and have learned something about magnetism.

I know methods for using digital technology to change realistic presentations.

Step 4

I can create step-by-step instructions for simple action sequences.

I can create my own ideas when designing, building and forming.

I can make healthy food from simple recipes.

I can mirror patterns.

I know that there are materials that conduct electricity and there are materials that do not conduct electricity.

I know things that are controlled by computers.

I know how to use and operate typical technical devices in daily routine and can describe them.

I can document my observations with a drawing or digital media.

Step 5

I can distinguish different symbolic systems (notes, numbers).

I can implement motion sequences with if-then statements.

I master a sophisticated printing technique.

I can use digital technology to express myself.

Production Literacy & Coding (Innovation)
Technological Literacy (Technology)
Information Literacy

With the criteria listed below, the pedagogical professional can assess whether the children have already mastered the previously listed learning steps of digital media literacy.

Step	Subject	Competence	Criteria
1	Production Literacy & Coding	You can sort things by similarities	The child shows interest in assigning objects of similar colours to each other, e.g. when building with coloured bricks.
1	Production Literacy & Coding	You can sort things by size.	The child can, for example, sort stuffed animals by size to form “families”.
1	Production Literacy & Coding	You recognise and distinguish patterns.	The child recognises patterns. It can, for example, point to the same pattern.
1	Production Literacy & Coding	You can add simple patterns.	For example, the child adds colour or animal patterns.
1	Production Literacy & Coding	You can shape clay, dough or other soft materials.	The child slushes with clay or similar materials.
1	Production Literacy & Coding	You can stack bricks on top of each other.	The child builds and places more than two stones consciously next to each other or on top of each other.
1	Technological Literacy	You can switch simple technical devices on and off.	The child can switch a lamp or a music system on and off.
2	Information Literacy	I can tell you something about photographs.	I tell what can be seen on a photograph and can connect it with my daily routine.
2	Production Literacy & Coding	I know geometric shapes and can continue simple patterns.	The child knows shapes such as circles, squares, triangles and can add corresponding pattern series.
2	Technological Literacy	I know something about how technical equipment and vehicles work.	The child knows that airplanes and vehicles are man-made things. They know that technical devices need electricity.
2	Technological Literacy	I know the safety rules for handling technical equipment.	The child can say in his or her own words what has to be considered when handling technical equipment.
3	Information Literacy	I know methods how to change realistic representations with the help of digital technology.	The child can change realistic images with the help of e.g. image editing programs or green screens.
3	Production Literacy & Coding	I can distinguish numbers from other characters.	The child recognizes numbers and can distinguish them from letters
3	Production Literacy & Coding	I can create complex patterns on my own.	I have understood that patterns follow certain laws and can develop them by myself.
3	Production Literacy & Coding	I can design an object.	The child can create a plastic object by deforming or joining materials.

Step	Subject	Competence	Criteria
3	Technological Literacy	I can build a simple circuit.	The child has carried out experiments with electricity, e.g. a light bulb with the help of battery and crocodile clips to light up.
3	Technological Literacy	I know which things attract magnets and have learned something about magnetism	The kid was experimenting with magnetism.
4	Information Literacy	I can document my observations with a drawing or digital media.	The child can document observations of nature/ experiments, e.g. with diagrams or film sequences. The child can develop and justify its own ideas.
4	Production Literacy & Coding	I can create step-by-step instructions for simple action sequences.	The child can plan sequences of action in the correct order and communicate precisely (e.g. setting the table, navigating a course for a group of children).
4	Production Literacy & Coding	I can implement my own ideas in construction, building and forming.	Can produce an object according to his own plan using suitable working techniques.
4	Production Literacy & Coding	I can prepare healthy food according to simple recipes.	The child can remember which ingredients fit together, e.g. for salads or quark dishes. The child masters simple kitchen techniques (mixing, measuring quantities, etc.).
4	Production Literacy & Coding	I can mirror patterns.	I recognise the laws of patterns and can mirror them.
4	Technological Literacy	I know that there are materials that conduct electricity and there are materials that do not conduct electricity.	The child conducted experiments with conductive and non-conductive materials.
4	Technological Literacy	I know things that are controlled by computers.	The child knows everyday objects that work with the help of a computer and can give corresponding examples. (mobile phone, washing machine, central heating, navigation system, etc.)
4	Technological Literacy	I am familiar with the use and operating procedures of typical everyday technical devices and can describe them.	The child knows how a television, telephone or kitchen work and what these appliances are used for.
5	Information Literacy	I can use digital technology to express myself.	The child can use digital technology (e.g. puppet pals, film, photo) to tell stories about real events or about themselves.
5	Production Literacy & Coding	I can distinguish different symbol systems (notes, numbers).	I know that notes represent pitches and digits

Step	Subject	Competence	Criteria
5	Production Literacy & Coding	I can implement motion sequences with if-then statements.	I have learned that it is sometimes convenient to make arrangements for different circumstances (e.g. if the traffic light is green, go straight out, if not, wait).
5	Production Literacy & Coding	I have mastered a sophisticated printing technique.	The child masters multi-step printing techniques such as multicolour printing or linocut.

5.2 Makerspaces in Kindergartens and the Maker-Mentality

„Makerspaces" are creative spaces and workshops (usually open to the public) in which diverse materials and technical equipment are made available for the implementation of joint project ideas. In these pedagogical environments children face special task, which they can examine in their complexity to develop concrete solutions.

What is special is that children implement their ideas and theories in the "makerspaces" by building, tinkering, constructing, programming and designing. They can use diverse materials such as wood, clay, cardboard and paper as well as digital media and technologies. They then use the opportunities offered in the "makerspaces" to present the products of their joint work, e.g. in the form of exhibitions.

Through collaborative, project-based forms of learning and through practical, experimental work on self-chosen challenges and through relevant, context-related and realistic situations important key competencies such as problem-solving skills, team-work skills and creativity can be promoted in the preschool area (cf. Schelhowe 2013). On this methodical basis, children become active learners and creative designers who develop their own initiative, reflect on what they have learned, consider alternatives, develop and directly test new solutions.

Against this background, it seems important to point out the importance of "game-playing" - especially in the training and education of pedagogical professionals. Pedagogical professionals should not train so much on how to operate technical equipment rather as how to 'play' with it. In other words, 'learning by doing' can be extended by 'learning by playing'. This enables pedagogical professionals to (re)learn in order to be able to really live this open pedagogical attitude in their work. Makerspaces are thus not only centres of 'doing', but also always centres of thinking.

The kindergarten as a learning laboratory

In modern pedagogy, a learning laboratory is a material-rich and stimulating learning environment that focuses on active, self-organised and learning through discovering. A learning laboratory is a permanently furnished room with a variety of tools, materials and everyday objects. It is set up in such a way that children are stimulated to marvel, ask questions, try out and discover and to learn co-constructively. Learning is an active and holistic process in which the learner is the decisive actor. The material provided must fit the current state of development and be offered in a form that stimulates action and arouses curiosity. It must be able to withstand a wide range of studies and be used in as many different ways as possible.

Space has an influence on behaviour and learning. In pedagogical contexts one speaks of space as the “third educator”. Room design plays a decisive role in learning processes that are intended to promote creativity, initiative and social invention. Well thought spatial design creates incentives and can positively influence educational processes of children and adults.

In the minds of the mini-makers, an educational space is a workshop that supports joint activities. Not only educational settings are considered. Rather, the play activity in particular, which is understood as curious and concentrated research, should be stimulated and supported. For this reason it is not enough to set up a makerspace in the kindergarten. Rather, each room should be examined to see whether creative learning and joint activities are supported as well as the material it offers. It should be kept in mind that creative play also needs a place of retreat and that opportunities of contemplation are implemented on purpose.

Figure 10: View of Makerspace Room

Interior design is very important to promote creativity. Creativity is promoted by providing children with an environment in which a variety of incentives are available for a wide variety of activities: As soon as they enter, they feel like trying out all the things they have to offer.

A clearly arranged room promotes learning processes and enables children to work independently on their projects over a longer period of time. This is only possible if you find the things you need by yourself. This also means that the material that the children can use without the guidance of an adult is readily available and clearly visible: i.e. on the open shelf instead of behind closed cupboard doors. High-quality and expensive materials can also be laid out open at children’s height instead of hiding them in the cupboard. Here, the task of the pedagogical professionals is to encourage the children to handle the valuable material responsibly. Exceptions to this should refer to a few things that are too dangerous without the support of adults.

The changed educational requirements for kindergartens causes a new priority to the learning laboratory concept. The aim is to prepare children for the digital world by providing new knowledge about technology, digital information systems and new social structures without simply continueing the time children spend in front of monitors anyway. The learning environment should therefore be enriched with materials that encourage chil-

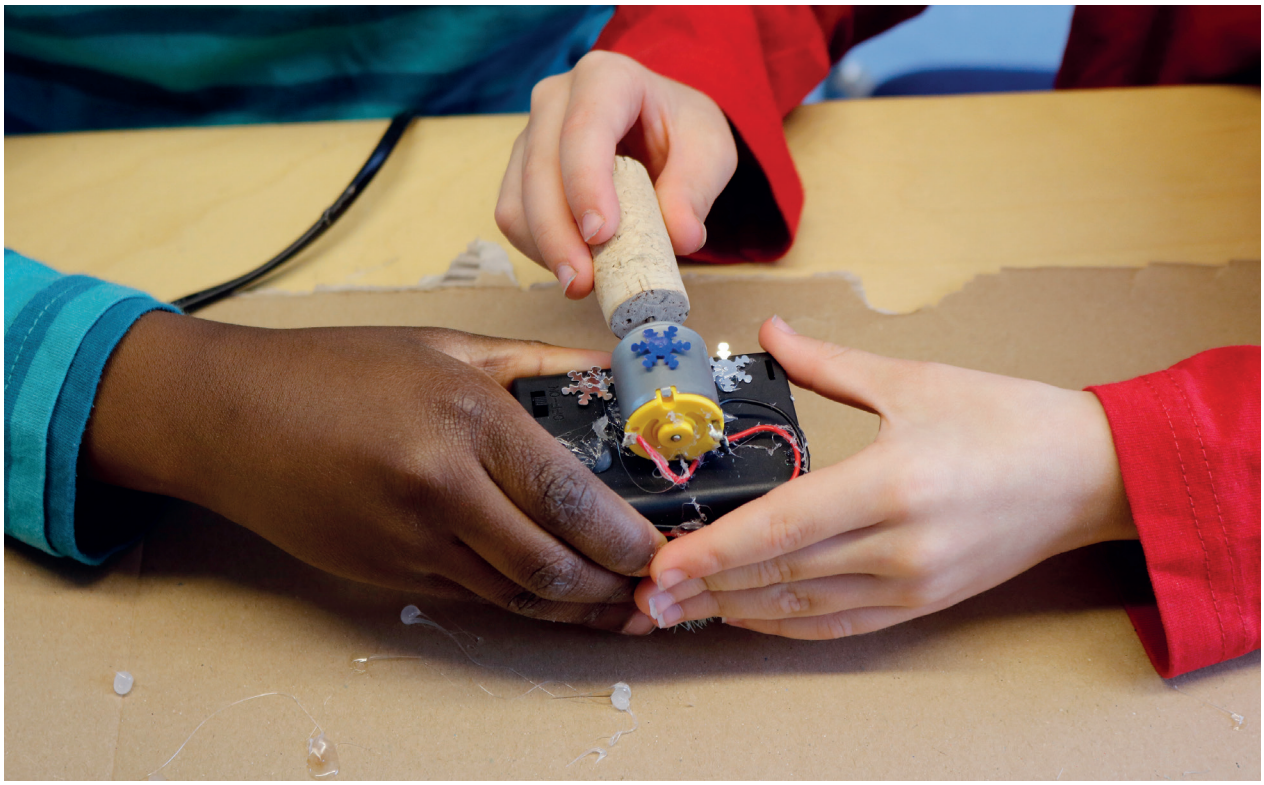


Figure 11: Children who build something with garbage and electrical equipment

dren to actively engage with the various aspects of digitalisation: Cables, motors, batteries, switches, conductive tape or yarn, conductive paint or dough, small processors and a few robots. The technology should be integrated into the conceptional design of the room in such a way that the children can use it as a meaningful enrichment of their game and develop a responsible handling of digital media. The placement of digital and technical materials close-by and in a stimulating way is meaningful and up-to-date.

We have experimented with different spatial designs and discussed much about our observations and experiences. In the end we agreed that it makes little sense to recommend new rooms or special shelves filled with technical things to the kindergarten. Creativity comes with the integration of things. So it makes sense to provide a corner in the kindergarten studio free for the work with electricity and motors and to design in such a way that

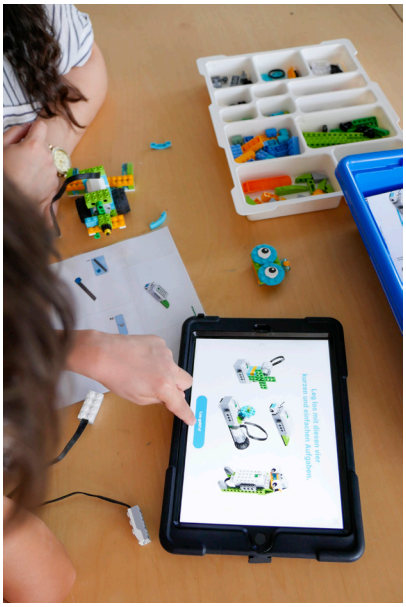


Figure 12, 13: Children who work with Lego Wedo; Space with robot

the shelf with the material, the necessary tools and a table specially made for this work in close proximity to each other invite to invention. In the installation space a programmable robot, cardboard boxes and plastic screws as well as Lego mechanics or Lego Wedo boxes will invite you to extend the games you have played so far.

Thus, digital media find its place in various educational areas. Such as digital construction materials in the installation space, mathematical games to promote mathematical competence or letter games for early literacy. In the kindergarten, tablets for information research in various knowledge areas should be freely accessible and loaded for the children.

The learning laboratory needs materials that are ready to play. This is not the sole responsibility of the teachers. Charging stations at various locations in the kindergarten, which are marked for their purpose, help the children to understand that after the game-play the device must be returned to the power supply.

Integration of the digital reality of life into the crèche

Since children in the crèche age are increasingly learning about sensual experiences, a makerspace or a learning workshop with technical and electronic materials in the crèche does not yet make sense. Children between the ages of 0 and approx. 3 years learn more experimentally using their whole body and all their senses. Sensibly furnished nursery rooms respond to the children's needs for well-being, exploration and retreat. Rooms for small children should be equipped with materials that support their learning processes and sensual experiences. These include, for example, everyday and natural materials, which are of different types and can be combined with each other. Above all, they must be easily accessible for the children - i.e. close to the ground - and clearly laid out.

For example, it is possible to set up a crib studio. In such a room the children are provided with things to touch, lick, dismantle and places to move, distribute, paint and mate. Here they can experiment, spill and design undisturbed, which corresponds to their needs to a high degree.

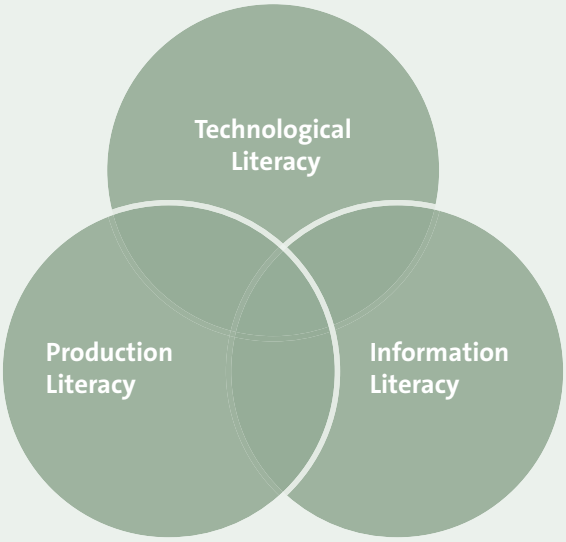
Figure 14, 15: Building with everyday materials: Flashlight and painting robot

6. The Structure and Learning Objectives for Training in the Use of Digital Media in Pedagogical Daily Routine for Pedagogical Professionals in Early Childhood Education

Technical innovation and the proceeding digitalisation are currently changing the experience and the knowledge of children. Thus the demands on educational work in the kindergarten and preschool sector are changing too. Societal participation is increasingly linked to technical and digital skills. Hence, educators are challenged to provide children with skills to deal responsibly and critically with digital media and an insight into technical contexts and the functioning of technology. This also means that pre-school children should learn to express themselves creatively using digital media and technology, just as they do with wood, plaster or clay. All of this is best achieved in so-called "makerspaces". Makerspaces are equipped with recycled and handicraft materials such as cardboard, paper, clay, wood as well as technical and digital materials such as switches, batteries, copper tape or miniprocessors. Therein children can experiment, tinker, handicraft and educate themselves. According to the principle "challenge-based learning" they develop their own solutions to specific questions or problems. Technology and digital media are not used as a substitute for social interactions or well-functioning analogue learning materials. Rather, they serve as a complementary tool for promoting creativity and self-learning processes.

Upon completion of the "Mini-Maker" advanced training course, participants are capable to carry out pedagogically sound courses in the fields of electricity, technology, robots, language training, sciences and/or art with the support of digital tools. This enables them to meet all the requirements that educational plans in the fields of technology and media pedagogy place on pedagogical professionals. The participants gain a basic understanding of media pedagogical approaches and participate in the further development of the educational tasks of the kindergarten.

During the training the pedagogical professionals become enabled to support children in kindergarten and preschool in their skill development in the three learning fields of digital media competence. By themselves they develop competencies in technical, production and information literacy. However, the three fields of competencies should not be considered separately. Rather, they are interlinked since they are equally effective in many activities and pedagogical offerings.



Technological Literacy

For children to really understand technology and its (physical) laws, they need technical devices and materials to touch and use. In order to learn the responsible use of technology and digital media, children need space as well as a variety of possibilities to experiment with the devices independently. Additionally they need adults to accompany and support them in their learning processes. These adults do not necessarily need to have a sound knowledge of technology or digitalization. Nevertheless they should have a certain attitude that is above all characterized by receptiveness and impartiality. They should show an interest in finding out what lies behind certain technical phenomena or problems to find answers and solutions together with the children.

Production Literacy

Children should not only learn how to use different technical devices, moreover they need to understand how they function. They should learn how to use and change them for their own purposes. It is about children using technology and digital media as tools for their own learning processes. With the purposeful use of technical and digital instruments children are supported in understanding the logic and basic functioning of devices and constructions. In other words, the comprehension of an electric circuit works much faster if you already have built one by yourself. It is a switch from passive to active learning. For this it is necessary that children develop their own ideas which they can also produce on their own eventually. Psychologically spoken knowledge is internalized sustainably when it is acquired in ones own actions. In addition, children realise their self-efficacy by developing their own small project ideas, which in turn significantly strengthens their self-confidence and self-esteem.

Information Literacy

Thanks to the Internet nowadays children have access to information with one click. However, children do not know where this information comes from or from whom. Rather they observe adults who take the Internet for granted and deduce that the Internet is omniscient and that the information provided is always true. They are not yet able to filter the content for authenticity, seriousness and security and cannot always distinguish deception from reality. They must therefore learn how to independently assess the quality of information on the Internet and how to find the right answers to their questions. Being able to do the right research is a competence that is of great importance today, since it is not a question of being omniscient in life and later in one's career. Rather, it is about being able to act and to obtain the information suitable for the situation at the right moment.

6.1 “Learning Steps” for Training

Goals of “Learning Steps”

Name: **Year:**

No.	Competence	Participant	Learning Guide	Proof
Production Literacy & Coding				
1	I know basic programming concepts that are also relevant in daily routine.			
2	I know basic programming concepts and can develop diverse education offerings.			
3	I know basic concepts of visual programming concepts and can apply them.			
4	I can carry out different offers with visual code blocks (Blockly) in the pedagogical daily routine.			
5	I know the order in which programming languages can be integrated into everyday pedagogical life.			
6	I can build simple three-dimensional models and thus convey the meaning of the term 3D.			
7	I can design appealing and functional products for daily pedagogical use and know the tools and materials.			

Goals of “Criteria Steps”

Name: **Year:**

No.	Competence	Criteria
1	I know basic programming concepts that are also relevant in daily routine.	In my pedagogical daily routine I can develop offers through which children can get to know programming concepts and experience them together in role plays. I am familiar with various offers for analogue programming and can apply them in daily routine.
2	I know different codings in daily routine and can develop different offers for it.	I understand encodings such as barcode, QR code and can decode them. I can generate code myself.
3	I know basic concepts of visual programming concepts and can apply them.	I understand that programming consists of individual commands and sequences merged from them. I understand the usefulness of loops for programming. I know that a `bug` is a bug in an algorithm that can be fixed by changing, deleting or adding substeps (debugging). I know how to program conditional loops (e.g. “While” or “For”).
4	I can carry out different offers with visual code blocks (Blockly) in the pedagogical daily routine.	I can program different devices using visual code blocks. I learned something about the thesis that code is the language competence of the 21st century.
5	I know the order in which programming languages can be integrated into everyday pedagogical life.	I have experienced the action tablets on the topic of patterns, promoting skills that are important in the application of programming concepts. I know in which order it makes sense to introduce different offers.
6	I can build simple three-dimensional models and thus convey the meaning of the term 3D.	I got to know different ways to build analog models in three dimensions. I can certainly put this into pedagogical practice.
7	I can design appealing and functional products for everyday pedagogical use and know the tools and materials I can use for them.	I know different possibilities for the production of selfmade products e.g. for action trays, story bags. For example, I can use modeling software for a 3D printer. I have got to know devices such as laser cutters or plotters.
8	I have a basic knowledge of design thinking processes and have developed ideas for implementation in my everyday pedagogical work.	I know the cycle of design thinking processes. I have developed ideas on how to integrate it into project work with kindergarten children.

Goals of “Learning Steps”

Name: **Year:**

No.	Competence	Participant	Learning Guide	Proof
Technological Literacy				
1	I’m sure I can handle simple electric circuits. I know didactic varieties to implement this topic with children.			
2	I can build models with simple electric circuits, motors and switches. I have developed ideas for pedagogical practice.			
3	I know the most important components of a computer and their task. I know didactic varieties to implement this topic with children.			
4	I have basic knowledge of the use of technical devices such as tablets and computers.			
5	I gained my first experience in the use of electrical engineering and got to know first ideas for the implementation in pedagogical practice.			
6	I learned something about how 3D printers work.			
7	I can critically question the use of 3D printers in kindergarten.			

Goals of “Criteria Steps”

Name: **Year:**

No.	Competence	Criteria
1	I’m sure I can handle simple electric circuits. I know didactic varieties to implement this topic with children.	I can build different electric circuits. I know different conductive and non-conductive materials. I can develop and implement learning opportunities for this.
2	I can build models with simple electric circuits, motors and switches. I have developed ideas for pedagogical practice.	I can build simple models that move and light (e.g. brush bot or LED torch). I can put these offers into practice. I have experienced what machines are.
3	I know the most important components of a computer and their task. I know didactic possibilities to implement this topic with children.	I know components of the computer like CPU, RAM, operating system, and know what these do in the computer. I know the difference between hardware and software. I can implement this topic didactically in everyday pedagogical life.
4	I have basic knowledge of the use of technical devices such as tablets and computers.	I can create photos and movies with technical equipment. I can use word processing programs and create presentations.
5	I gained my first experience in the use of electrical engineering and got to know first ideas for the implementation in pedagogical practice.	I can build simple electric circuits and use printed circuit boards. I can build models with electrical engineering in the pedagogical everyday life in offers.
6	I learned something about how 3D printers work.	I can operate a 3D printer and fix minor problems. I have made self-drawn models with the 3D printer.
7	I can critically question the use of 3D printers in kindergarten.	I can discuss 3D printers in the context of sustainability, resources, and the environment.

Goals of “Learning Steps”

Name: _____ **Year:** _____

No.	Competence	Participant	Learning Guide	Proof
Information Literacy				
1	I can justify the importance of key competencies - which will be important in the future - for my pedagogical daily routine and can create appropriate learning environments.			
2	I can use media tools to collaborate and exchange information in an educational context.			
3	I can discuss the opportunities and risks of digital media and critically question their advantages and disadvantages.			
4	I can use digital technology to document the pedagogical daily routine together with the children			
5	I know methods how to use digital technology to change realistic representations on photos and in films. I can integrate this in a meaningful way into my pedagogical daily routine.			
6	I have learned why it is important for kindergarten children to learn about the Internet. I know the didactic approach to this topic.			
7	I can convey the pedagogical benefits of using digital media in everyday daily routine.			
8	For my own media contributions, I can take into account the principles of copyright and personal rights as well as data protection.			

Goals of “Criteria Steps”

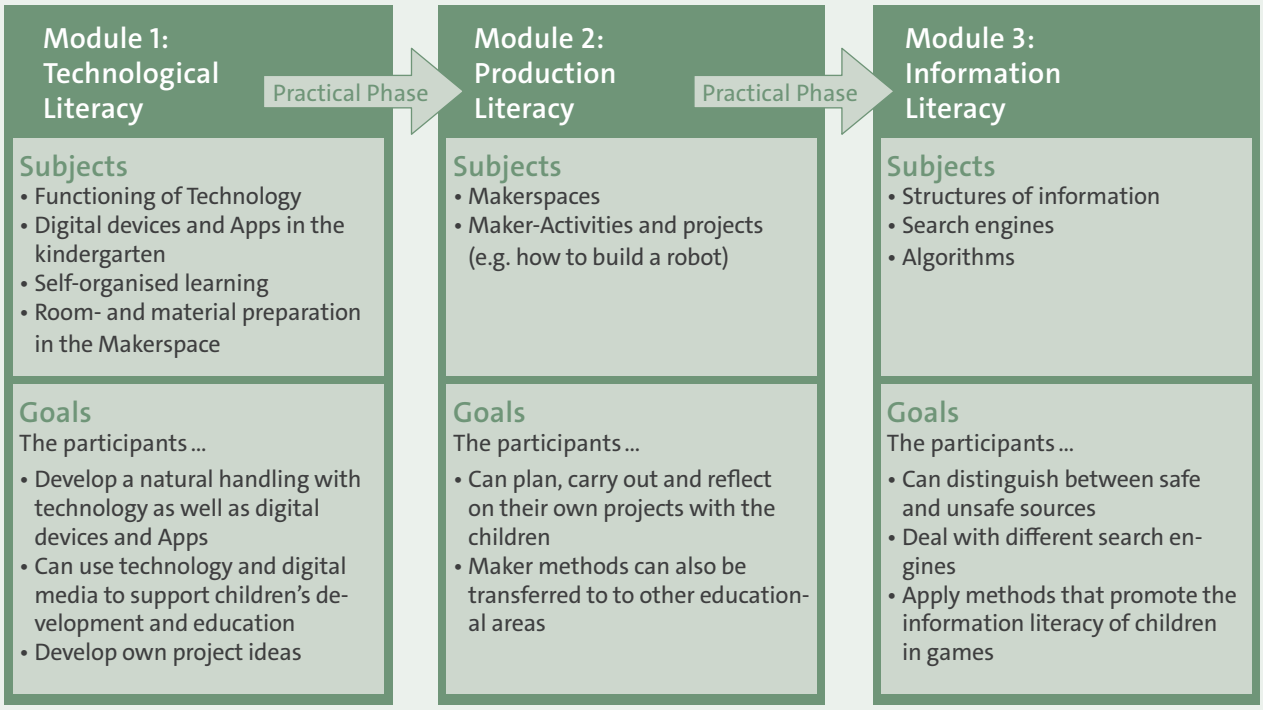
Name: **Year:**

No.	Competence	Criteria
1	I can explain the importance of the key competences which will be important for my pedagogical daily routine in the future and can create appropriate learning environments.	I can identify the relevant key competencies and explain their importance. I can design offers and projects which take into account the following points: integration into the real world, communication and creation, teamwork, critical thinking and personalised learning.
2	I can use media tools to collaborate and exchange information in an educational context.	I can use web-based platforms to collaborate, share and collaborate on documents.
3	I can discuss the opportunities and risks of digital media and critically question their advantages and disadvantages.	I discuss different applications of digital communication and digital media in an educational context and reflect advantages and disadvantages.
4	I can use digital technology to document the pedagogical daily routine together with the children.	I can use various digital applications to create invented stories with the children or to document real events. For this purpose I can plan a corresponding sequence of action together with the children and implement it in the team across educational areas.
5	I know methods how to use digital technology to change realistic representations on photos and in films. I can integrate this in a meaningful way into my pedagogical everyday life.	For example, I can use image editing programs or GreenScreen to create movies or learning documentaries with real and fictitious elements. I can discuss the truth of information in pedagogical daily routine.
6	I have learned why it is important for kindergarten children to learn about the Internet. I know the didactic approach to this topic.	I have basic knowledge of how the Internet works. I know that algorithms are used by search engines, networks, online shops. I can develop and implement appropriate offers for pedagogical practice. I have experienced that displayed results can be adapted to my profile.
7	I know the difference between machines and robots.	I can develop educational offers in which I can take up the topic: “machine, or robot” with the children. I can explore questions such as “When does a machine become a robot” together with the children.
8	I can convey the pedagogical benefits of using digital media in pedagogical daily routine.	I can pass on to parents, or colleagues, the methods, tools for the use of digital media. I know the different competencies (level sheet targets) which are important in kindergarten.
9	For my own media contributions, I can take into account the principles of copyright and personal rights as well as data protection.	I observe the basics of copyright and personal rights as well as data protection in my own media productions and my communication in social networks.

6.2 Structure of the Training

The practical training is divided into three modules, which cover the three fields of competencies technology, production and information. These three modules can be offered as individual events or as a complete package. Schedule and range can also vary according to requirements. For example, a module can be distributed within one weekend or over five (consecutive or individual) days. The training depends on the initial situation and the needs of the participants and should therefore be flexible and adaptable.

The following overview shows the individual modules of further training with the particular topics and learning objectives. Between the modules, practical phases should be inserted in which the participants can implement what they have learned in an institution and then reflect on within the group and mentors. If only individual modules are attended, the participants should also be given the opportunity to practice.



In the modules, short input phases alternate with practical training and independent work in one's own kindergarten or in a practical kindergarten under the reflective guidance of the trainers.

The practical phases between the classroom sessions enable the direct implementation of what has been learnt in the participants' daily pedagogical work. In the following presence phase, the implementation of the participants' own small projects can be reflected upon and, if necessary, suggestions for improvement or alternative courses of action can be derived. Through this close integration of theory, practice and reflection, the participants develop sustainable skills and abilities in the areas of competence described above.

The participants themselves learn according to the principle of "challenge-based learning" within the training course, so that they experience how effective the acquisition of knowledge and skills is when it is stimulated by self-learning processes and creative solution finding. This makes it easier for them to see themselves more as learning guides and less as classical knowledge transferes. Educators can better initiate and support this type of learning in children if they have experienced it by themselves.

This means that the participants themselves carry out projects and activities that they can later implement with the children in their daily pedagogical work. In the modules they should bring in their own experiences, ideas and examples from practice and work on their specific questions or problems. Participants will have the opportunity to try out in makerspaces all the materials that play an important role in acquiring technical, production and

information skills. They experiment with digital and technical devices, apps or other tools such as the 3D printer, laser cutter, MaKey MaKey, green screen, puppet pals, etc. The students will also be able to learn how to use the materials in the classroom. In dealing with them, they learn, for example, how to make films by themselves or how to build a simple robot. The participants will also see on site what means they can use to set up makerspaces for the children in their facility and what possibilities they have for using them.

In the following we show two exemplary structured weeks:

Schedule Training Mini Maker Week 1

Day Time	1st Day 08.00 AM – 03.00 PM	2nd Day 008.00 AM – 03.00 PM	3rd Day 08.00 AM – 03.00 PM	4th Day 08.00 AM – 03.00 PM	5th Day 08.00 AM – 03.00 PM
7.45 - 8.00	Arriving	Arriving	Arriving	Arriving	Arriving
8.00 - 12.00	Welcoming Procedure and Content Expectation matching until 10.00 AM — — — — — — — — — Input: How do children learn and when does the use of digital media make sense?	Applied Maker: Tinkering in Makerspace „Invent meaningfully“ (build diverse robots)	Applied Maker: “Understanding the inside of the computer together with children” “Hello Ruby - The journey inside the computer”, building paper models...	Applied Maker: Information Literacy Internet - search engines, algorithms in everyday life e.g. brushing teeth, QR - codes	Applied Maker: Project Ideas for the Educational Sectors Universe and Society entry Geocaching, Everything round, Determine plants, Digital microscopes/Create allocation game
12.00 - 12.30	Break	Break	Break	Break	Break
12.30 - 02.30	Applied Maker: Entry to electric circuits: What conducts electricity and what does not?	Input: Possible applications of digital media in the day care centre	Input: Project work & development of project ideas for implementation in your own facility	Applied Maker: First programming. Getting Started Movement Game - Learning counter: Getting to know and trying out materials and apps on the topic of coding	Input: Project work, reflection and agreements on the projects to be carried out by week 2.
02.30 - 03.30	Final circle and feedback	Final circle and feedback	Final circle and feedback	Final circle and feedback	Final circle and feedback

Schedule Training Mini Maker Week 2

Day Time	1st Day 08.00 AM – 03.00 PM	2nd Day 008.00 AM – 03.00 PM	3rd Day 08.00 AM – 03.00 PM	4th Day 08.00 AM – 03.00 PM	5th Day 08.00 AM – 03.00 PM
7.45 - 8.00	Arriving	Arriving	Arriving	Arriving	Arriving
8.00 - 12.00	Welcoming Evalation and Reflection of the applied projects until 09.45 AM — — — — — — — — — Applied Maker: film workshop. Learning counter: Getting to know different application possibilities in pedagogical practice, trying out different possibilities for creating films	Applied Maker: Getting started with 3D printing geometric shapes, building with chickpeas, building paper models, first 3D prints	Discussion: How can the Makerspace Methodology be meaningfully linked with all educational areas?	Discussion: How do we convince adults (our team, our sponsors, parents, etc.) of our media pedagogical work?	Final Presentation
12.00 - 12.30	Break	Break	Break	Break	Break
12.30 - 02.30	Applied Maker: Learning counter: Development of ideas for the use of digital media, with the background from consumer to producer	Input: How do I design an offer with digital media sensibly?	Time for the preparation of the final presentation; individual further tinkering	Time for the preparation of the final presentation; individual further tinkering	Final circly and feedback
02.30 - 03.30	Final circle and feedback	Final circle and feedback	Final circle and feedback	Final circle and feedback	Final circle and feedback

6.3 Proposals for the Didactical Planning

Learning Opportunity for Skills[4]	Methodology / Procedure	Didactical Comment
Day 1 ... Serves to get to know each other, to clarify expectations and to set theoretical basics.		
The educator can search specifically for media content and find it. The educator works creatively and constructively with media. The educator uses media as tools to produce his/her own products or to implement his/her own ideas.	• Photos with certain facial expressions or gestures and/or an object in the context of digital media. • Teams of 2. • With the help of the photos, a round of introductions takes place in which the participants introduce themselves with their poses (either themselves or the other person). • In a second round, the portraits are changed using an app. • Installing the App • Designing the portrait. • Changed portraits that represent in which area or subject the participants would like to develop. • Print out photos and assign them to workshop planning (already prepared on large pin-board poster). • After a short break, in which the program is changed if necessary, the presentation of the course of events for the next days follows.	• The photo game at the beginning of the training is the first step into the reflection of one's own use of media. By selecting a photo and a pose that represents one's own experiences and developmental desires, an abstraction is achieved from everyday experiences to a meta-level that can trigger the process of reflection. The reflection is not finished with this unit, but is taken up and continued in the course of the further education. • At the same time, the exercise fulfils other functions: ◦ The participants get to know each other and learn something about the others. ◦ The wishes of the participants are directly taken into account in the presented schedule, which increases the feeling of self-efficacy in the individual participants and thus also increases motivation. **Tasks of the trainers:** • Preparation of the materials • Moderation and documentation • Ensure a trusting atmosphere
The educator can search for particular media content and find it. The educator works creatively and constructively with media. The educator uses media as tools to produce his/her own products or to implement his/her own ideas.	**Questions to answer:** • How many spines does a hedgehog have? • What does the wind do when it is not blowing? • How far is the sky? • What is the distance from door to window? • How heavy is the coffee cup • ... **Validity of the sources:** • Selection of text modules for the quality of sources • Walk through the laid out text modules • Then the further procedure is explained: The participants now have about 20 minutes to take a close look at the text modules laid out in the room (each on a DIN A4 note with a few sentences or comprehensible keywords that concisely characterise a specific aspect of the source quality) on which quality criteria of sources are presented (example slides of a presentation on the quality of sources that could be used for the walk). -> text modules from the App „Fake News Check" • The participants perceive this part of the exercise individually and do not yet go into the exchange with each other. At most playing marbles is possible. • After 20 minutes the participants can select a text module that they subjectively regard as particularly important for their own choice of source.	• The exercise focuses on information literacy. The initial aim is to find out how information can be searched for and checked in general. The questions encourage to do this in a variety of ways. • In the following phase, in which the participants view the material for themselves and make an individual choice about what is particularly important for them, the knowledge is expanded. In addition, the newly acquired knowledge must be linked with one's own experiences, since prioritisation of knowledge is required on the basis of one's own wealth of experience. • In the presentation of the selected fragment, an in-depth examination of the newly acquired knowledge takes place, since it must be reformulated in one's own words and the connection to one's own experiences must be demonstrated. • In the group discussion the contents are repeated again and deepened by further connections of one's own experiences. • The visualization by the trainer ensures on the one hand the results and at the same time supports the comprehensibility of the discussed points for all participants. **Task of the trainer:** • Preparation of the suitable material - text blocks for laying out and presentation with the blocks. • Moderation of the final round.

4 In accordance with EQR-Table

Learning Opportunity for Skills[4]	Methodology / Procedure	Didactical Comment
	• Return of the participants to the large group. • The trainer now shows a presentation that contains the text modules that were displayed before in a sequence. As soon as the slide with 'their' text module appears, the participant reports and presents the text module considered significant from their own perspective and explains why the text is particularly important. • By the method of "Mirroring" the trainer extends the explanations, if necessary, by the level of the previous and newly to be learned procedures in the choice of source which may already be recognizable here. Any questions will be clarified with the trainer. This will be followed by a discussion in plenary on the opportunities and risks of choosing a source (fake news), moderated by the trainer. Here, the participants once again contribute their own experiences. The speaker may document the results on a flipchart.	Active listening and professional conversation, summary of the arguments in precise keywords in order to record the contents of the discussion.
The educator can search specifically for media content and find it.	**Research on topics or fields of education:** • in plenary: collection of topics on which is to be researched (selected) • alternative: research on the sectors of the educational plan in the corresponding federal state	• The already acquired knowledge can be applied and anchored in the in-depth exercise for information research.
The educator works creatively and constructively with media. The educator uses media as tools to produce his/her own products or to implement his/her own ideas.	**Working in small groups:** • The participants are commissioned to come together in small groups with three participants (methods of group division: see Klein 2003; Schubach/Beermann 2010). • Each of the participant specifies the interest again. • Work order: Compilation of recommendable pages in the net (if necessary also naming of not recommendable pages) • After approximately one hour all participants meet in the plenum. • Presentation of a selected source/website by the small group • Joint exchange and workshop management makes reference to quality criteria for source selection • What insights have been gained? The catalogue of research results is compiled by the management, supplemented if necessary and made available to participants after completion (mail, drop box, ...).	• The choice of a topic relevant for one's own practice serves to motivate and to include the topics and interests of the participants. The topic block can thus be individually processed and filled. • In the presentation in the plenum, the knowledge acquired by the participants themselves is shared and passed on to the others. • The collection of material, which was created by means of research, can be used by all participants as a concrete working aid. **Task of the trainer:** • Moderation • Provision of materials • Moderation of the large group • Support with questions, perhaps also with the search for topics Compilation of the results.
Day 2 ... theoretical basics and "creative construction"		
The educator can search for particular media content and find it.	**Introduction:** • Introduce schedule **Energiser:** Repertoire moderation	• By presenting the daily routine, the participants are tuned in. The participants know what to expect today.

Learning Opportunity for Skills[4]	Methodology / Procedure	Didactical Comment
The educator works creatively and constructively with media. The educator uses media as tools to produce his/her own products or to implement his/her own ideas.	**Input digital living environments of children: Short lecture/impulse** **> Why "digital education" in the kindergarten?** • The moderator will give a short lecture on children growing up in a digital world. Current data/studies on media use will be integrated (only briefly) and the question will be raised as to why "digital education" is important? (see presentation) (max. 15 -20 minutes) • A possible discussion can be connected (30 minutes) **Reflection on one's own media use** • Reflection paper and timeline (see worksheets) • The participants are given two worksheets. The first one contains reflection questions which can be used to independently reflect on one's own media use. On the second worksheet there is a timeline on which it is possible to enter the age at which a certain medium was used (30 - 45 minutes). • Afterwards, depending on the time and needs of the participants, the second group can be exchanged. (15 minutes)	• This is followed by a short activation game, which takes the participant into the day and counteracts possible fatigue. The attention for the upcoming lecture will be increased. • A short knowledge input takes place in the next step. In between, questions should be put to the plenum. At the end the still open questions can end in a discussion, depending upon how intensively the group would like to exchange itself. • The subsequent reflection by means of worksheets serves to return from the plenary round to one's own person. The linking of one's own experience with digital media and one's attitude towards "digital education" should be stimulated. The participants are given the opportunity to train their sensitivity to how they perceive media and how they use digital media based on their own biography. • The possibility to exchange ideas afterwards should be handled flexibly, depending on the needs and time available. **Goal of the lecture and the following reflection:** **1. sensitisation and stimulation** with regard to one's own use of the media (exemplary function) **2. knowledge transfer** in dealing with media depending on the age group Then in the later course and possibly for the individual participants future goal: **3. draft an action plan with clear rules** for child day care facilities that is adapted to this concept > Why do we use digital media? How do we justify the use of digital media? When and when not? What do we want to achieve? What is our goal?) **Tasks of the trainer:** • Moderation • Interactive impulse lecture • Leading the ensuing discussion and possibly-maintaining the questions and results Provide an understandable explanation of the reflection task material
	Getting to know different Apps for creating movies, documenting etc.: • The three different Apps will be introduced by the course leader (approx. 10 minutes). • The participants familiarise themselves with the apps by trying them out independently (approx. 20 minutes). • The participants get the assignment to create a short film with the help of one of the apps in two or three groups (depending on the size of the whole group) about the topic "adventure". Each group independently develops a story and selects the app they prefer (approx. 45 minutes - 60 minutes). • The results of the groups are then presented in the plenary session. • Subsequent round of reflection and transfer of one's own experience into the pedagogical context: How did I experience the last lesson? How could these apps be used in a meaningful way in the day-care centre? What does it promote in the children?	• The next unit focuses on the creative and self-controlled learning process of the participants. The Apps have to be known and "discovered" independently. The joy of trying things out and of one's own productivity is an important experience. • The creativity and the integration of one's own experiences are stimulated by the task. • The tablet and the app, which are tools to realise the task, serve to achieve the goal. ◦ This idea can be integrated into the subsequent reflexion. • The next step deals with the possibilities of implementation in the day care centre. Didactic considerations are made and concrete ideas are developed. • The results are recorded and then made available to all participants.

Learning Opportunity for Skills[4]	Methodology / Procedure	Didactical Comment
		Task of the trainer: • Introduction and presentation of the apps • provide material • Ensure smooth presentation of films from the groups Record the results of subsequent ideas
Day 3 ... with a focus on "Coding"		
The educator uses media as tools to produce his/her own products or to implement his/her own ideas.	**Introduction:** • Introduce schedule **Robot treasure hunt** • Participants go together in pairs. A treasure is hidden by one person, without the other person seeing this • Then the person who hid the treasure must lead their "robot" to the treasure by means of commands. • Then the partners are swapped. • Several rounds can be played in which the commands are exchanged ◦ by hand signal ◦ through picture cards ◦ by verbal commands can be given. **Afterwards a short reflection round is held:** • How have I been? Which role did I like better? (Robot or programmer?) • How could the game be implemented in the daycare center? What other ideas could be integrated? E.g. giving commands by means of tones/music	• Daily schedule: see above • The introduction provides first experience of programming, information-processing and -implementation. • With one's own body, it can be understood how information is processed and which codes have to be given tot he robot to reach the target (without Didactical Comment forgetting any important information (code). • The immediate implementation leads to a direct comparison of whether the correct conclusions have been drawn (which codes are required). • Accordingly, the exercise can be transferred into everyday kindergarten life. • The codes can be passed on in two different ways: ◦ A command is always given and the robot executes it directly. ◦ Several commands are given and the robot then starts running when the "Start" button is pressed at the end (the "robot" must then remember the corresponding commands). **Tasks of the trainer:** • Clear and comprehensible moderation of the tasks • Further moderation and change of the task, depending on the needs, motivation and ideas of the group. Summary of the subsequent brief reflection

7. Structure and Learning Objectives for Education in the Use of Digital Media in Pedagogical Daily Routine for Pedagogical Professionals in Early Childhood Education

The topic of digital media still plays a subordinate role in childhood education courses or in the training of pedagogical specialists. Their knowledge is often based on their own - voluntary - commitment to deal with the topic and the possibilities of digital media (Schubert et al. 2018; Friedrichs-Liesenkötter 2016).

Media pedagogy has meanwhile taken a firm place in the training of pedagogical professionals in their studies. However, this is usually limited to the acquisition of knowledge about today's media (systems) and their critical but passive use. Active design skills in the media field, which are a prerequisite for the responsible use of digital devices and technology, are still rarely acquired in media education seminars. Currently, in most European countries, pedagogical staff lack didactic methods and approaches. Further there are scarcities in teaching and learning materials that support an age-appropriate, active and creative use of digital media on the basis of discovering and researching (cf. Thestrup 2013) which promote insight into technical contexts and the functioning of technology.

It is precisely these action-oriented media skills that enable people to develop from consumers to producers who actively use the media to implement their own ideas and projects. Creativity and the ability to solve problems are among the key competences of the 21st century and therefore are an important prerequisite for being or remaining fit for the future. The training of pedagogical professionals on the subject of digitalisation should therefore not concentrate exclusively on media pedagogical aspects.

The political and cultural public is currently discussing the use of digital media primarily as a question of choosing new technologies (computers, iPads, etc.) and new digital tools (mindmasters, Prezi, PuppetPals and educational games, etc.). However, digital media are already an integral part of children's everyday lives when they grow up (cf. vbw 2018) and therefore have a special significance in early childhood education institutions, especially with regard to culture, education and learning.

Against this background, it makes sense to treat the use of digital media in institutions of early childhood education as a new educational project. Training should therefore focus on empowering educators to challenge the traditional agendas of child day care facilities and their educational goals and to support new ways of organising and structuring facilities and educational work.

Educational Goals

Upon completion of their education, students are able to fulfil the requirements of the pedagogical profession of early childhood education. Students acquire a co-constructive and accompanying pedagogical attitude, a basic understanding of media pedagogical approaches and the ability to permanently reflect on educational offers, learning environments and the institutions of early childhood education as well as to further develop them within the framework of new insights and possibilities. They learn to carry out pedagogically founded offers in the areas of electricity, technology, robots, language promotion, science or art with the help of digital tools. This enables them to meet all the educational requirements in the fields of technology and media pedagogy

Competencies

The students develop methodological skills and didactic competencies to playfully introduce children to the creative use of digital techniques and enable them to create their own projects and ideas. These skills are acquired by

the students themselves with the help of self-organised and co-constructive learning and educational arrangements. This procedure is the basis for the development of a co-constructive pedagogical basic attitude of the future pedagogical specialists.

In addition, the students acquire competences that enable them to treat the use of digital media in institutions of early childhood education as a new educational project in the context of which a digital culture can emerge. To this end, they need competencies that make it possible to question the traditional agenda of day-care centres and their educational goals and to support new ways of organising and structuring institutions and educational work. In this context, competencies such as:

- to permanently combine and expand pedagogical basics, methods and didactics with new insights and possibilities.
- to plan and implement pedagogic processes and educational projects in the spirit of maker mentality.
- to initiate co-constructive learning arrangements and translating them into educational offerings
- to integrate digital media sensibly into daily routine and into the educational offerings of kindergartens
- relationship design
- reflectivity
- technical, production and information literacy

Students will also be enabled to support kindergarten and preschool children in their specific competence development in the three learning fields of digital media literacy (see chapter 6). To this end, they (further) develop their technical, production and information literacy during their training (cf. ibid).

Integration of educational objectives on digital media literacy into existing educational curricula

When looking at the competencies to be acquired and the learning objectives to be achieved, it is noticeable that many framework curricula already contain learning fields or topics into which the competencies and learning objectives can be integrated. On the other hand, it can be seen that there are learning fields and topics into which the concrete use of digital media can be integrated.

That's why it's important:

- identify relevant interfaces of practical and theoretical learning content,
- extend existing concepts and learning arrangements
- to combine the theoretical learning contents and their application in the practice of everyday hospital life and to reflect permanently on them.

The latter point in particular is of great importance with regard to the training of pedagogical professionals in the age of digitalisation:

- Theoretical topics can be tested through the practice in the daycare centers, which leads to aha-effects and practical applicability.
- conversely, case studies from the daycare centres can be brought to the training institutions and processed.

To this end, students should start to deal with digital media in everyday school and pedagogical life from the first semester onwards and increasingly apply the acquired skills independently. With a higher number of semesters, more in-depth emphasis should be placed on the individual topics, competences and learning objectives.

7.1 "Learning Steps" of the education

We have examined and extended the learning steps of an existing training curriculum for pedagogical professionals in early childhood education with regard to their applicability to the learning objectives identified. The corresponding points of contact are marked in colour.

Checklist for learning goals to be achieved in the 1st year of training

Name: **Year:**

No.	Competence to act professionally	Educational Objective – Theory	Educational Objective – Applied
1	I can reflect the skilled worker-child interaction (relationship building)	Explaining the image of the child and the role of the educator in social change (LF1)	Have a picture of the competent child as a guideline for pedagogical work
		Investigate pediatric basic attitudes for positive relationship formation (LF2)	To create professional pedagogical relationships (e.g. proximity and distance)
		Discuss knowledge about bonding theory (LF2)	Accompany and observe practical instructors in their work with groups (games and offer design)
		Analyze communication in pedagogical relationship design (LF2)	Develop a first professional understanding of your own professional role
		To deal with one's own motives for choosing a profession, including social expectations of the professional role (LF1)	Introduce yourself to the parents in a profile
2	I'm learning Portfolio work with children and carry them out (incl. getting to know the work with Learning Steps and "Done! Learned!"-Sheets)	Investigate the process of (co-constructive) learning and competence acquisition (e.g. competence raters/ level sheets) (LF2 and LF4)	Observing and documenting child development, e.g. with the help of the Post-it method and portfolio work
		Evaluate observation procedures with regard to their effectiveness in paediatric processes (LF2 and LF4)	Participation in planning meetings (e.g. to derive pedagogical conclusions)
		Use educational plans and step sheets as a basis for pedagogical work (LF2)	Involve digital media (e.g. tablet) for the documentation of pedagogical processes.
3	I'll go along with the preparation, implementation and reflection of morning and closing circles	on the subject of "Learning in social Relationships" on the basis of respect, participation and rules (LF3)	Accompanied performance of morning and closing circles
		Explain the basics of group pedagogy and deepen them using examples (LF2)	age-appropriate text and song selection
		Explain basic didactic principles (LF4)	make music together with children
4	I observe and document the development (including getting to know the Lotus planning and a pedagogical development discussion)	Child development: Analysis of development processes on a case-by-case basis (LF4 and LF5)	Accompaniment of admission talks
		exemplary in-depth knowledge of development peculiarities of children and educational support (LF5)	Accompaniment of child-centred development talks
		Explain legal frameworks (e.g. Data protection) (LF6)	Assess the child's development (language, motor skills, behaviour) and provide relevant information about it
		Entwicklungstabellen diskutieren (LF2 u. LF5)	Apply presentation and moderation techniques and develop your own media skills enlarge

No.	Competence to act professionally	Educational Objective – Theory	Educational Objective – Applied
5	I support the acclimation	exemplary in-depth theoretical knowledge about the design of transitions (LF2 and LF5)	conduct handover talks
		Investigate child development in the different phases of life (0-6 years) (LF2)	Apply methods of conversation and counselling
			Participation in parent-teacher talks to explain the daily routines in the day nursery and day care centre
6	I perceive family systems in modern times and reflect on them.	deepened knowledge to support families in carrying out their educational tasks (LF5)	Examples for Parental work in digital age get to know sb./sth.
		Explain altered growing up of children (LF3)	Explain educational partnership guidelines
		Expertise on support and guidance systems (LF5)	
		Explain rights and duties of parents (LF5 and LF6)	
		Expertise on Child Welfare Threat and Protection Mandate (LF6)	
7	Preparation, implementation and reflection of the didactic fundamentals within the own pedagogical educational work (offers, projects, music offers)	Explain game development (LF2)	Educational offers in various Accompanying educational sectors
		legal framework conditions (e.g. supervision, child and youth protection, health protection) (LF6)	age-appropriate be able to estimate material selection
		Offer and project planning discuss (LF4)	have in-depth knowledge of the rules for dealing with space and material
		Describing Bloom's Taxonomies using Selected Examples (cf. Bloom 2001) (LF1)	
8	I'm learning to use development-enhancing materials in different age groups	Specialist knowledge of the basics of Creativity and aesthetics, discussing artistic-aesthetic education (LF4)	
9	I get to know "story bags" and „treasure baskets" and implement them	Discuss development theories (e.g. Piaget) (LF2)	Get to know practical narrative and play suggestions
			Create and use story bags/ treasure baskets yourself
10	I use methods to teach the basic attitude that promotes language and reflect them	Explain language development theories (LF3)	Using at least 3 methods of language promotion (especially narrative materials)
		Explain milestones of language development (LF3)	
		Discussing the prerequisites for language acquisition (LF2 and LF3)	
11	I souvereignally use methods to teach scientifically based experiences in the educational field Klax Universum (nature and environment)	Deal with the Education area "Universe" (LF4)	Preparing and carrying out experiments (e.g. on the subject of electricity, technology and computers)
			Plan and accompany an excursion

No.	Competence to act professionally	Educational Objective – Theory	Educational Objective – Applied
12	Practical educational work in the field of games (including getting to know elementary game actions)	Expand and deepen knowledge about game development (especially toddlers' games) (LF2 and LF4)	observe and describe learning causes in everyday life (e.g. meals, in the garden)
		Know the role of the skilled worker in the game (LF1 and LF2)	Accompany the work with action tray and action tubs
			Create toys (e.g. marble run), sockets, glitter bottles, feel carpets etc.) by yourself
13	I can instruct indoor and outdoor games	to deal with the topic "children as co-constructors of their own development" (LF1 and LF2)	different game situations observe and describe
14	I carry out nursing and hygienic tasks (diapers, dressing and changing, accompanying bathing situations	Describe the legal basis for food hygiene (LF6)	Carrying out of nursing and hygienic assignments
		Explain protection mandate in the event of endangerment to the welfare of the child (LF6)	
15	I accompany sleep situations	Discuss over the handling with need for sleep (LF1 u. LF2)	Co-create sleep and growth situations
16	I accompany food situations	Expertise on child oriented design of eating situations (LF1 and LF2)	To derive consequences from the specialist knowledge for pedagogical practice in order to make eating situations more optimal for the children.
17	I learn how to deal with accidents and infectious diseases.	Information on selected infectious diseases and measures to be taken in the event of the emergence of the ailments name (LF2)	Knowing formulars for compulsory registration with childhood accidents
18	I have knowledge of accident and occupational safety	Explain selected DGUV regulations and information (LF1 and LF6)	To know the contents of the annual the instruction plan
19	I'm going professional with diversity/ Diversity in the pedagogical everyday life around	I'm explaining social differences: How does poverty affect children? (LF3)	Being able to tell together with children children's books on the subject of diversity
		I explain cultural differences (LF3)	
		I explain religious differences (LF3)	

Checklist for learning goals to be achieved in the 2nd year of training

Name: **Year:**

No.	Competence to act professionally	Educational Objective – Theory	Educational Objective – Applied
1	I perceive group events in everyday pedagogical life and reflect on them.	Deepening the basics of group pedagogy (e.g. functions of the social community for the individual, group structures, group phases) (LF2)	Develop play ideas and suggestions for educational relationship building for a group of children.
		Discussing expert knowledge on dealing with conflicts in groups (LF2)	Practice techniques of closed and open questions in working with children's groups
		Explain and deepen the basics of value mediation (LF1)	talk to children about values (e.g. value reason, children's conference)
2	I deepen my knowledge about portfolio work with children (including work with learning steps)	on "Key Competences in the 21st Century." (21st century skills) (LF1)	include digital media (e.g. tablet) for the documentation of pedagogical processes (puppet pals, book creator, iMovie etc.)
		Deepening knowledge about development in the different phases of life (0-6 years) as an example (LF2)	illustrate, using a concrete example, how learning development becomes visible in the portfolio
3	Independent preparation, implementation and reflection of morning and closing circles	Discuss the advantages and disadvantages of open and sub-group work (LF5).	Independent performance of morning and closing circles
		To discuss expertise on the influence of cultural and religious, life-world, social and institutional norms and rules on children's experience and behaviour (LF3).	be able to tell fairy tales or children's books on the subject of "diversity" together with children
			reflect on learning with a group of children (e.g. with the help of a review of the day, documentation of offers, etc.)
4	I observe and document developmental processes	child development Analyzing Development Progressions for Cases (LF5)	Conducting admission interviews
		exemplary in-depth knowledge of developmental specialities in children, including pedagogical support options (LF3)	Conducting child-centered developmental conversations
		Explain legal framework conditions (e.g. child protection, child vulnerability) (LF1)	Assess the child's development (language, motor skills, behaviour) and provide relevant information about it
		Being able to assess the development in children's drawings (LF4)	be familiar with the procedure for child protection in child day-care facilities
5	I plan offers in the educational areas independently, carry them out and reflect on them	To discuss examples for the design of educational offers in the different educational fields (LF4)	keep a bid folder
		extended methodological basics and tasks of educational work (LF2 and LF4)	
		Explain the basics of room design (e.g. universe room, studio)(LF4)	
6	I deepen my knowledge about the use of development-enhancing materials in different age groups.	Basis of co-constructive learning: Investigating problem-solving, relatively independent and discovering learning in groups of children (LF1 and LF2)	Use free play material and didactic material in a targeted way
			Using action tablets and action trays
			know songs, stories, finger and circle games and perform them independently

No.	Competence to act professionally	Educational Objective – Theory	Educational Objective – Applied
7	I promote body awareness in children in the educational field of physis, movement and health	Explain significance and goals in the area of health, exercise and nutrition (LF4)	Educational offers in the area of body, movement, health (e.g. movement course etc.)
		To discuss examples for the design of educational work in this field of education (LF4)	Observing movement and deriving consequences
		have in-depth knowledge of the motor development of children (0-6 years) (LF2)	
		Acquire expertise in the early detection of movement abnormalities (LF2)	
		Recommendations for a balanced diet (LF4)	
8	I confidently apply methods for initiating creative processes at work in the educational atelier sector	Explain significance and goals in the field of aesthetic education (LF4)	Carry out educational offers in the field of ateliers
		To discuss examples for the design of educational work in this educational field (LF4)	explain the choice of rooms and materials in the nursery or kindergarten studio
9	Independent preparation, implementation and reflection of media offers	discuss maker activities against the background of the changing concept of learning and education (LF4)	carry out various maker activities with children
		have expertise in media literacy at pre-school level (LF4)	Knowing how to work with films and photos in everyday pedagogical life
10	I actively apply language promotion	Deepen knowledge of child language development and language acquisition (LF3)	Getting to know the language learning diary
		Deepen knowledge to assess the language level (e.g. symptoms of undesirable developments) (LF3)	have a repertoire of language games, stories, poems and songs
		Recognize possible speech development disorders and derive action goals (LF3)	
11	I estimate the child's development (language, motor skills, behaviour) and provide relevant information about it.	Expand knowledge of how to deal with aggression and conflict (LF2)	be able to create a rule poster with a group of children and talk objectively about misconduct with children
		Expand knowledge of how to deal with conspicuous behaviour in children (LF2 and LF3)	talk to the practice guide about the pedagogical classification of conspicuous behaviour
12	I deal professionally with diversity in everyday pedagogical life (deepening)	I deepen my knowledge about social differences (LF3)	I inform myself about institutions (advice centres, NGOs, associations etc.)
		I deepen my knowledge about cultural differences in working with children (LF3)	In at least one project that I carry out, the diversity of the group is reflected.
		I deepen my knowledge about religious differences in working with children (LF3)	

Checklist for learning goals to be achieved in the 3rd year of training

Name: **Year:**

No.	Competence to act professionally	Educational Objective – Theory	Educational Objective – Applied
1	Reflecting on one's own pedagogical actions	have in-depth knowledge of conflict management based on respect and responsibility (LF1 and LF2)	explain within the framework of a portfolio discussion how your own learning development becomes visible in the portfolio
		have the basic knowledge to understand the labour, collective bargaining and contract law framework conditions of social pedagogical activity (LF1)	
2	Deepen portfolio work with children (incl. work with learning steps)	have in-depth knowledge to support families in carrying out their educational tasks (LF5)	illustrate with a concrete example how a learning development becomes visible in the portfolio (e.g. in the context of a child-centered portfolio discussion)
		to understand the special life situations of parents and to take these into account when working with families in order to support them in carrying out their educational tasks (LF3 and LF5)	include digital media (e.g. tablet) for the documentation of pedagogical processes (puppet pals, book creator, iMovie etc.)
		Explain in-depth knowledge of methods of conversation and counselling with parents and caregivers (LF1 and LF5)	be able to use methods of conversation and counselling with parents and caregivers
3	Independent preparation, implementation and reflection of morning and closing circles	to derive pedagogical conclusions on the basis of observation and team reflection and to translate them into action to implement (LF2)	Independent performance of morning and closing circles
		have basic knowledge on the subject of "philosophising with children" and "appropriate handling of current events (war, etc.)" (LF4)	reflect on learning with a group of children (e.g. with the help of a daily review, documentation of offers, etc.)
			Identifying conflicts and supporting children in solving them independently
4	Observation and documentation of development processes	have basic knowledge on the subject of "philosophizing with children" and "appropriate handling of current events (war, etc.)" (LF4)	Conducting admission interviews
		exemplary in-depth knowledge of developmental particularities in children incl. pedagogical support possibilities (in-depth) (LF3)	Conducting child-centered developmental conversations
		explain legal framework conditions (in-depth study) (LF1 and LF6)	Assess the child's development (language, motor skills, behaviour) and provide relevant information about it
		have in-depth knowledge of the design of passages (children's garden primary school)	Know the special features of preschool work
5	Planning, carrying out and reflecting on educational projects (educational field universe: mathematics, sciences and technology incl. use and application of various media offers)	Discuss examples for the design of educational projects (LF4)	plan and carry out an educational project with children
		Basis of cooperative and co-constructive learning: problem-solving, relatively independent and discovering learning in children's groups through hypothesis-stimulating forms of conversation (deepening) (LF2 and LF4)	

No.	Competence to act professionally	Educational Objective – Theory	Educational Objective – Applied
6	Promoting a basic understanding of mathematics through a reference to everyday life	explain methodological principles for dealing with mathematical, scientific and technical phenomena (LF4)	apply methodical principles for dealing with mathematical, scientific and technical phenomena
7	Be able to confidently apply methods for initiating creative processes at work in the educational field "studio" - work with clay, wood, plaster, sculpture and object building	To discuss examples for the design of educational work in this educational field (LF4)	Carry out educational offers in the field of ateliers
		have an in-depth theoretical knowledge of the fundamentals of fantasy and creativity (LF4)	
		have in-depth knowledge of the motor development of children (0-6 years) (LF4)	
		Acquire expertise in the early detection of movement disorders (LF4)	
		Recommendations for a balanced diet (LF4 and LF5)	
8	Be able to confidently apply methods for initiating creative processes at work in the educational field of the atelier	Explain significance and goals in the field of aesthetic education (LF4)	Carry out educational offers in the field of ateliers
		To discuss examples for the design of educational work in this educational field (LF4)	visit an exhibition with children
9	Methods for the child-oriented mediation of social structures and processes (literacy)		To implement knowledge about question and discussion techniques in everyday pediatric life
		have expertise in the field of social and cultural life (LF3)	talk to the children about social and cultural peculiarities (external characteristics, gender, family, traditions, holidays, eating and drinking habits, etc.) in educational offers.
		Explain the development of writing and reading in children taking into account the basic theoretical knowledge of the subject (LF4)	to give impulses for the promotion of the reading and writing development of children in the pedagogical everyday life
		have an in-depth knowledge of the basics of literacy (LF4	
10	Language promotion in relation to multilingualism	Deepen knowledge of German as a second language and multilingualism (LF3 and LF4)	
		have basic knowledge of intercultural language competence and intercultural education (LF3 and LF5)	expand the repertoire of language games, stories, poems and songs
		declare legal framework conditions of inclusion such as UN Convention on the Rights of the Child, UN Convention on Inclusion, SGB VIII, SGB IX (LF3)	
11	Methods for initiating creative processes at work in the educational field of music	have knowledge of movement songs, sound stories and children's dances (LF4)	Implementing educational offers in the field of music
12	I deepen my knowledge of gender-conscious pedagogy	I reflect on the influence of my individual character on my pedagogical work (LF3)	I lead a 30-minute session with the team in my practice on the topic "What is a boy? What is a girl" by

7.2 Structure of Education

We have identified that elements in an existing training curriculum which focus specifically on the development of concentrating, identifying and expanding competencies for the use of digital media in kindergarten. The corresponding points are marked in color.

Example: School curriculum full-time studies

During the first year of training, it is important to acquire the following skills in order to combine theoretical and practical aspects from the outset. The focus is not only on acquiring specialist knowledge, but also on expanding methodological and personal skills. From the first semester onwards, the students deal with digital media in everyday school and pedagogical life and apply the acquired competences increasingly independently.

Methodological Competencies

The students

- get to know the basics of scientific work, e.g. by working on technical texts or writing term papers.
- get an overview of methods for media presentations and apply them depending on the topic.
- get to know the methods of "self-organized learning" (SOL) and "action learning" and use these methods to acquire knowledge with a personal objective. They apply the methods of time and self management
- they develop a selection of possible techniques in order to be able to independently master discussion causes in the technical school as well as in pedagogical practice.

During the third year of training, the acquired competencies in linking theory and practice are further expanded and consolidated. This serves as the basis for the preparation of the technical paper and the colloquium as well as for the final examinations. Reflection, which is used as an important criteria in the evaluation, is of high value.

The students

- continue to deal with digital media in their daily routine and increasingly apply the acquired skills independently.
- consolidate their competencies in scientific work and apply them in and during the preparation of the exposé for the technical work
- intensively deal with the evaluation criteria for the colloquium. They practice this during various presentations in the fifth and sixth semesters.
- They apply the method of "self-organised learning" (SOL) and derive personal objectives. The students continue to use the method of time- and self-management and document the SOL.

Social Competencies

The students

- are open, curious, attentive and tolerant towards the world, themselves and others
- accept the diversity and complexity of social situations in a democratic society.
- respect and respect diversity and complexity in social contexts and affirm them as a source of learning experiences and as a possibility for initiating and shaping educational processes.
- cultivate a style of communication based on mutual recognition and appreciation.
- show empathy for children, their families and their different circumstances.
- respect the diversity of goals and values in the education of children.
- act preventively against the tendencies of exclusion.
- understand diversity, individuality and diversity of all people as enrichment and normality.
- are able to build up pedagogical relationships and shape them professionally.
- take into account the importance of emotional ties and social relationships in educational work.
- have an image of the competent child as a guideline for their pedagogical work.
- see children and young people as subjects of their development and encounter them with a resource-oriented attitude.
- support all areas of children's personality development (cf. for whole paragraph Berliner Senatsverwaltung 2016: 17ff.)

Competencies for Self-dependance

The students

- reflect their own socialisation and professional motivation.
- are aware that they serve as role models for children, adolescents and young adults.
- reflect and evaluate the subjectivity of their own perceptions in the field of tension between self-perception and external perception.
- have a critical and reflective attitude towards the actions of their professional daily routine.
- are willing to review their own values, norms and stereotypes on the basis of constant reflection and examination of their own cultural and religious influences.
- reflect on the biographical aspects of their own actions and draw appropriate conclusions for the development of their professional identity.
- are in a position to develop an educational ethos, to reflect in a process-oriented way and to represent findings argumentatively.
- are open about open work processes and can deal with complexity and frequent changes in professional behaviour.
- have the ability to fulfil typical occupational requirements and to sustainably organise activities in various socio-educational fields of work.
- have a pronounced learning competence, through which they understand the development of their professionalism as a lifelong process in order to shape it sustainably.
- have the ability to further develop their professional role as an educator.

1st Year of Education

Learning Field (LF)	Goals - Expertise
LF 1 **Develop professional identity and perspectives.**	**1. Semester** **Subjects:** • Professional self-image of educators as learning guides • Training at technical colleges and academies • self-management • Methods of self-organized learning (SOL), co-constructive learning and action learning (AL) At the beginning of their training, the students deal with their own professional motivation and also form a professional understanding of education, training and care. In addition, they get to know the various cross-sectional tasks in the educational profession, e.g. language education, participation, media competence, inclusion, sustainability, etc. Furthermore, the students deal with the diversity and changeability of roles in the educational profession. The students get to know the legal framework of their education and acquire knowledge to acquire competencies for their professional fields of activity. In order to better understand their own pedagogical everyday life between theory and practice, the students get to know the didactic concept of the training and deal with the topic of reflection within the framework of Action Learning. In order to optimally achieve the individual learning goals, students acquire self-management skills during their training. In order to sensitize them to an understanding of learning and education as co-constructive processes, they learn about the goals and methods of self-organized learning and co-constructive learning. The students deal with topics such as "Individualised learning paths", "Designing learning environments" (e.g. makerspaces), "Social community" (e.g. as a basis for research-based learning implemented in group work) and "Authentic adult". The students implement the theoretical aspects of their training in their everyday pedagogical life using the method of action learning, reflect on their experiences and evaluate them with their practical instructions.
LF 1 **Develop professional identity and perspectives.**	**2. Semester** **Subjects:** • Social pedagogical fields of work • Mandate and standards guiding action • Further development of pedagogical principles, methods and didactics • Development of a pedagogical problem awareness The students get to know the different fields of work of the socio-educational institution and derive the mandate and norms for action. In addition, they examine the role and tasks of pedagogical specialists within the field of work and compare them with each other. Through the ability to critically and reflexively deal with scientific theories, models, studies and texts as well as practical instructions for action, they acquire the competence to continuously combine and expand pedagogical foundations, methods and didactics with new (scientific) findings as well as (technical and organisational) possibilities.

Learning Field (LF)	Goals - Expertise
LF 2 **Creating pedagogical relationships and working with groups pedagogically**	**1. Semester** **Subjects:** • anthropological foundations of education • attachment theory • Pedagogical bond design • Cross-cutting gender issue In order to understand the concept of education, the students first deal with the topic of the social nature of human beings. In this way, they can take different perspectives on human images with reference to different science. They then learn about the concept of education and the image of the child in historical change and from today's perspective. From this they derive goals of education and consider possibilities as well as limits of education. The students acquire pedagogical knowledge in early childhood relationship building and reflect on the influence of relationship quality on later development. This makes it possible to deduce pedagogical consequences for development and learning support. These theoretical aspects can then be linked with practical experience. It is further aimed on one's own pedagogical work to be defined and reflected during the practical instructions. In order to be able to build and strengthen a positive pedagogical relationship in everyday pedagogical life, the students reflect on the aspects of the basic pedagogical attitude which forms a fundament for the development of professional pedagogical relationships. Furthermore, the students deal with research on educational interaction structures. Students look at the impact, support and counter-effect of educational measures. This consideration should also include the gender perspective and reflect the newly acquired knowledge with the experiences from pedagogical practice.
LF 2 **Creating pedagogical relationships and working with groups pedagogically**	**2. Semester** **Subjects:** • Communication in building pedagogical relationships and as a basis for good learning guidance and facilitation of learning processes. • Models and methods of participatory pedagogical work, e.g. Within pedagogical work, communication is an important factor for the success of everyday pedagogical work. For this purpose, students need knowledge of the basic understanding of communication and various communication models. From this they can derive various influencing methods in communication which serve as a basis for the application of conflict resolution strategies. These theoretical aspects should be applied by the students in practice and then reflected upon with the practical instructor and in the technical college. Due to the multitude of communicative challenges in everyday pedagogical life, students must also make intercultural communication comprehensible. In order to be able to guarantee participation in daily pedagogical routine, the students expose themselves to the importance of participation and derive the role of the educator. For this purpose, they acquire knowledge about the goals of participatory pedagogical work, as well as about models and forms of participation. In order for participation to be successfully applied, students observe and reflect on the theoretical goals in everyday practice.

Learning Field (LF)	Goals - Expertise
LF 3 **Lebenswelten und Diversität wahrnehmen, verstehen und Inklusion fördern**	**1. Semester** **Subjects:** • Living environment orientation as a concept of social work and social pedagogy • Dimensions, goals and principles of action of living environment-oriented work • Modified growing up All topics can have the "age of digitalisation" as a focus The students • get to know living environment orientation as a concept of social work and social pedagogy and derive the dimensions, goals and principles of action of living environment-oriented work. • learning to perceive and to reflect different ways of growing up and to deduce perspectives and principles to act. Here, the changed way of growing up in the age of digitalisation and the resulting challenges for educators can be problematised. • Learning to perceive and observe the diversity in day-care centres. These include social origin, risk situations, migration background, disability and gender. In order to be able to link theoretical knowledge with practice, practical experience with the newly acquired knowledge is discussed and reflected by means of Action Learning. In this way, students can develop socio-educational skills for living environment-oriented work. These findings should be linked with experiences from everyday pedagogical life and evaluated with the practical instructor.
LF 3 **Perceiving and understanding living environment and diversity and promoting inclusion.**	**2. Semester** **Subjects:** • Perceiving diversity and taking it into account in socio-educational work • Socio-educational action competences for living-environment-oriented work • Promotion and design of inclusion in the socio-educational fields of work The students learn to perceive and observe the diversity in social pedagogical work. These include social origin, risk situations, migration background, disability and gender. In order to be able to link theory with practice, practical experience should be discussed and reflected upon with the newly acquired knowledge. In this way, students can develop socio-educational skills for living environment-oriented work. Additionally students learn • to understand the term and concept of inclusion and to derive the resulting tasks and challenges in pedagogical work. • to know and understand the perspectives on diversity and gender. • knowledge of the legal framework of inclusion and its development in the socio-educational fields of work.
LF 4 **Professional design of pedagogical work in the educational sectors**	**1. Semester** **Subjects:** • Didactic basics of socio-educational educational work • Aspects Learning, Development and Education Basic Principles of Didactics Gender Equitable Work • Daily structures and procedures in the day nursery and kindergarten • Offer projects/project planning • Studio: : Aesthetic education and art • methodical basics in the field of printing, colour, sculpture, nature, textiles, paper and digital worlds.

Learning Field (LF)	Goals - Expertise
	For their practical work, the students need professional and methodical competences for the acquisition of didactic basics. For this purpose they acquire the basics of learning, development and education. By perceiving this appropriation as a process of self-education, students develop the role of the educator in the implementation of educational activities. Here they reflect on the importance of interaction and communication in educational processes. Based on the forms of educational work, the students deduce the basic principles of didactics. On this basis they learn how educational work can be planned, carried out and reflected upon. For this purpose, they acquire skills for reflection, evaluation and documentation. The didactic basics are first developed theoretically and then applied and reflected in everyday pedagogical practice. In this way, students can adapt their own action competences and experience the theoretical-practical learning process. **Aesthetic education and art** The students deal with the development-specific foundations of aesthetic education, such as sensual experience as the basis for opening up the world, as well as creativity and art. Furthermore, the students get to know the development of children's drawing. The students then derive the meaning and goals of the educational field "Aesthetic Education and Art". For the implementation in the pedagogical daily routine the students learn methodical basics in the area of practice workshop printing, colour, sculpture, nature, textile, paper and digital worlds. The students develop practical examples for the educational work in the field of aesthetic education and art, carry them out practically and reflect on them.
LF 4 **Professional design of pedagogical work in the educational sectors**	**2. Semester** **Subjects:** • Educational work within the conception of science and society • Observation and documentation of educational and development processes • Play and game development **Educational work within the conception of science and society** The students • deal with the understanding of education in historical change and from the point of view of science. • work out differences and similarities in educational plans in different countries. • deal with the concept of education for sustainable development. **Observation and documentation of educational and development processes** The students • learn about the importance of perception and observation in pedagogical work. • to work out that perception is the basis of observation, and • transfer these aspects to their pedagogical actions. In order to be able to carry out observations, the students deal with various observation methods and apply them in practical everyday life. Additionally • the students learn about the importance and different possibilities of documentation. • the students apply observation and documentation procedures in their everyday pedagogical work, evaluate them with their practical instructions and reflect on them.

Learning Field (LF)	Goals - Expertise
	Play and Theatre The students • deal with socialisation influences and development-specific fundamentals, such as emotional and social development, as well as game development. • derive meaning and goals of acting and theatre. • learn methodical basics for the practical implementation in day-care life. • develop practical educational offers, carry them out and reflect on their implementation.
LF 4 **Interdisciplinary learning areas Scientific-technical field**	**2. Semester** **Subjects:** • Klax Universum - Focus on Nature and Environment • Methodical basics in the communication of nature and environmental contents The students • deal with socialisation influences and development-specific fundamentals, such as childlike research interest and alienation from nature. • derive the meaning and goals of the educational field nature and environment, e.g. for the development of environmental awareness. • learn methodical basics for the implementation in the pedagogical everyday life in the mediation of nature and environmental contents. • develop practical examples for educational work in the areas of nature and environmental experiences, carry them out and reflect them. • relate the topic of sustainability to nature and the environment in the development of ideas.
LF 5: **Design educational and training partnerships with parents and caregivers and endorse transitions**	**1. Semester** **Subjects:** • Family in transition • The child in the course of time • Support and guidance systems for educational partners **Family in transition** Educational professionals work with different families and family systems. Therefore it is important to get to know the social history of the family and to look at it in the course of time and from today's point of view. In addition, the students deal with • the study of the legal concept of education and the derivation of the role of the pedagogical specialist in supporting the family as a social pedagogical task. • the "image of the child" in the course of time and derive possible requirements for action in everyday pedagogical life. **Support and guidance systems for educational partners** To better support families, • the students learn skills in cooperation in the social space. • students acquire knowledge about family education in the social space.

2nd Year of Education

Learning Field (LF)	Goals - Expertise
LF 1 **Further develop professional identity and perspectives**	**4. Semester** **Subjects:** • Professional perspectives • Health prevention at work In order to be able to understand the requirements of the occupational profile of educators, students should deal with the history of professionalisation. In addition, students get to know different professional perspectives during their education. In order to be able to shape co-determination in the workplace, the students should work out various possibilities for representing professional interests. This also requires knowledge of the basics of labour law and collective bargaining. In order to meet the requirements of everyday practice, students should deal with health prevention in the workplace and develop their own ideas. In addition, this preventive knowledge should be applied and reflected independently in their own practical and school education.
LF 2 **Creating pedagogical relationships and working pedagogically with groups**	**3. Semester** **Subjects:** • Group Pedagogy - Group Structures • norms, roles, group cohesion and conflicts in groups, in addition to gender issues • Legal framework of socio-educational group work Since the pedagogical daily routine is characterised by group situations, the students have to get to know the socio-educational work in groups and to perceive the function of the group for the individual. The role of the group leader is derived from this. Furthermore, the students should consider the group structures, i.e. norms, roles, group cohesion and conflicts in groups, and additionally relate them to gender considerations. The students should also get to know the pedagogical relationship design in the group phases. These theoretical aspects are to be observed and reflected upon in their own everyday practice. For the pedagogical work, the students must have knowledge of the important legal framework conditions. These include children's and parents' rights, child and youth protection and social data protection. In addition, students must become familiar with the important aspects of supervision. Furthermore, it is important that students regularly repeat the application of first aid and get to know important aspects of health protection in daily pedagogical routine.
LF 3 **Perceiving and understanding living environments and diversity and promoting inclusion**	**3. Semester** **Subjects:** • Theoretical models to explain human experience and behaviour • Socialisation • Know the theory of productive reality processing • Systems Ecology Theory • various development and learning theories In order to interpret human experience and behaviour, students have to deal with the concept of socialisation and their own socialisation. In addition, when considering the effects of socialisation, the topic of gender should be related. The students then consider theories of action and structure. Furthermore, the students get to know the theory of productive reality processing and consider the systems-ecological theory and various development and learning theories. The students also get to know depth psychological approaches.

Learning Field (LF)	Goals - Expertise
LF 3 **Perceiving and understanding living environments and diversity and promoting inclusion**	**4. Semester** **Subjects:** • Resilience - concept and promotion • Design of inclusive educational and upbringing processes • Consideration of gender-conscious work The students get to know the development of the concept of resilience. The students should reflect on what resilience means for their own pedagogical work and how it can be promoted in daily pedagogical life. Furthermore, students should learn to understand the effects of resilience on child development. Students will learn and apply the professional skills of the educator in shaping inclusive educational and upbringing processes. In this way, the students deal, among other things, with professional attitude and self-reflexiveness. In order to be able to develop a pedagogy of diversity, the students learn to consider and apply diversity management, the index of inclusion and the pedagogy of diversity, as well as gender-related pedagogy. Furthermore, the students deal with inclusive processes and the confrontation with being different in order to derive and apply prejudice-conscious education and upbringing as an approach to inclusive educational work. Another important focus is the consideration of gender-conscious work as an approach to inclusive educational work.
LF 3 **Interdisciplinary learning area: Communication and language**	**4. Semester** **Subjects:** • Causes and symptoms of language development disorders • Language promotion in everyday pedagogical life The students deal with the causes and symptoms of language development disorders. This professional competence serves as a basis for advising reference persons and initiating specific funding opportunities. In addition, the theoretical aspects are linked with practical daily routine. The students should develop practical support measures and examine the applicability in the pedagogical daily routine.
LF 4 **Professional design of social pedagogical educational work in the educational sectors**	**3. Semester** **Subjects:** • Development processes and tasks as a point of reference for educational work - additional consideration of gender issues • Religion, Society and Ethics - Values and the Mediation of Standards (Gender) • Educational sector society: theatre (gender-conscious action) **Development processes and tasks as a point of reference for educational work** The students deal with the concept of development, the differences in development, the growth and maturation processes - e.g. the sensitive development phases. Using the example of sensitive development phases, students learn to take into account the influence of gender issues. In addition, students learn about development as a process in which there are various development tasks. By teaching different development theories, the development tasks are considered in different age groups. Thus the students can develop specific and age-appropriate educational offers within the practical work. **Religion, Society and Ethics** The students deal with the basics and goals of value formation as well as the diversity of worldviews. They get to know the stages of moral judgement, the development of conscience and the stages of religious development. The students develop examples of educational work in the fields of religion, society and ethics, which they carry out and reflect upon. In order to incorporate the topic of gender, the students offer In Bildungsangebote

Learning Field (LF)	Goals - Expertise
	zum Thema Familie. This enables an intensive discussion from a child's perspective as well as from the point of view of parents and caregivers. **Theatre** In addition, the students expand and consolidate their knowledge and action strategies in pedagogical work in the educational field of society: theatre.
LF 4 **Professional design of social pedagogical educational work in the educational sectors**	**4. Semester** **Subjects:** • Media (media development, media use and diversity aspects) • Media pedagogy • Planning and implementing digital media offers • Participation and sustainability • Education Body, Exercise, Health and Nutrition The students deal with socialisation influences and development-specific fundamentals, such as media development, media use and diversity aspects. Furthermore, the students should learn the prerequisites for the ability to receive media offers, the media effect and perception. The students then derive the significance and goals of media education. For the implementation in everyday pedagogical life, the students learn methodical basics in the area of situational approach, diversity aspect and age-oriented promotion. In order to be able to carry out the media education effectively, it is important that the students develop their own basic attitude to the topic. In addition, students should develop ideas for participation and sustainability in media pedagogical practice. Furthermore, the targeted use of media for sensory sharpening is to be trained. The students develop practical examples for educational work in the field of media work, carry them out and reflect on them. In addition, the students shed light on the use of digital media in pedagogical work and examine everyday pedagogical life with regard to the targeted use of media. These findings are reflected both in the technical college and with the practical instructor. **Health, exercise and nutrition** The students should deal with the socialisation influences and the development-specific basics, such as physical, motor, psychosexual development. This discussion forms the basis for educational work in the areas of health, exercise and nutrition. Here the students learn the meaning and goals in the individual areas and derive methodical basics and tasks. The students should develop practical examples for educational work in the areas of health, exercise and nutrition, carry them out practically and reflect on them. Within the development of ideas on health, exercise and nutrition, the topic of sustainability should be related.
LF 4 **Interdisciplinary learning areas** **Aesthetic field**	**3. Semester** **Subject:** • Creative design and material experiences and their implementation in everyday pedagogical life In this semester, the students continue to experiment and act creatively. Here they deal with creative problem competencies and reflect on their own actions in the creative process. This serves as a basis and to expand one's own pedagogical action, as well as its implementation in everyday pedagogical life. In addition, they should learn how creativity can be defined. The students will use conventional and unconventional material in their creative processes. They should experience the similarities and differences within this application.

Learning Field (LF)	Goals - Expertise
LF 4 **Interdisciplinary learning areas** **Scientific-technical area**	**4. Semester** **Subject:** • Learning area: Universe **Learning area: Universe** The students deal with the practical educational work in the field of education "Universe". The students learn the principle of the basic research attitude by applying the basic scientific knowledge and deal with methodical principles for dealing with scientific experiments. In addition, they plan activities for experimentation, implement them out and reflect on their pedagogical actions.
LF 5 **Design educational and training partnerships with parents and caregivers and support transitions**	**3. Semester** **Subjects:** • Education and educational partnership • Pedagogical conversations (leading conversations) • Develop and reflect on a professional attitude towards gender issues • Education and training partnerships to support transitions **Education and educational partnerships** In order to establish a good educational partnership, the students work out the general conditions and functions of the educational partnership. Here they deal with the tasks and responsibilities as socio-educational specialists. Furthermore, the students get to know the possibilities for building up the educational partnership, e.g. parent-teacher talks, parent-teacher evening. In addition, the students learn methods for leading conversations, moderation and presentation. In order to establish an optimal educational partnership, it is important to develop your own professional attitude towards the topic of gender and to incorporate this appropriately into the pedagogical design possibilities. These theoretical aspects should be carried out by the students in their everyday pedagogical work and should reflect on their own competences together with the practical instructor. **Education and training partnerships to support transitions** Educators accompany children and their families in coping with various transitions. In order to develop competencies in this field, students must be able to explain the term transitions and their forms and have knowledge of different models. The importance of transitions for the family system is also an important point for the development of optimal action competencies in everyday practice. The students should also get to know different models and concepts for the design of transitions.
LF 5 **Design education and training partnerships with parents and caregivers as well as support transitions**	**4. Semester** **Subjects:** • Education and training partnerships in challenging life situations • Support and guidance systems for educational partners **Education and training partnerships in challenging life situations** Within the pedagogical work it can also come to educational partnerships in challenging life situations. In order to cope with these situations well, students should acquire knowledge about families in challenging life situations. The focus is on families with children under the age of three and young people. Students should also reflect on their experiences in everyday pedagogical life and evaluate them with their practice instructor. **Support and guidance systems for educational partners** In addition, the students should get to know the work of counselling centres and family centres.

Learning Field (LF)	Goals - Expertise
LF 6 **Developing institutions, teams and quality and cooperating in networks**	**3. Semester** **Subjects:** • Networking tasks in the social space • Teamwork and team development • Gender in team work • Sponsors in socio-educational institutions **Networking tasks in the social space** The students should get to know the networking tasks in the social space and the work of the networks in the fields of child and youth welfare. In addition, the students are to perform and evaluate these tasks in their own pedagogical everyday life. **Teamwork and team development** Teamwork is the rule within social pedagogical work and is a matter of course in pedagogical action. In order to understand how a team is formed, the students deal intensively with the definition of a team, the different roles in the team and team development. These areas are not only examined theoretically, but the own behaviour in the team is reflected and analysed in role plays and team games. Since conflicts also arise within teams, communication within the team is examined and analysed. This leads to a discussion of the topic of conflict management. The positive impact of conflicts on the team is also discussed. In addition, the students should reflect with their practice instructor on the role in their own pedagogical team and reflect on solution strategies for team conflicts in everyday pedagogical life. Furthermore, the students should perceive and reflect the aspect of gender within the pedagogical teamwork. **Sponsors in socio-educational institutions** Another area is the consideration of institutions in social pedagogical institutions. In order to understand the diversity of the various socio-educational fields of work, it is important to consider the distinction between public and private organisations and their tasks. In addition, the students deal with the financing of the institutions.
LF 6 **Develop institutions, teams and quality and cooperate in networks**	**4. Semester** **Subjects:** • Teamwork and team development (professional teamwork, team conflicts, support systems) • Public Relations - Reference to Quality Management • Perceive public relations work as the social and socio-political dimension **Teamwork and team development** In order to further consolidate and expand the importance of professional teamwork, support systems for teams are considered and additional preventive measures to avoid team conflicts are developed. Furthermore, the cooperation in multi-professional teams is considered. **Public Relations** The students deal with the goals and tasks of public relations. For this purpose, students derive practical aspects for planning, implementation and evaluation. In order to concretize these aspects, public relations work should be reflected upon in everyday socio-pedagogical life. A reference to quality management will be established. Furthermore, the students should learn to perceive the goals and measures of public relations as social and socio-political dimensions.

3rd Year of Education

Learning Field (LF)	Goals - Expertise
LF 1 **Further develop professional identity and perspectives**	**5. Semester** **Subjects:** • Scientific Theories In preparation for the exams, students intensify the aspects of scientific work. They should expand and consolidate the handling of scientific literature and learn how to formulate a thesis or a question with regard to the preparation of a technical paper. In addition, students will prepare an exposé for their paper. Important emphasis will be placed on extending the knowledge to present the professional competence, the learning methodological aspects and the formal requirements within the technical work. To this end, students must acquire the ability to independently achieve results, interpretations and conclusions and develop a socio-educational awareness of the problem. This also includes the critical-reflexive examination of theories, models, positions and/or action concepts. In addition, the students should learn to establish a reference to the reflection of professional identity and professional perspectives within their written presentation, as this is the basis of the evaluation criteria of the paper.
LF 1 **Further develop professional identity and perspectives**	**6. Semester** *Scientific Working – Writing oft he Research Paper*
LF 2 **Creating pedagogical relationships and working pedagogically with groups**	**5. Semester** **Subjects:** • Pedagogical action concepts in the fields of work • Concepts such as Fröbel, Montessori, Pikler, Reggio pedagogy, etc. • Goals and methodical-didactic approaches • Role of the pedagogical professional in the respective concept The students should deal with the various concepts of action in pedagogy and consider them constantly. This includes the intensive consideration of different concepts, such as the concepts of Klax, Fröbel, Montessori, Pikler, Reggio pedagogy and so on. Here the development of the concept, the goal of the respective concept and the methodical-didactical approach are considered. Another important focus is the respective role of the pedagogical expert within the concept.
LF 2 **Creating pedagogical relationships and working pedagogically with groups**	**6. Semester** **Subjects:** • Creating pedagogical relationships and working pedagogically with groups • Reflection on one's own communication behaviour in everyday pedagogical life • Derivation of action competences for socio-educational work in groups The students relate the acquired knowledge to the basics of education, the image of the child in the course of time, and the pedagogical formation of relationships. They reflect on their own communication behaviour in everyday pedagogical life and derive action competences for socio-educational work in groups.
LF 3 **Perceiving and understanding living environment and diversity and promoting inclusion**	**5. Semester** **Subject:** • Resource-oriented work with special educational-, helping- and supporting needs The students first get to know the socio-educational concept of resource orientation. Then the students deal with resource orientation in special situations, such as physical impairments, impairments of vision, hearing, mental development, autism spectrum disorders, impairments in

Learning Field (LF)	Goals - Expertise
	speech and language. The students also work out the special features of dealing with children who have chronic illnesses or addictive behaviour. Furthermore, the students develop skills for resource-oriented support in challenging behaviour. So that students can also become aware of the limits of their own pedagogical work, they will combine opportunities for cooperation and networking with other professional groups and specialist services.
LF 3 **Perceiving and understanding living environments and diversity and promoting inclusion**	**6. Semester** **Subject:** • Perceiving and understanding living environments and diversity and promoting inclusion The students expand and consolidate their professional and agency competencies within the socio-educational work. They derive how they are able to apply the background knowledge of changed living environment orientation, socialisation, framework conditions for inclusion, gender and diversity in their daily pedagogical work. In addition, the students develop competencies for resource-oriented work and consider the role of the pedagogue. Further, the students take on different perspectives, e.g. with regard to the child, the child in the peer group, parental work, cooperation in the team and with other occupational groups. The theoretical aspects are examined in everyday pedagogical practice and reflected on with the practical instructor.
LF 3 **Interdisciplinary learning area: Communication and language**	**6. Semester** **Subjects:** • multilingualism • development of phonological awareness as a prerequisite for the acquisition of written language Students learn about the different employment opportunities of multilingualism and strategies for dealing with multilingual children and their parents. Furthermore, the students get to know the aspect of phonological awareness and lead strategies of action to support the acquisition of written language.
LF 4 **Professional design of social pedagogical educational work in the educational sectors**	**5. Semester** **Subjects:** • Music and Rhythmics • Language and Literacy **Music and Rhythmics** The students deal with the socialisation influences and the development-specific foundations, such as auditory, visual and tactile perceptual development, as well as the musical development. The students then deduce the meaning and goals of music pedagogy. For the implementation in the pedagogical daily routine the students learn methodical basics in the area of music pedagogy, as well as movement and music; making music with instruments. Students should develop practical examples for educational work in the field of music and rhythm, carry them out practically and reflect on them. **Language and Literacy** The students deal with linguistic socialisation and the acquisition of language by children. Students will also consider the influence of communication between parents and children and the special nature of multilingualism. Furthermore, the students get to know the individual phases of language acquisition and derive the meaning and goals of language education work. For implementation in everyday pedagogical life, students reflect on their own language development skills and learn methodological basics in the areas of literacy and language development,

Learning Field (LF)	Goals - Expertise
	as well as parent counselling. Furthermore, students learn how to observe and document language acquisition and language level. The students should develop practical examples for educational work in the field of language, carry them out in practice and reflect on them. In addition, they reflect the theoretical aspects with their experiences in practical everyday life.
LF 4 **Professional design of social pedagogical educational work in the educational sectors**	**6. Semester** **Subjects:** • Repetition and summary of the basics of socio-educational work and the design of educational work The students expand and consolidate their foundations of socio-educational work, derive development processes and tasks as points of reference for educational work and link these with the tasks of the pedagogue in observing and documenting educational and development processes. On the basis of the solid foundations, the students deduce how they can professionally organise socio-educational work in the various educational areas in everyday pedagogical life and develop exemplary practical situations. In addition, they reflect on the role of the pedagogue in socio-educational work.
LF 4 **Interdisciplinary learning areas** **Aesthetic field**	**6. Semester** **Subjects:** • practice workshops • material experiences In this semester, the students deal with various practical workshops. They explore the use of materials such as clay, paste, paint, etc., learn various techniques such as printing, modelling, mixing, etc. and apply them independently. The students then apply their own practical experience to the preparation of offers with nursery and kindergarten children and learn possible action skills in dealing with children.
LF 4 **Interdisciplinary learning areas** **Scientific-technical field**	**6. Semester** **Subjects:** • Education Universe: Mathematics, Science and Technology (Media) • Methodological basics in the areas of professional attitude of the educator in everyday research, project work and gender consideration **Mathematics, Science and Technology** The students deal with the development of knowledge and thinking. The topics constructivism and co-construction, development of counting and calculating skills, causal thinking and problem solving are considered. In addition, the students will highlight the development of thinking in the various phases of life. The students then derive the meaning and goals of early mathematics, sciences and technology. For the implementation in the pedagogical daily routine the students learn methodical basics in the areas of professional attitude of the educator in the researching everyday life, project work and gender consideration. The students develop practical examples for educational work in the fields of early mathematics, sciences and technology and reflect on them. Within the development of ideas on mathematics, sciences and technology, the topic of sustainability should be related.
LF 5 **Design educational and training partnerships with parents and caregivers and support transitions**	**6. Semester** **Subjects:** • Education and training partnerships in challenging life situations • Support and guidance systems for educational partners **Education and training partnerships in challenging life situations** Within the pedagogical work it can also come to educational partnerships in

Learning Field (LF)	Goals - Expertise
	challenging life situations. In order to cope with these situations well, students should acquire knowledge about families in challenging life situations. Here the focus is on families in partial and inpatient institutions, families in precarious living conditions, families with experiences of violence and families in special life situations. Students should also reflect on their experiences in everyday pedagogical life and evaluate them with their practice instructor.
LF 6 **Developing institutions, teams and quality and cooperating in networks**	**5. Semester** **Subjects:** • concept development • gender equity • quality development **Concept development** The students develop the contents and tasks of a concept. The students deal with the cornerstones of a concept. In addition, the students should consider how the topic of gender justice can be incorporated into a concept. Furthermore, the students should become familiar with the steps of concept development and conceptual approaches in socio-educational institutions. **Quality Management** In order to be able to perform an optimal pedagogical work, the students should deal with the quality in social pedagogical institutions. In addition, students should learn about the legal basis for quality management in child and youth welfare. The students will develop aspects and instruments of quality development. The students should reflect that quality development is seen as a team process. Furthermore, the students should compare different instruments of quality management with each other.

7.3 Proposals for Didactical Planning

Training unit for students to plan and implement a media pedagogical project with children

Example: Construction of a torch.

Planning a project can sometimes be more complex than simply doing it. Often it's only during the process or after a project has failed that how many details need to be considered in the preparation is realised.

Steps for project work with children can also be implemented in a modified, adapted form with students (see the section "Implementation of a media pedagogical project with children" below). While the students are learning, they already experience the method they will later use in their work with children.

In the following, the topic "Building electric circuits using a flashlight as an example" shows students how to plan, implement and reflect a project. In a second step, the implementation of the project in practice is described.

Exploration Phase

Goal:
First the students approach the topic.

Procedure:
For this they find out:
- what prior knowledge they have on the subject
- what they think, which questions, phenomena and challenges concern the children and why the topic electricity/flashlight could have a relevance for children.

An effective method can be to search here in one's own (learning) biography.
By remembering what you have experienced yourself
- a change of perspective to a child's point of view.
- the topic emotionally occupied and so more excitingly and more seizably.
- possible questions and ideas from children on the subject of electricity.

Open questions could be:
- When and in which situations did I have my first contact with the topic of electricity/flashlights?
- What questions or ideas did I have as a child about electricity/flash lamps?
- Do I know the structure of a flashlight?
- Can I build my own flashlight in an emergency?
- In which situations and how can I work with flashlights in daycare centers

The following key competences will be developed:
- **Learning competence and self-organisation; self-competence; creativity and problem solving; appreciation**
- The interest of the students is awakened, they gain understanding for why it makes sense to deal with this topic. Own ideas and experiences are activated, the own state of knowledge is reflected.

Teaching Phase

Goal:
Teach theoretical content on the topics of electric circuits and the construction of a torch.

Procedure:
- Short factual input on the topic (it may be the same as the children could get in the project).
- Development of a theoretical understanding on the topic of electricity/flashlights.

Method:
Station or group work
- Learning counters: At learning counters you will find various information about electricity and cables. Students acquire knowledge in a self-organised way and set their own priorities.
- Group work: the group works on and researches one or more topics. The students share their existing knowledge and develop it further together.
- Presentation of learning outcomes: students learn how to teach the topic to children later.

The following key competences will be developed:
- **Learning competence and self-organisation; I-competence; social competences; creativity and problem solving**
- The trainees acquire self-organized knowledge with their own methods. They learn to express themselves, to make connections and to share their knowledge in a social community.

Planning phase

Goal:
The project work is planned with all necessary steps, necessary resources.

Procedure:
The teacher carries out a project with the students as it could be carried out with the children.
The students discuss the following points in their planning for the project:

WHERE	spatial conditions, material and resources available in the room
WHAT	what do I need, what do I do, in which order?
WHENCE	Procurement of material, help, know-how
HOWMUCH	financial resources, spatial resources, human resources
WHEN	Time and duration of implementation, integration into daily and weekly planning
WHO	Age group, group dynamics, previous knowledge of the children

The following key competences will be developed:
- **Learning competence and self-organisation; I-competence; creativity and problem solving; social skills; tolerance and openness**
- The students learn to be open and flexible in order to be able to react independently to various challenges in the planning and implementation of the project.

Experimental phase

Goal:
The students themselves design a possible project and implement it. They find out whether the individual processes are coherent.

The following key competences will be developed:
- **Learning competence and self-organisation; I-competence; creativity and problem solving; social skills; tolerance and openness.**
- The trainees experiment together, exchange ideas and help each other. During testing, they uncover possible sources of error and find alternatives.

Free phase

Goal:
As with the children, the curiosity and joy of playful tinkering, building and experimenting may also be awakened inside the students. In this phase, adults tend to engage in theoretical dialogue rather than actively continue tinkering. In this phase, however, new ideas for projects can emerge: The group develops new solution ideas together and tests them. Ideally, ideas for further projects are developed in this phase. The teacher is in an observant role and supports the students as needed.

The following key competences will be developed:
- **Learning competence and self-organisation; I-competence; creativity and problem solving; social skills; tolerance and openness; appreciation, self-confidence**
- The social community is strengthened. Own solutions are developed and tested. Own learning paths are designed. The students experience self-efficacy and esteem.

Reflection

In reflection
- the learned and the experienced are brought together. The strengths and weaknesses of the topic, the project and other approaches are discussed.
- the transfer to educational theory is created.
- the discussion will focus on why the topic is relevant for children and what can be taught to children through the project.
- why chosen methods were meaningful or not suitable and whether they were understood reflexively from self-awareness will be discussed,
- the secondary learning experiences of the children are discussed (e.g. strengthening of self-confidence, practice in patience, community experience).

The following key competences will be developed:
- **Learning competence and self-organisation; I-competence; creativity and problem solving; social skills; tolerance and openness; appreciation**
- Knowledge is consolidated and embedded in an educational context. Students can formulate their own opinions and ideas. The group reflects together on what they have learned and exchanges ideas. Own plans, projects and strategies are designed and can now be tested independently with children.

The course of a media pedagogical project with children

Example: Electric circuit.

In a media pedagogical project, children and pedagogical professionals work together on a specific topic. The following example shows which phases and steps are necessary for planning, implementation and reflection.

Exploration phase

Goal:
In the exploratory phase, the pedagogical professionals and the children approach the subject, which is related to everyday life phenomena and challenges of the children.

Procedure:
For this purpose, the pedagogical expert asks the children for examples and ideas on the subject. With open questions, the pedagogical specialist can find out

- what prior knowledge, ideas and possible mistakes the children involved have on the topic
- which questions, phenomena and challenges concern the children.

Open questions could be:

- What do you find exciting about electricity?
- Who knows devices that work with electricity?
- Who knows where the electricity comes from?
- Do you know anything that works similarly?
- Do you have an idea how a cable works?

The following key competences will be developed:

- **Learning competence; self-organisation; I-competence; esteem**
- The children experience that
  - their thoughts and ideas are important.
  - they can help shape a topic.

Teaching phase

Goal:
Introduction of basic theoretical knowledge about the everyday phenomena that interest children.

Procedure:
After a short (10-20 minutes) factual input on the topic, the children are directly involved in the topic again by asking the same or similar questions as in the exploratory phase. With their answers, the children show that they have understood what they have heard and can transmit it. By formulating in their own words, they consolidate what they have heard in their memory. In this process the teacher can check what the children have understood.

Questions could be:

- What is electricity?
- What is a cable made of?
- How do we know similar or the same material?
- What does a cable do?
- When do we use electricity?
- What is important with electricity?

The following key competences will be developed:

- **Learning competence; self-organisation; I-competence;**
- The children can develop ideas and communicate.

Planning phase

Goal:

In the planning phase, the children plan the project work together with the pedagogical specialist.

Procedure:

The plan is discussed with the children on the basis of questions and the description of steps to be taken.

Questions could be:

- What are we going to do now...
- We want to build a circuit now.
- We now want to test why we need the cables and whether we can connect the cables in such a way that the light burns at the end.
- There you will find the cables you need.
- What order do we keep to...
- First they all come... then I explain further
- If all, then...
- First we do... when everyone is done with it we can go on...

The following key competences will be developed:

- **social competence; learning competence and self-organisation.**
- The children learn to listen, to plan, to respect each other and to be patient.

Experimental phase

Goal:

In the experimental phase or practical phase, the theory is tested by the children on the model. Through this initiative and playful character, the children can reflect on the topic, weigh up alternatives and develop new solutions.

Procedure:

The children experiment, build, tinker after the discussed plan.

The following key competences will be developed:

- **Learning competence and self-organisation; I-competence; self-confidence, media and information competence; social competence**
- The children get to know different materials and media and develop their own ideas. They act on their own responsibility and support each other. This strengthens their community.

Free phase

Goal:
In the free phase the children experiment independently, expand their learning effects and develop projects and (solution) ideas further.

Procedure:
If a topic is well understood and the enthusiasm is aroused, children develop projects further. They come up with new creative ideas and play free from instruction. This can be interpreted as disinterest, boredom or inattention and is unfortunately often prevented or aborted by adults.

However, it is worth observing this phase carefully and encouraging the children to come up with further (solution) ideas. Even if the children's ideas do not work, they have an extended learning effect. The fact that the children want to further develop the project shows that they have understood what they are doing, they not only imitate the role model but also develop their own ideas and concepts on the subject.

Encouragement could be:
- This is a great idea to build a second lamp into the circuit.
- Try to see if it works if you change the cables.
- What could be the reason why the lamp doesn't light up like this?
- I haven't thought about it yet ...
- Can you explain to me what you're doing?

The following key competences will be developed:
- **Learning competence and self-organisation; I-competence; appreciation, creativity and problem solving; media and information competence.**
- The children experiment on their own. They are creative and test media and material. They learn and experience appreciation by adults.

Reflection phase

Goal:
In the reflection the experienced is reported: It reflects what was fun, what was difficult and what happened differently than thought. The children can assign the tested to the theory.

Procedure:
All children have their say and receive appreciation for their project and its results. The pedagogical expert gives a short summary of what has been experienced on the basis of the implemented projects and links theory and project.

The following key competences will be developed:
- **Learning competence and self-organisation; appreciation; social competence**
- The focus is on what we have experienced together. The children can assign this tested to the theory. They receive appreciation for their actions.

8. Tips and Project Ideas for the Transfer into Practice

8.1 Proposals for Technological Use in Kindergarten

Continueously the question arises which technical equipment the kindergarten should purchase. There is no general answer. Before technology is purchased, the kindergarten has to deal with its existing requirements. Do we have a W-LAN and how good is it? How are the pedagogical professionals equipped? Are there tablets or laptops for the educators?

The team then has to decide. We recommend starting with electric circuits. Copper adhesive tape, batteries and LEDs are easy to obtain and can be sorted and placed in a handicrafts corner or studio. In addition, a collection of empty packaging and other things that might have ended up in the garbage will be purchased. Play Osmo is a very suitable learning material, which needs an existing tablet and finds a fixed place in the letter or number room. BeeBot, the little bee, is used in different learning and playing situations. It is available with other analogue play materials for the children (please make sure that BeeBots are always charged).

Whether it is necessary to purchase additional learning robots or even a 3D printer depends on how far the institution has come in its educational work with the new technologies. We recommend purchasing additional equipment and materials in the community of several kindergartens and borrowing them from each other.

Requirements:

- For maker activities: copper tape, LEDs, batteries, motors, crocodile clips
- For further information: LittleBits and MakeyMakey
- As a learning game in many educational areas (math, language, music, programming): Play Osmo
- For programming: BeeBot or Dash
- For design: 3D printer and Doodlebox

For some materials it is necessary to use a tray. Therefore, it is advisable to inquire before purchasing what is needed in addition to the device so that it can actually be used. For use in kindergarten it is particularly important that the equipment is always charged and ready for use. Therefore, we recommend to give the devices a fixed place at a socket. If the devices are brought back to their individual places at the end of the day and connected to the power socket when they are cleaned up, they are ready for use the very next day.

8.2 Cooperation with Parents

Opinions differ widely about the use of digital media in kindergartens. It is therefore essential to involve parents in the planning and implementation. We recommend not to focus that much on the technical equipment, but to emphasise the logic and the goal of the reorientation of the educational work. In many countries there is official support. It makes sense to study this legal basis for the educational work of the kindergarten together with the parents and to make joint considerations on the implementation. In this way, the parents are involved from the very beginning, creating a common understanding, reducing fears and ensuring coordinated pedagogical action between the kindergarten and the parents' home. We have therefore developed proposals for communication with parents.

Proposals for communication with parents:

- To take parents' worries seriously.
- Communication of the pedagogical goals and the pedagogical approach.
- Give lectures on education at parent-educator-conference.
- Organisation of parents' afternoons which give the opportunity to try out the procedure and the technical equipment by themselves.
- Reflection with parents on their own use of digital devices.
- Limitation of the use of digital technology in kindergartens, e.g. educators are not busy with their mobile phones the whole day!
- Digital devices are used exclusively as tools. They are not used for consumption and they never replace the social relationship e.g. when reading aloud.

8.3 Teamwork

In this case "All or none!" applies. It makes no sense to work in one kindergarten group with technical equipment, while this is rejected in the other group. It is also not a good idea to declare a team member responsible and allow her to work alone. The basic task for pedagogical professionals in early childhood education is reflection. This is only possible in a team. The education of children for a uncertain future needs common thinking and acting. At this point we would like to emphasize once again that the future tasks of the kindergarten is not about the use of technology. Rather, it is about the further development of the pedagogical self-image, the pedagogical values and insights. Only by working together a fundament can be developed that makes a changed pedagogical approach possible.

8.4 Tips for Leadership

The most important thing is communication. Leaders are responsible for facilitating good communication within the team and between parents and educators. They organise team cohesion and create formats for regular team reflection. Leaders must provide the right framework conditions. They ensure that the necessary materials are available, that the professionals can continue their training and that they can exchange ideas with other pedagogical professionals.

8.5 Proposals for Educational Units in the Kindergarten

We have developed various practical projects, which can be found on the website www.mini-maker.eu. These projects should serve as ideas for the development of further projects, but can also be implemented in daily routine. In order to record the development of digital media competence, we have developed a step-by-step classification and a criteria description within the framework of the first further training in the project. This system helps educators to develop suitable offers in the kindergarten.

A View – The Pedagogical Professional of Tomorrow

Be a dreamer

One could also say: "Stand by your visions and ideas. Maybe others are not yet ready to follow you, but stay tuned, then you will find a way to explain your ideas to others and maybe you even manage to inspire them". Even kindergarten-children experience that not everything they make up and think is right is correctly received by others. To endure this, to not be discouraged and to simply continue is something that is worth learning. How wonderful it is when teachers and children dream something together.

Just like the children in a Danish kindergarten: they provoked their educator with the statement that they were bored. His idea of building a rocket was also boring, because it couldn't fly anyway. "The educator replied, "Yes, it is. And so began an impressive project. The rocket was made of cardboard boxes. Everything was taken care of: The rocket needed a door, comfortable seats for the astronauts, light and of course space. The cardboard rocket with light to provide was not the problem, because the children knew with circuits and LEDs already well. But how should space be created? They thought about it for a long time. A child had the idea, if there were space noises around the rocket, one would think inside the rocket that one flies around in space.

The children discovered and recorded all kinds of sounds in the kindergarten. The melodic smacking of the refrigerator door when it is closed was chosen. "That sounds like a satellite flying by," the children noted, sitting in the rocket, listening to the sound and dreaming of flying in space.

Be fearless

Some are afraid of situations in which they have to prove themselves. Others are afraid of doing something wrong. In general, it is human to be afraid of the new and unknown, or of things we do not understand. The work with digital media needs discoverers, people who dare to approach something new full of curiosity. To educate the next generation in this sense means to let children grow up in an atmosphere of research. To give them the courage to do something wrong while trying out, not to give up and to start over and over again. This somewhat romantic-sounding challenge for the future is controversially opposed to our current understanding of teaching and learning. We have to be aware of this. The kindergarten, which was able to protect itself from schooling in many European countries, can in its didactics be a model for the education of people for whom mistakes are a learning opportunity. Danish kindergartens therefore work with the aim of creating opportunities for children to make mistakes in everyday life.

Be passionate

It is wonderful to do something you like to do, what you are interested in and what drives you. We humans are different and interested in different things. Nevertheless, the traditional school tries to teach children and teenagers that things that are fun belong more to the leisure sector. The pupils whose preferences coincide with the school curriculum have a great advantage in this educational system. It is worthwhile to go the other way around and think of a school where everyone can learn according to their interests and inclinations. We are sure that no scientific or artistic subject would be neglected. In our complex world it is important to acquire knowledge in many facets, to educate oneself further and to refine one's competences. The only difference would be that the learning process starts with the passionate interest of the children and young people.

Be Inclusive

The idea of learning as a social package includes the idea of learning together. The idea of the social community as a basis for good cooperation in kindergarten is part of this demand. To trust each other, to listen to each other, to be interested in each other are important prerequisites for learning in the social community. In order for this joint learning to unfold the energy of creativity, discovery and invention, it is important to be aware of one's own prejudices, to reflect on them and not to let them become too big. Everyone is an important member of the group, everyone has ideas and knowledge that can advance the common construction and discovery.

Be a hacker

Nothing stays as it is. Everything changes constantly. Children are getting bigger, have more abilities and competences. The world keeps turning and people change, new inventions and developments change our society. Especially in childhood changes are seen as something positive. “I’m getting bigger”, “If only I’d been to school”, “My girlfriend can swim already”. Such statements by children make it clear that they are very positive about change. We adults, especially pedagogical specialists, are rather sceptical about changes. We think a lot about transition processes. It is necessary and justified to accompany the children well during all changes, to protect them from irritations and to make sure that every child goes along well. But this is about balance. The children must learn to shape change processes well for themselves, to be able to create a positive attitude within themselves and in the end to be able to stimulate and implement changes themselves. Hackers change things, connections or practiced routines. They do this in an effort to create something new. The hacker spirit is absolutely necessary for research-based learning.

Be a storyteller

Are parents and educators aware that they, the adults, guide children through stories? The narratives of early childhood have changed little over generations. Even if the actors are always different, the stories deal with fundamental values of our social life, provide explanations for the laws of our world and above all give confidence and hope for a good end, a good success and the safe protection of the family or the community.

We humans are therefore used to being guided by stories and hardly notice their influence from news, gossip and social media on our beliefs and actions in everyday life. Especially in modern times, there is a need for a little attention, more reflection and certainly also regulation. This realization places a great responsibility in the hands of the storyteller or story inventor. Kindergarten needs positive, motivating and active stories. These stories should be shared with parents and other kindergartens.

Be an artist

Realize your own idea! Let your project or invention become reality. Don’t let it dissuade you. This is behind the request: “Be an artist! The kindergarten is the ideal playground for idea realizers and inventors. Enough space and many different building blocks, cardboard boxes, glue or adhesive tape, pens, chalk, watercolours - all this is available in abundance in the kindergarten. If these possibilities are supplemented by pedagogical specialists who create space and time for the imaginative activities of the children, they can realise their projects. The digital tools complete the offer. Trays and 3D printers provide a new dimension of stimulating material.

Be true

Children need adults who are open and show their strengths and weaknesses. This communicates that openness, honesty and the willingness to take responsibility and to act responsibly are characteristics that underlie the idea of the makermentality. A functioning community must assume that excluding rumours, self-interest, dishonesty, willingness to disturb and other negative things, which form the counter pool to the demands listed in this chapter, can occur again and again. It needs the ability to deal with them. This has to be reflected every day and the cohesion of the group has to be practiced. The more the children can experience about regulation processes in groups in their everyday life, the better they are prepared for the future and can integrate demands like “Be honest” or “Be inclusive” into their lives.

As pedagogical professionals of the future in the present, we are in a position to challenge the children to ask their own questions instead of prescribing steps for them. We give them the time and space they need to realise their ideas in a calm environment and also provide them with inspiring material and environments. We discuss solutions rather that results. Along with the children, we learn from our mistakes. We develop prototypes and put them into practice on a day-to-day basis. We recycle and repair instead of consuming. We believe in each other’s abilities.

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