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Chapter

# Early Childhood Education

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## Abstract

The relevance of early childhood education and care (ECEC) is widely acknowledged in many countries, the number of ECEC settings is expanding correspondingly. This trend reflects the tremendous learning potential during early childhood. Right from birth and during early childhood a variety of learning processes are initiated that foster agency, self-regulation and development. Even the newborn is an active learner, a competent interaction partner and a problem-solver. In line with a deeper understanding of the mechanisms, principles and conditions of learning, early childhood education relies on pedagogical concepts, approaches and didactic methods that promote early learning and development. ECEC settings for young children stimulate exploration and action in everyday situations, embedded in social relations and interactions with peers and with a skilled and reliable pedagogical professional. The expansion and professionalization of the ECEC sector requires establishing a research infrastructure as well as implementing different research approaches at the micro-, meso- and macro-level of the system of early childhood education.

**Keywords:** Early childhood, Learning, Education, Interaction, Agency, Research

## 1. Introduction

Early childhood education looks back on a long international history. Early childhood institutions date back to the late 18th century [1]. Right from the beginning, such institutions had two intentions: caring and education. Friedrich Fröbel's (1782–1852) "Kindergarten" was dedicated to the ideas of "self-education" and "self-activity" and was rooted in the philosophy of Romanticism. In this way, early childhood education was considered to be an organic process [2]. On the other hand, housing and emergency relief institutions were established to provide families with a possibility for their children to be cared for and thus solely fulfilled the functions of care and charity [3].

Furthermore, in the history of childhood until today we find a marked difference between early and mid-childhood. This difference considerably affects how children grow up and also how any kind of early childhood education is designed. Accordingly, Michael Tomasello writes [4]: "In the eyes of many cultural institutions and traditions, across many centuries and societies, children's sixth or seventh birthday heralds their entry into the 'age of reason'". This shift - still culturally effective today by starting school and formal learning - not only decouples early childhood education from other educational institutions but also works in favour of a differentiated understanding of education and profession.

The motifs of education and care have been defined more precisely only in the recent history of institutionalized early childhood education and care. By

integrating scientific insights, a more reflective understanding of early childhood education has emerged. In particular, results from developmental psychology research have led to this change. Children, as well as toddlers and babies, are socially competent actors right from the beginning. Adults have to respond to children's needs in a sensitive and responsive way. In this context, since the 2000s there is an overlap between empirical insights and the philosophical debate concerning early childhood education. The quality of interactions between adults and children is a key for the educational quality of early childhood education.

Effectiveness studies such as the *Perry preschool* or the *Abecedarian Project*, among others, have shown – over a period of 40–50 years – how sustainable high-quality early childhood education can be for the whole lifespan. At the international level, early childhood education has also become increasingly significant in the context of the demand "education for all" [5]. Since the 2000s, early childhood education in Germany has been the topic of a broad debate arguing that education is a human right and that early childhood provisions should be effective. On the other hand, the growing up of small children has changed most of all because of the rapid quantitative expansion of institutions of early childhood education. The implementation of high quality early childhood education is a challenge still today.

In the following, first a short description of the expansion of ECEC provisions and the increasing demand for places will be given. In the light of psychological and educational theories and evidence, currently debated issues and open questions in the field of early childhood education will be discussed. Lastly, challenges for and approaches to a modern kind of educational research within this action field will be named.

## 2. The growing significance of early childhood education

Across Europe, ECEC provisions are organized differently. In some countries, ECEC is part of the educational system (e.g. in Belgium, France, since 1968 in Italy and England) and in other countries it is part of the social service (or welfare) system. Furthermore, in several countries, early childhood education and care from birth to compulsory school is integrated in one unified system [6]. In recent decades Europe has moved towards universal access to ECEC for all children [7].

In many countries, institutions of day caring have become a crucial element of the educational system, first only applied to children from the age of 3 until school enrolment (ISCED 0). Accordingly, in the year 2005 the OECD average participation rate in ISCED 0 was 75 per cent, by 2010 it was already 81 per cent, and by 2018 it was 88 per cent [8]. Furthermore, the ECEC provisions for children younger than three years are currently rapidly expanding.

For Germany, the change from a welfare state concept of the system of early childhood education to a concept of the welfare state investing in social issues can be demonstrated [9]. At the heart of the new understanding of ECEC is the support for labour-force participation of mothers and for investments in children by providing early education. The quantitative expansion of ECEC provision has been achieved by massive investment packages, ensuring access and participation by introducing legal rights to a place. Expenses for parents have been reduced drastically, up to implementing free ECEC for an increasing number of age groups in several states.

With the changes in recent history, the obligatory start into the educational system has changed as well. "The last year of pre-primary education has been made compulsory in 16 European educational systems" [1]. Politics has placed its focus on children with a so-called low socioeconomic status [8].

## 3. Learning during early childhood

Anthropology describes man as a "deficient being" [10] who is born too early and prematurely and thus requires culture as a second, protective skin. The more recent infant research, however, shows that already at birth the newborn is provided with a complete set of reflexes and dispositions for learning, and thus, in contrast to anthropology, one speaks of the "competent baby" [11, 12]. Independent of experience, reflexes allow for protective mechanisms (such as blinking, clinging, grasping), reactions of turning towards stimuli (seeking, sucking), but also for highly complex motoric programmes (stepping, swimming). As a matter of fact, learning starts even before birth. For example, as early as the 32nd week of pregnancy fetuses react to repeated (already known) stimuli by showing reduced neuronal activities and react unabatedly to new stimuli. This habituation is a very basic way of representing experience which is close to a stimulus. Furthermore, there is evidence of early developed olfactory, gustatory and acoustic preferences which are a result of antenatal learning.

### 3.1 Experience-driven maturation of the brain

The depiction of reality (mental representation) takes place in the cerebral cortex. The development of the neurons is mostly completed by the end of the sixth week of pregnancy, however the synaptic interconnections between these neurons are not. The development of the brain structure in the various areas of the brain happens according to different schedules: the development of the auditory and the primary visual cortex happens during the first months of life, the speech centres develop with a delay, the synapses in the frontal lobes of the cortex, which are in charge of thought, develop throughout the entire childhood. In the course of the maturing of the brain, an experience-dependent selection from the surplus of synaptic connections between the neurons occurs: active connections tend to get stronger, inactive connections degenerate. Only by degenerating unused or inactive connections is the brain able to develop its differentiated and highly efficient structure. These insights have far-reaching implications for the question whether a person's personality and behaviour is genetically determined or acquired through experience ("nature–nurture debate"). As demonstrated by modern brain research, the development of the neuronal "hardware" happens in an experience-dependent way. Thus any one-sided biological determinism is as inappropriate as theories that purely refer to learning and milieu [13]. Educationally relevant is the finding that from the moment of its birth the child is an active problem solver and a learning agent. Perception, movement, thought and action form a unity already within the newborn. And even the development of the first cognitive schemes is based on activity.

### 3.2 Mechanisms of learning

#### *3.2.1 Habituation*

Right from the beginning, the human mind is attracted by new information. New and unknown stimuli evoke neuronal activity in the brain. This neuronal reaction gradually decreases when the stimulus is presented repeatedly. Attention as well as heartbeat and breathing rate decline reflecting a general loss of interest. More or less slight variations can induce a return to a high level of reaction (dishabituation). The mechanism of habituation functions as a very basic differentiation between known and unknown information and as a very fundamental

representation of experience. Habituation and dishabituation can be observed in the third trimester of pregnancy [14].

### *3.2.2 Classical and operant conditioning*

In the case of the learning mechanism of "classical conditioning", a neutral stimulus which is repeated together with a reflex-inducing stimulus starts functioning as a reflex stimulus. Learning through conditioning works particularly easily and secures survival. The coupling of stimuli to feeding (sucking reflex) is successful from the first months of life, however, the conditioning of avoidance reactions is only successful when the baby has acquired the necessary motoric abilities. Thus, early childhood learning processes are embedded in domain-specific development schedules.

Whereas in the case of classical conditioning the baby selects stimuli from its environment, in the case of "operant conditioning" the baby's own actions are crucial. Here, learning results from the effects of the baby's own actions which may support or suppress each respective action. For example, drinking (sucking, licking) a sweet liquid has a supporting effect, taking in a sour or bitter liquid has a suppressing effect. In the course of the baby getting older and step-by-step extending its repertoire of behaviour, the learning mechanism of operative conditioning is extended to an increasingly broader range of reactions and ways of behaviour. When the baby is interacting with its close reference persons (e.g. parents), the mutual reactions of both interaction partners – e.g. the child looks into the eyes of the adult reference person, this person reacts by making eye contact and smiling, which again the child answers by smiling back – result in acquiring and consolidating new ways of behaviour and action skills. It also leads to dyadic communication patterns which rapidly become more complex and dynamic. On this basis, dyadic ties can develop. A disorganised sphere of experience, where the child's behaviour does not lead to expected and adaptive results, as well as a lack of interaction with adult reference persons can lead to grave developmental disorders [15].

### *3.2.3 Imitation*

Imitation is another way of learning in early childhood. The newborn is already capable of imitating gestures and movements of the head. Sticking out the tongue, opening the mouth or a sad facial expression are imitated two days or a few weeks after birth. Also, the significance of early social interaction and communication is obvious. The different learning processes are always embedded in a social and cultural context [15], which has been obscured by concepts of learning theory such as "stimulus" or "situation". Social learning theory specifies these learning processes and, according to further developments in the theory, emphasizes how the acting subject contributes to its own development [16].

An enormous catalyst for the development of thought is the child's ability to direct attention. Already at the age of six months, either in typical play situations or diaper-changing situations, the child directs its attention either towards an object or towards the adult reference person. Two or three months later the object is included increasingly in the interaction. The child and the adult direct their attention towards the object together, they communicate about the object, and they use it in playful interactions. In this context, the child increasingly makes use of the interaction partner as a means of achieving its own goals, such as to get a desired object it cannot get to on its own. Significant for the further development in this context is the emergence of children's joint attention skills. The child learns how to adjust its attention to the adult's direction of attention and how to direct the adult's

attention to things that are of interest to the child. In this interaction process, the adult reference person plays the role of a teacher, who can facilitate the learning and development processes to a great extent. Some authors consider this ability to share attention to an object with another individual the foundation of intentionality and self-reflectivity [15] - this already differentiates the human baby from other primate newborns.

*3.2.4 Play*

Learning means the appropriation of something new, and the baby has a marked need for new stimuli and experiences from the very beginning. In this context the baby's exploration behaviour is of a playful nature, and during early childhood play it maintains its outstanding significance as a genuine frame for learning processes. Objects (such as a rattle) are focussed on and grasped, they are sensed (looked at, palmed, sucked) with the help of the senses developed at that stage, they are manipulated (turned around, shaken, thrown). By repeating these actions, the characteristics of objects and materials are understood. Being cultural goods, objects have certain meanings and functions which the child acquires in a playful manner. Here, play is characterised as being without purpose and the playing child motivates itself (to a high degree) to engage in this playful action [17]: Playful actions appear spontaneously, in situations of inactivity and boredom, they are started voluntarily and, as soon as the child has delved into play, it becomes fully immersed in its environment. What makes child play meaningful is not the result of the game but playful action as such.

The development of children's play behaviour shows typical patterns, which is why it is possible to determine a child's stage of development from its observed level of playing [18]. Accordingly, "functional play" is the simplest way of dealing with an object in a functionally correct way, such as when the child puts the receiver of a telephone (or of a toy phone) to its ear. Functional play is acquired by imitation. Next, at the level of "representative play", actions are transferred to new situations or persons. For example, the mother or the doll is given the mug for drinking. During "sequential play", topically connected actions are imitated, finally during "symbolic play" any object (such as a toy block) may represent a specific object (such as a car). At the age between nine and 30 months these levels of playing change: functional play is continuously replaced by higher-level play. Child's play is found in the respective everyday cultures of children (in the past e.g. street games, today increasingly game apps on digital devices), but also in cultivated, commercialised and institutionalised forms (parlour games, educational games, various sports clubs). Children's play develops within a social context which is mostly determined by adult reference persons [19]. For example, mothers, when playing with their children, adjust their own supportive actions (demonstrations of actions) to the child's level of playing. This development-appropriate support of playing happens without any advice and without previous training. The spontaneous and usually competent adjustment of the parents' behaviour to the child's stage of development is also found in the context of supporting the child's language acquisition. During the first months of life the so called "infant-directed talk" makes the recognition of speech easier for the child, by using exaggerated intonation, a high pitch, a simple sentence structure and a familiar wording. In the second year of life, language can be used to establish joint attention to an object, which particularly fosters vocabulary learning [20]. Only after the age of 24 months is the child instructed, by so-called "motherese", about the specifics of grammar. Apparently, these patterns of learning support appear across all cultures.

### *3.2.5 Mental representations as constructions*

Constructivist developmental theories further explicate these learning processes. The child acquires and develops its knowledge and its understanding of the world by being confronted with reality. Observations are classified, interpreted and appropriated (assimilation) according to already established cognitive schemes. New, surprising and scheme-incongruent experiences stimulate changes in existing schemes (accommodation). These processes as well as robust developmental sequences are postulated by Jean Piaget, in his theory of stages of cognitive development.

In this context, crucial learning processes happen in the "zone of proximal development" [21]. This zone describes the next level of development and thus the child's next step of development. Development in the zone of the next developmental step is stimulated by interaction with peers moving within similar zones of development, secondly by development-appropriate stimulations or instructions through an adult reference person, furthermore through a stimulating learning environment, and finally through play.

## 3.3 Exploration and attachment as complementary systems of behaviour

Attachment research sketches attachment as a phylogenetically preprogrammed behavioural pattern of the child, which at first covers certain affective states and emotions (such as fear, pain) and the corresponding signals by the child (such as crying) which trigger a purposeful behaviour of the adult reference person [22]. Attachment may not be understood as a feature of the child but is a dyadic system which includes the socio-emotional needs of the baby and the reactions of the reference person. By the end of the first year of life, dyadic experiences of interaction result in a specific quality of the attachment relationship. A simple taxonomy distinguishes between four attachment patterns: secure, uncertain-avoidant, uncertain-ambivalent and disorganised attachment. During infancy and as a baby, the child depends on the care of adult reference persons who are in charge of the regulation of its emotional well-being. If the attachment system is activated, such as in a situation of uncertainty or threat, the reference person responds appropriately to the signals of the child with behaviours that contribute to comforting the child. Adult reference persons (typically mothers and fathers) are different from each other according to their degree of sensitivity. A sensitive reaction shows the following elements: 1. perceiving signals from the child, 2. interpreting these signals in the correct way, 3. an effective reaction, as well as 4. immediate reaction. The sensitivity of the reference person proves to be the most important determinant of the quality of attachment.

The functioning of the dyadic attachment system is of outstanding significance for learning processes during early childhood. In situations of uncertainty, irritation or fear the child immediately interrupts any explorative behaviour. Only when the aversive state has been overcome or dissolved, the child turns back to new objects or activities. Thus, exploration and attachment are two complementary systems of behaviour which are important for the child's development [23].

## 3.4 Intrinsic motivation and learning

The self-determination theory developed by Edward Deci and Richard Ryan [24] describes the conditions and processes contributing to maintaining and increasing the motivation for learning. The two researchers started out by exploring the question: How might the seemingly innate curiosity be used and facilitated to establish

interest-guided, motivated action? They distinguish different degrees of intrinsic motivation: An action is considered to be intrinsically motivated if it is completely without purpose and performed for the pure joy of action ("integration"). Slightly less self-determined would be an action serving for achieving one's own purposes, here the person identifies herself/himself with the action goals and accepts the necessary effort ("identification"). Intrinsically motivated only to a small extent would be an action suggested from the outside, such as to avoid trouble and conflicts with third parties ("introjection"). According to the theory, the degree to which intrinsic motivation increases or decreases while dealing with an object, solving a problem or completing a task depends on the satisfaction of three fundamental needs: the experience of competence or a gain in competence, the experience of autonomy or a gain in autonomy; finally, the experience of social inclusion or belonging. In this context, the change of motivation may run into two directions: When experiencing competence, self-determination and belonging the activity becomes more interesting. When experiencing incompetence, heteronomy and social isolation the interest in the matter decreases.

Compatible with this theory of motivation is also the concept of self-efficacy [25]. Dependent on the child's experiences and the feedback provided by relevant reference persons, the child develops a feeling for its own creative skills and competencies which, in the sense of self-confidence, supports proactive action. In the course of childhood these self-related estimations and self-images become further differentiated, depending on the developmental domain and type of behaviour [26, 27].

## 4. Early childhood education

All over the world the significance of day care institutions has increased [7]. Today, not only families but also day care institutions crucially influence how young children are growing up. These developments are also viewed critically, and it is emphasized particularly that children should not be degraded to become sheer addressees of adult ideas on how to educate and raise children. The organization of the generational order of the different age groups, such as adults and children, in modern society moves into focus [28]. In the course of these debates, theories of an organic development during childhood as well as mono-dimensional ideas of education lose their significance. Findings from more recent psychological studies indicate that for early institutional education the various opportunities for young children to interact with adults and peers must be taken into consideration instead [29], and that an understanding of relations which is based on sensitivity is of high significance. Against the background of these insights, early childhood education establishes a socio-cultural understanding of education and learning. Basically, these models refer to Lev Vygotsky [21] who closely relates cognition and sociality to each other and attributes particular importance to the development of (oder through?) socio-cultural activities. Also, the studies by Jerome Bruner [30] and Barbara Rogoff [31] are of outstanding significance for developing an idea of bringing up and educating based on the perspective that children are social actors. These theories have recently been boosted by the studies of Michael Tomasello [4]. In his research he connects to these theories and develops them further towards a neo-Vygotskyan approach. Right from birth, he describes human development as a close interplay between evolutionary and cultural dynamics of development. The dialectical logic is a basic element of socio-cultural theories [32]. That is why they are so appropriate for understanding educational processes. Man's flaw – not being able to survive without other humans – is at the same time also man's strongest

point. Being socially referred proves to be a core element of the human species and a driving force of culture. A reflective kind of early childhood education takes up these insights and makes use of them not only for a modern understanding of education but also connects a differentiated understanding of educational relations to it – an understanding which is aware of the powerful responsibility of adults and the fragile dependence of young children [33].

### 4.1 The quality of educational interaction

The extension of institutionalised early childhood education is greatly influenced by education policy debates. Children have a right to high quality early childhood education as well as to institutions of high educational quality [1, 34]. Since the beginning of the 2000s and triggered by the post-PISA debates, early childhood education is at the heart of European educational policy. In Germany, these debates had their peak e.g. in the decision by the 16 state ministers to develop a "Common Framework for Early Childhood Curricula" [35]. This decision supported the introduction of educational and orientation curricula which, at the structural and topical level, were a significant innovation as they strengthen the educational tasks of day care centres. These changes were fostered, among others, by the OECD's "Starting Strong I" study and initiated debates on improving the quality of early childhood curricula under the perspective of "lifelong learning". With the publication "Starting Strong: Curricula and Pedagogies in Early Childhood Education and Care Report" [36] a consensus was achieved that communication, collaboration and creativity must be at the heart of early childhood-educational approaches.

For a long time, quality research on institutionalised care was most of all interested in clarifying how non-family caring affects young children. The appropriate studies emphasized that attending a day care institution had a positive influence on the intellectual development of young children, even influencing later academic skills [37]. From the 1980s on, such studies – particularly in the English-speaking countries – were increasingly designed to assess the quality of the experiences of young children in non-family caring [38–40]. Thereby, the study approaches became more complex. More recent studies emphasize that not only attending an institution but the stimulations the children are provided with while engaged in direct social relations and interactions exert a strong influence on their development [38]. Also, the interplay of domestic and non-family care plays an important role for the studies on early childhood development. The effects of ECEC on child development seem to be conditioned to high quality. Some studies identify a higher potential for children prone to so called socio-economic risks [41]. At the international level, high quality ECEC appears to be most effective regarding cognitive performance [38]. The fact that in this field socio-emotional indicators can be less satisfactorily depicted might, among other factors, be due to the fact that these indicators are more difficult to assess [40]. Longitudinal studies such as the "Effective Pre-School, Primary and Secondary Education Project" (EPPSE 3–16) provide evidence for effects of early childhood education reaching as far as adolescence [39].

Like in other fields of education, the analysis of the quality of early childhood education is nothing new [42]. However, so far no sustainable education research has been established in this field that goes beyond the initiative by individual actors. Also, the development of tools for assessing quality lags behind compared to the strong expansion of day care. One of the oldest and still internationally most frequently used tools for the measurement of quality is the "Early Childhood Environment Rating Scale" (ECERS) [43]. As early as in the late 1980s there were different attempts to replace the dualism of programmes in the field of early childhood education by a debate on quality. In the tradition of this scale, further

tools have been developed – which in particular address the process quality of everyday business in day care institutions. Among these is a scale for younger age groups (ITERS for children below the age of three), for different academic domains of education (ECERS-E) or concerning the quality of interaction and well-being (SSTEW). Furthermore, the Classroom Assessment Scoring System (CLASS) [44] for recording process quality has been developed. Meta-analyses show that process quality varies much between as well as within individual countries. In all countries, the quality of institutions of day care lags behind their expansion. Currently, comparative studies from different countries do not provide a common answer to the question, which structural factors particularly influence process quality. Professionalization, structural and socio-economic factors are influential to different degrees in different countries [45–48].

### 4.2 Implications for pedagogical practice

The various studies on ECEC quality attribute a high significance to the organization of the interaction process between adults and children for the development of small children. Well-founded insights on early parent–child interactions have been provided by attachment research, among others. When it comes to caring for children younger than three, a meta-analysis [29] reveals that the sensitivity displayed in interactions is also significant for the interactions between ECEC professionals and children, although the character of caregiver-child attachment is somewhat different to parent–child attachment, due to the fact that the dyadic relationship in a group context is less exclusive. In this context, Ahnert [47] emphasizes group-orientation as a crucial feature.

#### *4.2.1 Sustained shared thinking*

Also concerning children older than three, the quality studies indicate a closer connection between direct interaction and children's cognitive development. In particular, the "Sustained Shared Thinking" (SST) interaction format has become highly significant for the shaping of educational and learning processes during early childhood. This interaction format was identified by analyzing observation data collected in the British longitudinal study on "Effective Preschool and Primary Education" (EPPE/EPPSE) [48, 49]. In the EPPE study, the educational quality (process quality) of ECEC institutions was assessed with the ECERS-R and ECERS-E [50]. The SST interaction format goes back to categories of "instructional techniques" worked out in the context of the EPPE project. In the course of doing so, the following sub-categories were outlined: demonstrating, telling and dialogue [51]. Bringing together the different sub-categories to form the SST interaction format explains the high degree of complexity while at the same time describing the competences required by professionals (e.g. preschool teacher).

Siraj-Blachtford [52] defines sustained shared thinking as "an episode in which two or more individuals 'work together' in an intellectual way to solve a problem, clarify a concept, evaluate activities, extend a narrative etc. Both parties must contribute to the thinking and it must develop and extend." SST is a kind of cognitive cooperation. It requires active participation by the interaction partners and aims at solving problems by jointly considering them. SST also aims at finding definitions or assessments of events. In the course of a co-constructive process, ideas, stories and experiences are exchanged, extended and newly developed. According to SST, the balance between (child-initiated) free play and adult-structured learning phases is emphasized [53]. Solving problems or tasks together may be accompanied by educational professionals who apply strategies that facilitate language development

in everyday situations. One important strategy involves asking open questions (e.g. What do you think ...?). SST covers the co-constructive processes of understanding and scaffolding, through which educational professionals create a theoretical scaffold to purposefully support children in their acquisition of knowledge. Additionally, the dialogue component of this teaching-learning method supports the establishment of knowledge. For the time being it is still an open question if in these situations it is the children or the pedagogs who promote learning by social interaction. It is also an open question if in this case there is a more sensitive reaction to weaker children or if an important potential of educational interaction stays unused and if, thus, the children are provided with fewer learning stimuli, which inhibits their further development. There is empirical evidence that the following aspects influence the learning processes positively [48, 49]:

- Adults create a relaxed socio-emotional atmosphere.
- Educators at the institution are highly skilled.
- The learning arrangements are suitable for both the educational domains (literacy, language, mathematics) and for social development.
- In the individual settings, interactions between educational professionals and children are characterised by sustained shared thinking (SST), which may provide an optimum of support for children's learning.

SST pursues several principles: on the one hand, a particular kind of sociality, such as a dyadic connection of the educational professional and the child or the small group dealing with each other is connected to it. Furthermore, dealing with each other in a cognitive way (jointly referring to an object) is considered important. In this context, there is particular emphasis on processes of problem-solving, clarifying situations, assessing or describing activities as well as on inventing stories. These principles – as demonstrated by the studies by Iram Siraj – are positively connected to children's learning processes. Thus, this interaction format or the implementation of these principles is of great significance for the shaping of interaction processes in the field of early childhood education. SST requires much involvement of those participating in the interaction process, which is characterized by the actors jointly focusing on one subject and exchanging their ideas, opinions etc. on it. Crucial for this interaction format is the key word "sustained" which refers to the broadening of perspectives. In addition, the studies share an understanding of interaction that is also part of many qualitative studies e.g. [54, 55]. The reciprocity of the interactive relationship is a basis for a stimulating learning process. Salminen et al. show this with children under three years: "Scaffolding children's actions, thought processes or educational dialogue seems to require different types of educator engagement" [54]. A systematic review of teacher-child interaction with multilingual children [56] illustrates these challenges as well.

### *4.2.2 Informal learning*

Education embedded into everyday situations in day care institutions relies on informal learning processes. For early childhood education, this approach is supported by findings of recently published effectiveness studies. The SST interaction format describes the quality of exchange in a differentiated way. Mutual interactions or dialogue, i.e. staying with the child, are crucial for effective and sustained informal learning. The empirical findings can be explained in terms of

socio-cultural theories. At the same time, however, these conceptions also point to blind spots of the debate. For example, current educational research does not take sufficiently into consideration how the peer group, or the social group in general, influences learning and how young children experience social inclusion. Concerning the care of children under three, differentiated models have already been described [29, 47]. Also, for children older than three the relationship between the professional and the child is not an exclusive one. These insights are important for considering appropriate group arrangements and effective conditions for informal learning. The strong orientation towards a school-oriented teaching-learning research (formal learning) does not seem to be sufficient for the analysis of informal learning processes of young children.

Education embedded in everyday situations has an inclusive orientation. Fundamental for this is an orientation towards diversity education as well as an understanding of education which is based on human rights and democratic values. Inclusive approaches take into account the basic human rights principles and democratic values. Any early childhood education based on dialogue and exchange must also include the complex interactions within the social group, where exclusion from or participation in interaction emerges. Participation in education focusses on economic, socio-cultural and gender equality regarding the access to educational institutions. Participation puts the inequality of generations into question – "that is the powerful responsibility of the older and the vulnerable dependency of the younger generation" [57]. Socio-cultural learning can be related to a relational and transgenerational perspective. Here the potential for participation within the informal setting of day care institutions become obvious. The mutuality of interactions, joint attention and cooperation are typical features. Typically, participation is demonstrated by "listening" and by "the children influencing" the interaction process. Sharing and appropriation of knowledge are crucial aspects of cultural learning. Thus, this kind of learning shows features of implicit, explicit, and also intentional learning. Children may experience this kind of learning both with adults and with peers, particularly while playing children may experience various types of participation. The research on "peer-culture" [58] and on "co-construction" [59] is fundamental for these insights. These underlined action patterns are not a matter of course, not even in the context of play. The implementation of a qualitative, inclusive early childhood education requires well-trained professionals who have not only developed a sensitive educational practice but also have scientific reflective skills, so that they are able to acquire a differentiated understanding of the system of education and are able to integrate sustainably insights from educational research into everyday practice.

## 5. Conclusions

Day care for children has changed much over the past decades [48]. Among other reasons, this is due to effectiveness studies that have increased the interest in early childhood education. However, a practice which is only based on empirical evidence runs the danger of losing the core qualities of early childhood education, which in particular include informal educational and learning processes. Early childhood education is different from learning in higher age groups. Tomasello [4] refers to a neo-Vygotskyan approach. He describes human development as a close interplay between evolutionary and cultural lines of development, starting immediately after birth. The dialectical logic is a basic element of these socio-cultural theories [31]. Sensitivity and the opportunity to play are also highly relevant. Thus, it is a crucial challenge to move into focus on those criteria that are particularly

emphasized by research, namely high-quality relationships and interactions (process quality). Under such conditions, the potentials of (academic) education could be increased [39], and children and their families can experience better participation and social inclusion. An inclusive early childhood education formulates its educational concepts based on the core idea of social coherence. Never before in history has the right to education for all been proclaimed as clearly as in the more recent publications of the United Nations [60].

To this end, awareness has been raised in recent decades and the number of institutions has increased. Today ECEC is part of an established infrastructure in many countries. Nevertheless, when it comes to early childhood education, there are still enormous differences in how well this infrastructure is developing. Differences exist between rural and urban areas and according to the wealth of the society. Since 1999, globally we have observed a rise in the number of pre-school institutions. Also, research on process quality shows how much practices in individual countries can differ [47]. Establishing sustainable educational research is crucial to better understand barriers within the educational system, also in early childhood education. In the field of childhood education, educational research is indeed nothing new – investments into this field have been made as early as the first Head-Start projects. Nevertheless, up to this day it has not been possible to establish a sustainable and comprehensive educational research in this field, with a permanent research infrastructure independent of education-political cycles and not limited to effectiveness studies. Science intended to improve educational practice is the precondition for professional education. Since the development of education in the 18th century science has been aiming to develop a theory of educational practice that is a different of practical work. Education requires practical orientation and research effort [61]. It means reflecting on the education and bringing up of children. As far as early childhood education is concerned and in contrast to other sectors of educational science, this target has not yet been met. Early childhood education as a discipline must be strengthened. As long as the training of early childhood professionals is separated from research and science, the transfer of insights gained by research as well as the establishment of a scientific-reflective early childhood education will remain difficult [62].

Establishing sustainable educational research must happen against the background of these debates. In this context, also the differentiation of the system of early childhood education must be taken into consideration [63]. Theoretical reflection combined with empirical monitoring and analyzing of pedagogical practice seems to be a promising way to face the challenges of early childhood education for the 21st century. This chapter tried to outline the practical value of scientific research on learning and development for ECEC practice.

Sustainable educational research provides descriptive, explicative and operative knowledge [64]. Apart from official statistics, replicative surveys and prospective panel studies are crucial to disentangle effects of social change, ontogenetic development and pedagogical program and intervention. In this context, both large-scale studies and more sophisticated studies taking a deeper look into pedagogical interactions are necessary. Multiperspective study designs are essential in order to analyse the interplay of contexts and socialization agents (e.g., family and ECEC). A biographical or life-span perspective is suitable in order to analyse developmental and institutional transitions (e.g. entering ECEC, entering school). Insight into the complex interplay of contexts and institutions over time will only be possible utilising differentiated research approaches at the micro-, meso- and macro-level of the educational system. Micro-level studies focus on the direct interactions between educational professionals and children, on educational practices and routines. Meso-level studies take a differentiated view at organizations. Finally, macro-level

analyses integrate the wider context including the sub-systems of professional training and further education, providers, stakeholders and governance of the ECEC and the broader educational system. Also, these analyses require profound and sustainable research funding.

## Notes

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