

ITERS and ECERS as tools for developing quality in physical activity and science in ECEC

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Abstract

This article discuss how ITERS-R and ECERS-R used on item level can contribute to a budding science and physical education in ECEC and the ECTE. We use data from ITERS and ECERS obtained within the project of GoBaN³ and searching for Quality in Norwegian kindergarten. From our point of view an essential part of quality is rooted in “Fachdidaktikk”, and there are no-such in physical education and science education in ECEC-programs. We therefore seek to find some core elements of its potential content with ITER-R and ECERS-R as possible tools.

Introduction

During the last two decades several questions and concerns about the quality of both the kindergarten and the Early childhood education has risen (Megalonidou, 2020; Bjørnstad. Baustad & Alvestad, 2019). The framework plan has changed, and in Norway the framework plan and curricula span from starting kindergarten until a child leaves high school. In the same manner Early childhood teacher education (ECTE), teacher education, kindergartens and schools are all addressed to see bridges instead of gaps between institutions. Changing a focus to bridges validates a need for a common ground in how, why, what we teach and explore in physical- and science education for the ECEC. To teach youngsters there is a need to be able

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³ In english: Better Provision for Norway's Children in ECEC

to facilitate, challenge, motivate and supervise an exploration in/of physical and science education. Kindergarten teachers live in a seesaw of tension linked to how the concepts of play, learning and care should be understood and worked within a holistic pedagogical approach.

ITERS - R and ECERS - R as quality indicators

Infant/ Toddler Environmental Rating Scale-Revised Edition, ITERS-R, (Harms, Clifford & Cryer, 2006) and Early Childhood Environment Rating Scale- Revised, ECERS-R, (Harms, Clifford & Cryer, 2005) are a widely used instrument in research on childcare quality (Barros et al., 2016; Bjørnstad & Os, 2018; Baustad, 2012; Campbell et al., 2008; Gevers Deynoot-Schaub & Riksen-Walraven, 2008; Goelman et al., 2006; Vermeer et al., 2016). The ITERS - R instrument assesses overall quality of the classroom environment for children up to 30 months of age. The ECERS - R instrument assesses for children from 3 through 5 years of age. The ECERS-R consist of 35 items and the ITERS-R of 33. This study is grounded on data from ITERS-R items (Kaarby & Tandberg, 2018, 2019b) and ECERS-R items (GoBaN conference, 2019; ETEN conference, 2022) and will be used as inspiration for starting a reflection upon didactics in physical and science education in kindergarten. The Items are quite like several of the subjects or themes in the ECTE and ECEC.

There is a growing interest for education in the ECEC, often referred to, at least in the North of Europe, as the “schoolification”. Both on Iceland (Gunnardottir, 2014) and in Estonia (Mikser et al, 2019), kindergarten teachers have been worried about their pedagogical professionalism being subject to the external evaluation, children’s learning outcomes and a curriculum for the kindergarten. Though Norway just has a Framework plan for the kindergarten, we share parts of this concern. At the same time, we find it meaningful to address parts of it with increased knowledge and didactics that aims to unite both exploring, learning, play and care. Both WHO (2020) guidelines for physical activity and sedentary behaviour for children, and UNESCO’s (2008) report on the contribution from the early childhood as a factor to change to a more sustainable society, actualize the importance of subjects like physical education and science even in ECEC settings.

This is the background for our research interest and research questions.

RQ 1: How can ITERS-R and ECERS-R increase the everyday awareness of subject knowledge and pedagogical use of the environment in exploring and challenging physical activity and science

RQ 2: How to use ITERS and ECERS in a budding Fachdidaktikk, meaning subject specific didactics for science and physical education.

Theory

The importance of quality education and its short-, medium- and long-term impact on development and learning, well-being, early abandonment rate reduction or increased life expectancy, is widely argued by numerous international authors and agencies (Blanco, 2008; Heckman, 2017 among others). It has been shown that ITERS - R and ECERS - R measure quality in coherence with the Norwegian Framework plan for the kindergarten (Bjørnstad et al, 2019). However, the results from ITERS and ECERS have most commonly been shown and discussed in the light of an overall perspective. In this study we analyse data at Item levels, which highlight each subject more thoroughly and focus on how the subjects can be encouraged in an everyday setting.

An expert group appointed by the Norwegian Ministry of Education and Research (2018) points to the tension between play as an activity with intrinsic value, and play that must fulfill an educational content, goal, or intension. The report problematizes the kindergarten teacher's understanding of didactic work, and thereby also challenges the ECEC institutions to meet this. A kindergarten has a complex educational activity where a didactic understanding must be developed that considers both the here and now perspective as well as the framework plan's values, intentions, and content descriptions. The kindergarten teacher is said to be an active learning actor and for being so, there is a demand of a certain subject knowledge and didactic, into what we will refer to as the German term Fachdidaktikk, since we find this term more coherent with our thoughts and observations, for children in kindergarten, meaning children from 0 – 6 years of age.

Quality

Sheridan's (2001, 2009) approach to quality is based on her beliefs in a "common core of qualities and shared knowledge of characteristics that constitute the concept of quality" (Sheridan, 2001, p. 25). The shared knowledge relies on theoretical and practical knowledge that can define a high-quality environment for children's learning and development. Values, traditions, norms, and ideologies of the society are interwoven into this broad perspective. This perspective is child oriented and interactive, and it is formed by the interplay between the child and the environment. The pedagogical perspective of quality emphasizes the staff's capability to create environments that appeal and attract children, enabling them to discover, explore, act, and learn along with the staff and their peers. Sheridan (2009) further proposed four interacting and interdependent dimensions in the pedagogical perspective of quality in ECEC settings: the society, the child, the teacher, and the learning context.

Baustad's (2012) findings indicate that Sheridan's theories, norms, and values underlying pedagogical perspective on quality corresponds with the idea of the Norwegian Framework Plan for kindergarten, which is further supported with later studies from Bjørnstad et al. (2019).

In this study we aim to draw from the ideas of Sheridan and investigate and discuss the learning context.

Why didactics and even Fachdidaktik in ECEC?

A central idea in didactics is that education involves variable content and formats chosen by teachers, institutions, policymakers, and other areas of society. In the English language, the word didactics can be associated with systematic instructions or specific teaching methods differing from the continental European perspective. In Scandinavia and continental Europe, the concept covers a sociocultural approach to learning, concerned with teaching and learning theories, situated practices and the context embedded character of learning concerning participation and membership in a social group (Quennerstedt & Larsson, 2015, p. 567). In this text we mean the latter related to the subject of physical education and science education in a kindergarten setting, and we call it Fachdidaktikk, as discussed above.

Three knowledge components have been put as important in terms of being able to assess how a certain content should be presented. The teacher must have both procedural competence, subject or content competence as well as pedagogical knowledge (Shulman 1986). The knowledge components are in line with what Brostrøm (2016) believes the kindergarten teacher must know. Subject knowledge is the ability to discover and use the meaningful here and now situations. The kindergarten teacher must be able to interpret situations and use his/her knowledge to improvise in the work with the children. Capturing the situation requires an actively present and competent teacher. The children must have their attention directed to something, a phenomenon, a material, an invitation to different movements, or a story that gives them the opportunity to explore, reconstruct, interpret, and fantasize in new ways. The children in a playground, act based on their individual interpretation of the opportunities they have for activity (Gibson, 1979, Kyttâ, 2004, 2006, Waters, 2017). In this perspective, the kindergarten staff's facilitation for activity is important and closely related to Fachdidaktik as we use it.

Epistemic stance and conversations

Studies based on Norwegian EC teachers' own evaluations of their practices, show that teachers seem to consider a shortage of knowledge as a somewhat challenging factor when working with natural sciences and in providing children with varied experiences in nature (Kaarby & Tandberg, 2017). As part of the SciTalk⁴ project Fritsche (2021) made an investigation concerning the epistemic stance of EC teachers in conversation about science. From her 99 participants from Germany, Netherlands, and Norway two aspects were clear; On the one hand, most of the participating pedagogues stated that they were interested in science and considered it very relevant to talk about the subject with children. On the other hand, they stated that they lacked both self-confidence and (subject) knowledge to have conversations with children about science, as well as didactic methods for this type of conversation.

Having conversations and explorative talks with children can be quite challenging. Skalstad (2020) links the exploratory talk to committed sustained attention on a topic, sustained shared

⁴ Natural science talk i teacher education, <https://www.hvl.no/en/collaboration/project/sci-talk/>

thinking (Siraj-Blatchford & Sylva, 2004), and the term communicative project from Linell (1998) and Matre (2000). A communicative project arises between the interlocutors and aims to create a common interpretation or understanding of something (Skalstad, 2020). In this way, the exploratory science conversation can mean that the child gains ownership of the thematic science content, and the teacher gives the child experience in using concepts (Scott et al., 2006; Skalstad, 2020). The good science talk with kindergarten children can be short-lived, but they become good due to it being a conversation with committed and competent adults that become repetitive and accumulate over time, through sustained shared thinking (SST) (Siraj-Blatchford & Sylva, 2004). Wegerif introduces the term dialogic space, a given opportunity to think together, without limitation, and without demands or expectations of conclusive agreement (Wegerif, 2011). Sustained shared attention is sustained thinking together about a challenge or a practical task, where children can work together with other children and together with a competent adult. This has common features with what Mercer and Dawes (2008) calls thinking together.

Children's self-governed play and exploration are at the centre of didactic sensitivity. By employing didactic sensitivity, teachers can respond to children's interests and cocreate meaningful situations, which Hussain (2018, in Sanderud et al., 2021) perceives as central to meaningful learning. At the same time, van Manen (2008) argues that teachers must be sensitive to when to enter different situations and to what extent. Løndal and Greve (2015) find that many teachers balance observing, initiating, and participating in children's play. Didactic sensitivity argues Sanderud et al. (2021) encompasses teacher sensitivity to the unique and daily unfolding relationships between children and the natural environment that inspire and nurture children's play, exploration, and growth. All this shows the need of an active and competent teacher, as pointed out from the expert group appointed by the Norwegian Ministry of Education and Research (2018).

Qualified use of the environment

Manning, Wong, Fleming and Garvis (2019) metanalysis includes the studies from 1980 to 2015 which analyse the qualification of the teacher in relation to the evaluation of the quality of the environment in the classroom through the scales: ECERS, ECERS-R, ITERS and ITERS-R. It showed a positive correlation between teachers' training level and the quality of child

educational programs. Bae (2018) reminds us that both teacher-initiated and child-initiated interactions are important when exploring nature with children, since in addition to following up children's own discoveries in nature, EC teachers also have an important role in making children aware of interesting things in nature that they do not necessarily notice or discover on their own.

In a Norwegian context, Kippe & Lyngstad (2022) found that an educational environment that adapt common values and a culture promoting physical activity is a key factor for children's amount of moderate to vigorous physical activity (MVPA) during the day. According to WHO (2020) children should be physical active with MVPA a minimum of 60 minutes a day. Kippe & Lyngstad (2022) also found that organised physical activity and use of the outdoor area was important to reach the physical activity level. In addition, a collective professional awareness led to activity.

Mikkelsen's (2011) study in Denmark also show a positive association between pedagogue's attitudes towards promoting children's physical activity and the number of children having at least an hour MVPA per day. A positive association was also found between policies and pedagogue's attitudes towards promoting children's physical activity and the number of days physical activity games was initiated. In line with the Norwegian study, the social and organisational environment in the kindergarten is an important determinant for the level of physical activity among children.

Skarstein & Ugelstad (2020) found in their research that there was evident that the teachers considered the outdoor environment as an arena for pedagogical work with physical education and science, and not merely as an arena for free play. Their respondents emphasised nature as an environment offering opportunities for spontaneous activities and for working in an interdisciplinary manner with physical and science education (Skarstein & Ugelstad, 2020).

Instruments

In this study the ITERS-R and ECERS-R were conducted by certified ITERS and ECERS observers and performed according to manual (Cryer, Harms & Riely, 2004) as a part of the GoBaN

project. The scale was designed to be used with one room or one group a time. A block of at least 3 hours were set aside for observation and rating. In addition, the observer arranged a time with the teacher to ask questions about possible indicators that were not observable. Approximately 20–30 min was required for questions (Harms et al., 2006). Observers rated individual classrooms using a 7-point scale. The scale is hierarchically organised with basic needs at the lowest levels (2 and 3) and more educational and interactional aspects on higher levels with descriptors for 1 (inadequate), 3 (minimal), 5 (good), and 7 (excellent).

The ITERS-R includes 39 items, organized under 7 subscales: Space and Furnishings; Personal Care Routines for infants and toddlers; Listening and Talking; Age-Appropriate Activities; Adult–Child Interaction; Program Structure and Parent and Staff Communication. Our results are based on observation from 206 classrooms in 93 ECEC settings. The results on item level for science, active physical play, and sand and waterplay are presented in Kaarby and Tandberg (2018, 2019b). The ECERS – R scale measures the quality of childcare for children from 2½ through 5 years of age. It's organized along 7 subscales: space and furnishing, personal care routines, language- reasoning, activities, interaction, program structure and parents and staff. It has a total of 43 items. Our results are based on observation from 205 classrooms in 94 ECEC settings throughout Norway.

Findings and discussions

Investigating the ITERS-R and ECERS-R result gave us insight in how the indicators of these two studies can contribute to an everyday awareness of science and physical activity and possibly be useful guidelines in building a budding Fachdidaktik for the ECEC.

Each Item both in ITERS-R and ECERS-R consist of several indicators. These indicators are, from our point of view, relevant and essential for creating a learning environment with many affordances and potential explorations and learning situations. They are also possible entrances to self – reflection among the staff for how and why we for instances keep the book of dinosaurs and picture books of threes at a shelf height where the child itself can pick it. These are practical but needed tips and advice for opening the subject for the child when the child itself wants so. But they are also important for use in the kindergarten since many employees in the kindergarten often are unskilled labour.

Physical activity

In ITERS- R the Item physical activity has 14 indicators that evaluate the qualities of the space for physical activity: the size, the safety, the adequateness, accessibility, and organization for different types of activities. It demands adequate and enough materials, so children do not need to wait too long. It also demands equipment and materials that stimulate seven to nine different gross motor skills. The indicators at the highest level are achieved to a great extent than those on level five. These indicators require outdoor area for toddlers separated from older children, access to materials and equipment without long periods of waiting and appropriate equipment. The results show a relatively high score for active physical play, slightly below good (Kaarby & Tandberg, 2018).

In ECERS-R three items are connected to gross motor play: space for gross motor play, gross motor equipment and supervision of gross motor activities. Space for gross motor play measure availability, size, adequateness, safety, and no interfering activities. Gross motor equipment measures the amount of equipment, the repair and adjustment for age, development of skills and accessibility. Both portable and stationary gross motor equipment are required used. One of the indicators requires equipment stimulating seven to nine different skills. They are listed up as balancing, climbing, cycling, pulling, pushing, hanging by arms, swinging, jumping, hopping, use a rope, a hula hoop, tossing at a target, catching, throwing, or kicking. Another indicator requires equipment stimulating gross motor skills on different levels of skills. Examples given are different types of balls, climbing opportunities, tricycles with and without pedals, thus meaning being able to adjust the equipment to each child. The score is good on both those items (5.4 and 6.2). From our point of view, it is worth reflection what sort of knowledge is required about motor development, appropriate materials, and a scaffolding behavior to facilitate materials used daily for stimulating seven to nine gross motor skills on different levels of skills?

The item supervision of gross motor activities measures if the supervision is adequate related to protect children's health and safety, if the child-staff interaction is pleasant and helpful, if they help children to develop skills needed to use the equipment and develop their play, and if they help children to develop positive social interaction. None of the mentioned examples demand staff physically engaged in the activity, only verbal. Adequate supervision means

enough staff to watch and to get a detailed overview of the children. Examples of positive staff-interaction is pleasant, helpful, and engaged. The scores fall compared to scores for space and equipment to minimal, and the low score is connected to Norwegian traditions for allowing and even motivate for dangerous play.

A question for reflection could be how supervision is understood in gross motor activities in ECERS-R and in a Scandinavian culture. Children are encouraged to walk and run on uneven surfaces like grounds with roots and stones in the Scandinavian culture, but these activities are valued as hazards in ECER-R. Pedagogue's supporting and promoting attitude towards physical activity is essential when it comes to activate every child, especially sedentary children (Mikkelsen, 2011). A Norwegian study (Johannessen et.al.2020) combined results from ECERS-R with data related to time spent outdoor and children's MVPA. They found that children enrolled in ECEC settings with high scores on quality has less time in MVPA (and spent less time outdoor).

Science

The indicators in the science item for both ITERS-R and ECERS-R include both materials, availability, and situations where the employee and the children must name and/or observe an organism or a natural phenomenon together. This is helping to frame a potential science situation for exploring, meaning a didactical approach with the intention of exploring, experience, and learning. In the case of ITERS-R, only two indicators deal with an interaction between an employee, a child and the third, that can be an organism or a natural phenomenon. 28 per cent of the kindergartens in the study meet the requirement for daily experiences with live plants or animals inside, or that they can be seen through the window. The "less is more" and easy cleaning ideas has developed kindergarten with few or nonliving plants or terrarium for looking at and taking care of living animals like woodlouse (Oniscidea). Pedagogically it is a loss not having living projects easy to see and talk about, but still adding subject specific knowledge like terms, observations etc., into the talk. 50 per cent of the kindergartens meet the requirement that daily situations be used as a starting point for learning about nature or natural science. These indicators may indicate a subject-specific learning interaction between employee and child. On these indicators, the scores fall significantly (Kaarby & Tandberg, 2018).

This may tell us that both having the scientific knowledge about the phenomena or organism and the knowledge on how to talk with children about it is missing. Being able to observe must be experienced and learned, and preferably with the help of a qualified fellow wonderer who can demonstrate knowledge with both words and actions (Kaarby & Tandberg, 2019).

Regarding the ECERS-R, there are only three indicators where the score is below 69 per cent. These low scores indicators are about materials, their organization and accessibility. A particularly low score, only 9 per cent is achieved on the indicator which requires many games, activities, and toys from three categories, i.e., a variety of materials. Knowing that the variety and the use of it is at the core of didacts.

Implications

Improving the quality of Early Childhood Education brings countless benefits for the development and well-being of every child, as well as for society. The professional competence of the ECEC teachers, developed not only through experience and modelling, but also through initial and permanent theoretical-practical training. In this lies a challenge for the educational institutions, as well as in the subjects to develop their didactic, or Fachdidaktik. In the performance of teaching, one of the essential aspects to work with children from 0 to 6 years old, is to apply the principles of well-being, activity and the appropriate selection of teaching and learning activities (Otero-Mayer et al, 2021).

For supporting and guiding on materiel and implicit learning activities we find ITERS-R and ECERS- R at item level as being useful. The indicators, or questions, rises necessary needs for being able, as ECEC teacher, to create activities and moments for challenging, exploring, play and development. It also shows the importance of being an active part of the interaction with the child, both physical and verbal. Part of the discussions about ITERS and ECERS is the influenced by the Anglo-American cultural and educational history. We also see that some of the indicators clearly are part of an Anglo-American context more than a Nordic one (Kaarby & Tandberg, 2018; Bjørnstad & Os, 2018). This is argued as some of the reasons why Norwegian kindergarten has low score on safety practices and for active science indoors.

According to the Framework plan “kindergartens shall help the children to evaluate and master risky play through physical challenges” (Udir., 2017 p.53). This recommendation conflicts with ITERS-R and ECERS-R, and as Johannessen et al. (2020) comment safety concerns may also cause more sedentary children. Sando, Kleppe & Sandseter (2021) are concerned with restrictions on children’s everyday experience with risky play and want safety worries to be balanced against joy and the benefits of challenging physical play.

Since the interaction between staff and children is an important aspect of quality (Sheridan, 2009), it is a weakness that this is to a small extent measured in the ITERS-R and ECERS -R. But used together with other research tools it seems to give a proper picture of the everyday situation in kindergarten (Bjørnstad & Os, 2018; Bjørnstad et al., 2019; Kaarby & Tandberg, 2019). ITERS – R and ECERS -R emphasize the quality of the environment and accessibility for materials etc. (Kyttâ, 2004, 2006; Waters, 2017). The use of ITERS-R and ECERS-R will from our point of view enriches the staff and help them see opportunities and challenges especially concerning the frames of the everyday life in a kindergarten and therefor contributing strongly to a budding Fachdidaktikk in science and physical education.

Using everyday situations – a core element of a Fachdidkatikk

Using an everyday situation, especially indoors, to start or promote a conversation or act together with children are the center of the everyday life in a kindergarten. Therefore, it is a challenge for the ECEC to start or promote a science subject conversation with curious children is used or perceived to such a small extent in ITERS-R study (Kaarby & Tandberg, 2018). The fact that the instruments used in this study so clearly asks for everyday situations and differentiation of challenges for the children shows us that in creating a Fachdidiaktikk for physical and science education in the kindergarten the use of “her and now situations” are to be encouraged to use with all children in the kindergarten. One way of being able to play along with your subject is to have a dept knowledge of its core elements. Then the educational institutes also need to address the student’s epistemic stance and developing it as a part of the process of becoming a profession teacher. For that matter, a Fachdidaktikk will be useful in trigging both play, investigation, exploring and observations of the everyday possibilities in ECEC settings.

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