Indicators of educator-child-interaction quality in early childhood education

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Abstract

Out-of-home childcare is now commonplace. Numerous studies have shown that the quality of interaction between child and educator is decisive for child development. As part of the EIK study in Austria, detailed data on 'interaction quality' was collected for 55 early childhood educators (N = 29 nurseries in Austria). The results show that the level of interaction quality is clearly capable of improvement in most nurseries. In four of the facilities examined, only a minimum level was achieved for all ten quality criteria employed using the GrazIAS 0-3 evaluation tool. But there are also nurseries exhibiting excellent quality of interaction were also found. The descriptive analyses of interaction quality indicate how individual interactions may be optimized and where improvements in educator training might be needed.

Keywords: Interaction quality, quality in nurseries, educator-child-interaction, GrazIAS 0-3, EIK Study Austria

Zusammenfassung


Schlagwörter: Interaktionsqualität, Qualität in Kinderkrippen, ErzieherIn-Kind-Interaktion, GrazIAS 0-3, EIK Studie Österreich
Recent societal changes have increased the demand for institutional childcare facilities, particularly for toddlers (OECD, 2016). Statistics on out-of-home care for nursery-age children show that demand is steadily increasing. For example, in Austria, the usage numbers have increased from 14% to 26.5% within the last ten years, with urban areas seeing an increase of up to 44% (Statistik Austria, 2019). The assumption is that more and more toddlers will attend nurseries and that this trend will continue to rise. The reasons for the increase in demand are the need to reconcile family and career and the growing awareness that the use of facilities with a high quality of education and care supports children’s development (Burghardt & Kluczniok, 2016; Viernickel & Fuchs-Rechlin, 2016). The EIK study described here examines and describes in detail the extent to which high-quality interactions exist in institutions. The focus of the study is on the interactions between early childhood educator and children.

Quality of nurseries

The growing number of children in nurseries has made it increasingly important to focus on the quality of services offered. Many studies show that high care quality - as measured, for example, using CLASS (Classroom Assessment Scoring System) by Pianta (2017), CIS (Caregiver Interaction Scale) by Arnett (1989), or the Infant/Toddler Environment Rating Scale by Harms, Cryer, & Clifford, 2006 - has a positive effect on the social-emotional and cognitive development of children (NICHD; CQC; ECDE; EPPE; NCCSS; NUBBEK; BiKS), and that it is the quality of interaction in such settings which is of paramount importance (see Wadepohl, 2017; Melhuish, Ereky-Stevens, Petrogiannis, Ariescu, Penderi, Rentzou et al., 2015; Moyles, Adams &Musgroves, 2002; NICHD, 2002; Sylva, Melhuish, Sammons, Siraj-Blatchford, Taggart, 2004; Mashburn, Pianta, Hamre, Downer, Barbarin, Bryant et al., 2008). The provision of a stimulating learning environment, one that enables children to explore, participate, and experience things first-hand, is crucial. This, however, requires a reliable relationship between the early childhood educator and child (Ahnert & Eckstein-Madry, 2015; Ballaschk & Anders, 2020; Becker-Stoll, Niesel & Wertfein, 2015). Furthermore, the chances for learning increase when children are given adult support in their (confrontational) interactions with peers, or when they are attempting to coordinate several perspectives, or to apply specific strategies, norms, and values (Gutknecht, 2015; Walter-Laager & Plautz, 2017). Petermann and Wiedebusch (2016) define this as the “social reinsurance phenomenon”. Here, children turn to the educator for co-regulation. In addition, the maintenance of a clear daily routine, one which encourages child participation, serves to promote the development of autonomy, self-efficacy, and prosocial relationships. All such competences contribute to the psychological wellbeing of children (Lutz, 2016).

How can educators create ideal surroundings for children in nurseries? One starting point is provided by simply looking at the skills needed by educators. Anders (2012) analyses several complementary skill models of early education, dividing them into three models. We refer to the structural approaches and the first model is the competence to act. It is split into its sub-dimensions, where the fundamental skills, knowledge and abilities are described and classified.
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(Anders, 2012). Such skill models have a long tradition in pedagogy. Shulman's (1986) model, for example, is based on the three areas of 'content knowledge', 'pedagogical content knowledge' and 'general pedagogical knowledge'. Anders (2012) The second model in contrast - stage models - focus on the development of central skill sets. In early childhood education, the process model approach has been used more frequently in recent years, especially the model devised by Fröhlich-Gildhoff, Nentwig-Gesemann and Pietsch (2011). And much more often in early childhood education are process models. Those begin with a specific pedagogical situation, and attempt to identify the processes underlying professional behaviour and understanding in that situation. Such processes encompass: knowledge and understanding, analysis and assessment, research and investigation, planning and conception, organization and implementation, and evaluation (Anders, 2012). Among other things, Fröhlich-Gildhoff and colleagues (2014) highlight how important motivation is (as a regular part of any competence) as a precondition for activity planning.

We now shift perspective and focus on the level of action. Irrespective of their personal level of motivation, professional educators need to design daily pedagogical routines such that they are conducive to child development. This is a core element of professional didactics. The science of didactics helps all educators analyse and describe the interplay of teaching and learning in groups and shows them how the necessary processes are to be designed (Meyer & Walter-Laager, 2019). The educator's knowledge and skills and, less directly, his or her child-oriented inner positioning, are all crucial in the implementation of didactic principles and concepts. However, in practice, the influence of everyday routines and professional socialization often result in 'inner positioning' being neglected even though, ideally, it ought to be directly addressed and incorporated into each round of reflection.

Early childhood educators plan everyday activities in nurseries based on their professional knowledge and on their didactical skills. In doing so, they design a learning environment which is suitable for both group and individual activities (Meyer & Walter-Laager, 2012). Everyday life in nurseries contains very movement-intensive (active) phases and others in which the children engage in more quiet activities, so that countless learning opportunities among all children occur and the social group form and degree of self-determination are always changing. Useful here, are the four methodological-didactic building blocks described by Walter and Fasseing (2017), since they support goal-oriented planning. Active observation of children's activities and development enables the early childhood educator to make situational short-term adaptations at the micro level, and also to adapt the learning environment over the long term (Walter-Laager, Pfiffner, Bruns & Schwarz, 2014; Walter-Laager, Luthardt & Pfiffner, 2017). In order to offer suitable developmental activities (the zone of proximal development), or to deepen children’s interest (Eichen, Tinguely, Geissmann & Walter-Laager, 2014; Meyer & Walter-Laager, 2019), pedagogical professionals are in a position to draw on detailed, existing knowledge concerning the various stages of learning and development (e.g. Rettenbacher, Eichen, Pfiffner & Walter-Laager, in press). They can also make use of recurring rounds of team
meetings, information from relevant work materials, and established evaluation instruments in order to support a process of reflection. All this serves to act as an extension to the traditional planning cycle (Eichen et al., 2014, Jank & Meyer, 2020).

**Figure 1**: Extended didactic cycle of interaction that supports children’s development (“Erweiterter didaktischer Kreislauf der entwicklungsförderlichen Interaktion” - Did-EI)

We present in this paper a didactic model (see Figure 1) for the early childhood education sector that represents the cooperation of these fundamental components of action competency and connects them with the implementation of pedagogical everyday life. This clarifies starting points for optimizing practical work in day-care centres. The implementation and connection of the model components constitute the basis for establishing a quality of interaction that is conducive to development. This is the basis for good teaching-learning processes and child well-being (Remsperger, 2013; Wadepohl & Mackowiak, 2016; von Suchodoletz, Fäsche, Gunzenhauser & Hamre, 2014). The benefits of such didactical preparation are then experienced by the children on a daily basis and are also measurable on a scientific basis. Markers of a high quality of interaction or good pedagogical practice and thus of implementation (see point 1 in Figure 1) including short-term-control in daily pedagogical routine (see point 2 in Figure 1) were presented’ in eleven characteristics. These have been described in scientific texts, illustrated with videotaped examples, and published as an open educational resource for the professional community (Walter-Laager, Pölzl-Stefanec, Gimlinger & Mittischek 2018).

Figure 2 shows the ten measurable characteristics of good interaction quality and practice. The eleventh characteristic, *interpreting signals*, has been omitted as it is an internal process and cannot be measured directly. It is something that can only be observed though other
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characteristics, such as giving appropriate impulses or considering individual needs. As a basis for high-quality interaction, each early childhood educator must be physically and emotionally present. This enables him or her to recognize and interpret the children's signals, to respond to the children's individual needs, and to provide appropriate stimuli. To create a comfortable climate, the children must experience stable, positive relationships. Should the children not be doing well, it is essential that their emotions be adequately perceived and addressed. In addition, the feeling of self-efficacy and participation is supported by the possibility of actively helping to organize everyday life. The clear use of a few sensible rules ensures that all children feel secure. An atmosphere of active communication and experimentation, in which all of a child's senses are engaged, is a further component in the provision of educator-child interaction quality.

**Figure 2: Theoretically derived interaction quality characteristics (on the basis of Walter-Laager et al., 2018)**

The properties (hereafter referred to as 'characteristics') of good practice, described above, have been operationalized in the form of an evaluation instrument - the Grazer Interaction Scale for Children from 0-3 Years (GraziAS) (see point 3 in Figure 1) (Walter-Laager, Flöter, Geißler, Petritsch & Pölzl-Stefanec, 2019). Each of the characteristics for interaction quality (see Figure 2) is made up of a number of different components (hereafter referred to as 'aspects'). Each aspect covering four consecutive qualitative levels (level 1 'insufficient', level 3 'minimum', level 5 'good' and level 7 'excellent'). This instrument has also been made available to the professional community.
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In order for the instrument to be effective, it was decided early on in the developmental phase of the GrazIAS, that specific requirements had to be met. GrazIAS measures the pedagogical work of each individual childhood educator. The observation period is set at around four hours so that the entire everyday life can be represented. To simplify the input, an app was developed. The automated output provide feedback on the individual and team level and the assessment and feedback concentrated on each single aspect examined in the GrazIAS procedure.

In addition, the instrument needed to be applicable in a multilingual environment was clear from the beginning that can easily be supplemented by other languages due to the technical implementation. The tool has in fact been used internationally (in Austria, Germany, Italy, Portugal, Slovenia, Hungary), in such projects as the Erasmus+ project Qualimantary (Pölzl-Stefanec & Projektgruppe, 2019–2021), and the data thus acquired has been fed into the GrazIAS database at the University of Graz. This remains an open educational resource and is – besides the OER regarding the theory - available to the professional community for research purposes.

Method of the EIK Study
Detailed data on interaction quality were collected during the EIK study (Effekte der Interaktionsqualität auf Krippenkinder). The following research question is addressed in this article: What is the level of educator-child interaction quality in Austrian nurseries?

Sample
For the study, 29 Austrian nurseries in different regions were randomly selected from large cities (17.3%), towns (51.7%), and rural areas (31%). Each nursery group was visited for three periods of observation (in October 2018, and in February and June 2019). A total of 116 early childhood educators were observed. Of these, 55 were observed in all three of the measurement periods. It is the data obtained for these latter persons which is discussed and analyzed below.

<table>
<thead>
<tr>
<th>Education</th>
<th>30 pedagogical staff with professional training</th>
<th>25 staff with no professional training</th>
</tr>
</thead>
<tbody>
<tr>
<td>First language</td>
<td>49 German-speaking</td>
<td>6 other first language*</td>
</tr>
<tr>
<td>Age</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>Years of service</td>
<td>1</td>
<td>40</td>
</tr>
</tbody>
</table>

* Croatian, Serbian, Slovenian, Turkish and Hungarian

Table 1: Details for the sample of 55 early childhood educators

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Research instrument

The data derived from the EIK study were used for the present analysis. The focus is on the educator-child interactions. These were measured using GrazIAS 0-3 (9\textsuperscript{16} characteristics, \(\alpha = .912\)). The evaluations were done by trained observers with an interrater reliability of about 95%. The evaluation procedure lasted between four and six hours.

Initial results

The research question dealt with here focuses on how the interaction quality is rated in terms of the individual aspects. As children need time to settle in and familiarize themselves with nursery routine, data from the first measurement period is not likely to be representative. Thus, the data reported here is from the second measurement period in February. It is assumed that by this point in time educator and child routines have become established for the entire group.

Figure 3 provides an overview of the distribution of the values obtained per characteristic of the GrazIAS. For each aspect, the number of nurseries at each quality level is indicated. These vary between 1 (insufficient) and 7 (excellent).

![Characteristics Distribution of interaction quality levels within the aspects](image)

\textsuperscript{16}The four aspects of the characteristic *Supervising conflicts* could only be assessed in individual cases, as conflicts were rarely observed. Therefore, these aspects were excluded from the analysis of internal consistency.

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The characteristic Supervising conflicts was not observed in all nurseries.

* The characteristic Supervising conflicts was not observed in all nurseries.

Figure 3: Overview of the distribution of values achieved per aspect of the GrazIAS

### The highest quality of interaction

First of all, it can be stated that the highest aspects are aspects of structural characteristics or basic conditions (such as the material, the variety of exploration possibilities, the spaces available or a good order in which the children can find their way independently, etc.). These will now be analyzed.

The characteristic for which the most nurseries achieved an excellent level of quality is *Introducing rules and adhering to them*. This is for the aspect Number/System (MED = 7.00, SD = 2.24). 19 of the 29 nursery groups achieved the highest quality level and four achieved good quality. This indicates that the children in such nurseries are provided with a sufficient number of rules for orientation, and that the educators themselves also follow such rules and situationally reflect them. In addition, values of 'good' or above were achieved by 19 nurseries with respect to the aspect Arriving (MED = 5.00, SD = 1.50). Here, children are allowed to arrive and settle in at their own pace. In 17 of the nurseries good values were obtained in the aspect Rooms/Areas (MED = 5.00, SD = 1.62). This indicates that sufficient space was available for the

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<table>
<thead>
<tr>
<th>SUPPORTING THE REGULATION OF EMOTIONS</th>
<th>Verbalizing emotions</th>
<th>Reaction of early childhood educator</th>
<th>Regulation of emotions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility &amp; diversity of materials</td>
<td>1</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Participation in daily routine and bodily care</td>
<td>11</td>
<td>9</td>
<td>2</td>
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<tr>
<td>Announcement of events</td>
<td>5</td>
<td>14</td>
<td>7</td>
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<tr>
<td>Independent orientation</td>
<td>9</td>
<td>15</td>
<td>1</td>
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<table>
<thead>
<tr>
<th>ENABLING PARTICIPATION</th>
<th>Accessibilities &amp; diversity of materials</th>
<th>Choices</th>
<th>Announcements of events</th>
<th>Independent orientation</th>
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<tbody>
<tr>
<td></td>
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<td>6</td>
<td>14</td>
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<th>OFFERING AND ALLOWING SENSORY EXPERIENCES</th>
<th>Allowing sensory experiences</th>
<th>Encouraging sensory experiences</th>
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<tr>
<td></td>
<td>3</td>
<td>9</td>
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<table>
<thead>
<tr>
<th>PROVIDING STIMULI (verbal/nonverbal)</th>
<th>Disrupting activities</th>
<th>Changing the rooms for exploration</th>
<th>Stimuli for actions</th>
<th>Difficult activities</th>
<th>Encouragement</th>
</tr>
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<td></td>
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<td>4</td>
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<td>2</td>
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<tr>
<th>COMMUNICATING IN A STIMULATING</th>
<th>Opportunity to speak</th>
<th>Language contributions</th>
<th>Corrective feedback</th>
<th>Playful usage of language</th>
<th>Using terms</th>
<th>Verbalizing experiences</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>11</td>
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</table>

<table>
<thead>
<tr>
<th>Quality level 1</th>
<th>Quality level 3</th>
<th>Quality level 5</th>
<th>Quality level 7</th>
<th>N = 29</th>
</tr>
</thead>
</table>

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children and that the room/areas were open when needed. In just as many facilities, the children find their way effortlessly through everyday life (independent orientation, $\text{MED} = 5.00, SD = 1.39$). Regarding the aspect accessibility and diversity of materials ($\text{MED} = 5.00, SD = 1.78$), 18 nurseries achieved good or excellent quality, i.e., a variety of materials was available, and in sufficient quantity, from at least five areas of education. Further, in 21 nurseries, the data show that exploration space is regularly changed in order to adapt to the interests of the children (Changing the rooms for exploration, $\text{MED} = 5, SD = 1.80$).

The majority of nurseries (18 out of 29) also achieved good or excellent quality with respect to emotional availability ($\text{MED} = 7.00, SD = 2.14$). This shows that the educator is clearly present and emotionally available for children, thus providing a secure base. Concerning the aspect appreciation ($\text{MED} = 5.00, SD = 1.80$), the nurseries are mostly ranked at the good or excellent quality level. In these facilities, the children are usually treated with respect and appreciation.

**The lowest quality of interaction**

Looking at other characteristics illustrates that there is still a lot of room for improvement. The proportion of educators exhibiting insufficient quality is noticeably high in two aspects of Enabling participation. For the aspect choices ($\text{MED} = 3.00, SD = 1.41$), 12 nurseries were found in which children were restrained or restricted without justification. This may pertain to things such as bib-fixing, pushing on a seat, or forcing children to participate in educational activities by holding them down or bringing them back when the child moves away. Low quality was also found with respect to participation in daily routine and bodily care ($\text{MED} = 3.00, SD = 1.91$). In 14 of the nurseries observed, early childhood educators failed to create situations in which the children can voluntarily participate in everyday life in a way appropriate to their age, e.g., setting and clearing the table, spooning up food or pouring water, dressing or undressing, washing hands, or performing everyday tasks such as cleaning or taking away laundry.

Likewise, insufficient quality was recorded in a high proportion of nurseries with respect to supporting the regulation of emotions, more specifically, concerning the aspect verbalizing emotions ($\text{MED} = 3.00, SD = 1.93$) in which it is determined whether the early childhood educator verbalizes the children's emotions and whether she/he names various emotions. 10 nurseries do not make it beyond the first quality level.

The characteristic communicating in a stimulating way shows a similar picture: 8 nurseries demonstrated an insufficient quality level with respect to using terms ($\text{MED} = 3.00, SD = 2.19$). Thus, these educators rarely name objects, categories and materials adequately. They fail to use a variety of terms and describe object properties, usage, shape, and colour etc.

Another characteristic exhibiting a relatively high number of nurseries at a lower level is providing stimuli (verbal/non-verbal). The aspect stimuli for activities ($\text{MED} = 3.00, SD = 1.71$) was found to be of insufficient quality in 8 nurseries. The children here do not receive...
sufficient stimulation. The early childhood educator fails to support the children’s play, and children are not placed in a position where they may experience themselves as competent, independent agents.

Discussion
As mentioned at the beginning, the quality of interaction between educators and children is an important factor influencing child development. For the results available here, the values obtained for the quality characteristics are extremely diverse, and the majority of the nurseries are in the medium-good quality range. This is not too dissimilar to the results found in other studies where low to medium quality was found, albeit for other quality aspects like rooms, space, staff etc. (Tietze, Becker-Stoll, Bensel, Eckhard, Haug-Schnabl, Kalicki et al., 2013; Kuger & Klucznik, 2008; Smidt & Embacher, 2021). Several things about the nurseries observed in the EIK study are quite impressive. For example, good or excellent quality levels were achieved with respect to structural aspects. The rules system was found to be good in 23 nurseries. In the majority of nurseries studied, suitable rooms were both available and frequently used. Learning material was freely accessible for the children and was curated according to the children’s interests. Supporting morning arrival and orientation within the nursery were also dealt with well or excellently in the majority of cases. This is evidence of clear improvement over the past few years and can largely be attributed to new legal regulation and to greater overall awareness concerning these issues, particularly when new locations are opened.

Despite the improvements, the analysis shows that quality in a number of areas remains deficient. There are deficits in the individual interactions that have to be established and created on a daily basis. It can be seen that early childhood educators can significantly improve everyday pedagogical life through their actions (e.g., Petritsch, Sonnleithner & Walter-Laager, in preparation). One of these characteristics is enabling participation. The analysis reveals what seems to be a general lack of knowledge in day care centres on how to create a form of greater daily participation, one that enables children to participate safely, and in a self-determined manner. Participation is a child’s right (see UN Convention on the Rights of the Child) and is not something that should be left to the whim or inclination of the individual educator. Apart from being a basic right, the opportunity to participate has a clear influence on a child's development. Participative children perceive themselves as competent and feel wanted. The BiKA study (Hildebrandt, Walter-Laager, Flöter & Pergande, 2020) dealt intensively with this topic and investigated participation in nurseries throughout Germany. The conclusion reached by the study authors was similar to our own: there is much that still needs to be done. Our society needs autonomous and self-confident people and promoting empowerment during childhood is one means of achieving this.

Only relatively low scores were achieved for all three of the aspects subsumed under supporting emotion regulation. Yet, as the literature clearly shows, this area is of major importance in
a child's learning. The inability of an educator to accept strong, negative emotions, or to deal with them in a positive fashion, has a clear negative impact on a child's well-being.

The characteristic *communicating in a stimulating way* is also intriguing. While overall, scores are quite good, there appears to be a qualitative collapse in the aspect *using terms*. At this age, as the child's language ability is still in its infancy, the naming of things by an educator is highly relevant for the child's future education (Lange & Gogolin, 2010). The construction and use of specific terms are also intrinsically connected to sensory exploration (where some nurseries also gained a low-quality score). Sensory exploration, however, is important in concept development and in experiencing conceptual differentiation. Both the development of language and concepts begin with immediate sensory experience. Such experience imbues a concept with meaning, thus enabling the child to progress to the development of related mental concepts and abstract terms (Zehnbauer & Jampert, 2009).

The data gained from GrazIAS thus provide several well-founded indicators for every early childhood educator wishing to optimize his or her own professional behaviour. The instrument also allows for further possibilities for reflection within the team. As can be seen in the 'Did-EI' (see Figure 1), ideally, the reflection process ideally has a clear effect on future planning and also encourages early childhood educators to incorporate or expand upon knowledge to be able to act in a well-founded manner. Optimal implementation of all steps of the Did-EI improves the quality of interactions.

The EIK study, made wider use of the GrazIAS in order to generate scientifically valid, statistical values. The heterogeneous nature of the sample recruited for the study is, to some extent, reflected in the wide quality range of educator-child interaction observed.

It can be stated that with the EIK study, a detailed insight into the realised interaction quality in Austrian nurseries was created, although it is rather a small sample. The overall scores found for interaction quality are highly diverse. With respect to the individual quality characteristics, there are always some educators in the sample who achieve a high level of interaction quality, and there are others where there is clearly room for improvement in daily work activities.
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Tables and figures

Figure 1: Extended didactic cycle of interaction that supports children's development ("Erweiterter didaktischer Kreislauf der entwicklungsförderlichen Interaktion" - Did-EI) (self-created)

Figure 2: Theoretically derived interaction quality characteristics (on the basis of Walter-Laager et al., 2018)

Table 1: Details of the sample on the 55 early childhood educators (self-created)

Figure 3: Overview of the distribution of the achieved values per aspect of the GrazIAS (self-created)

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