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## The structural quality of preschools: How it influences process quality and children's achievements

**Abstract:** In the paper we discuss the structural quality of preschools in relation to the process and indirect levels of quality, situating them in Bronfenbrenner's ecological systems theory. We approach preschool quality as a protective/critical factor of children's development and learning. Therefore, we base our discussion on various conceptual models of preschool quality as well as Slovenian and international empirical research studies to elucidate the complex and comprehensive relationships among quality indicators and the influence of preschools, including the quality of the family environment. The results lead to the conclusion that in Slovenia – just as in some other countries with good-quality preschool education – we need a definition of national preschool quality standards at the legislative level and a parallel development of ways and procedures of quality assessment, both at the levels of self-evaluation and external evaluation.

**Keywords:** socio-cultural theories, structural quality indicators, process quality indicators, children's achievements, preschool influence, national quality standards

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## **The theoretical backgrounds to the various models of quality in preschools**

It has been a couple of decades since some research studies (e.g. Andersen 1989, 1992;<sup>1</sup> NICHD 2000, 2001<sup>2</sup>) confirmed that both short- and long-term influence of preschools on children's development and learning can be explained in view of preschool quality. Preschool quality, especially process quality – or pedagogical quality as some researches call it (e.g. Sheridan 2011) – is understood as a comprehensive system, including different dimensions and aspects related to material and human resources. These conditions enable children to develop in physical, movement, cognitive, linguistic, social, and emotional areas, and they also allow for learning as well as the realization of preschool educational goals. In good-quality preschools, children feel emotionally safe; they develop self-confidence; they become skillful at language use and able to regulate impulsive and aggressive tendencies; and they are successful in mental problem solving. They also acquire important skills to be used later in school. They are successful in school and have few problems with social adaptation (Helburn and Howes 1996).

The theoretical bases for a discussion of preschool (process) quality can be primarily found in interaction theories, and we would like to call special attention to Bronfenbrenner's ecological systems theory (1979, 1986). This theory sees the learning environment as a complete system in which toddlers/children, other

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<sup>1</sup> In his longitudinal study, the Swedish researcher monitored three groups of toddlers according to the age when they started attending preschool (children who started attending preschool before they were one year old, those who started attending when they were between one and two years old, and those between two and six years). He was interested in the influence of preschool on their development (cognitive, social, and emotional) and school achievements. In his first study he monitored the children until they were eight years old, and in the second study until they were thirteen years old. His findings confirm a positive influence of preschools in all development areas as well as on children's school achievements. The author did not assess the quality of preschools themselves. However, researchers from other countries used comparative analyses to affirm that Swedish preschools maintain high quality.

<sup>2</sup> The *NICHD Early Child Care Research Network* carried out comprehensive research studies in North America, assessing preschool influence in relation to preschool quality. They confirmed a long-term positive influence of good-quality preschools on the cognitive, language, and social development of toddlers/children.

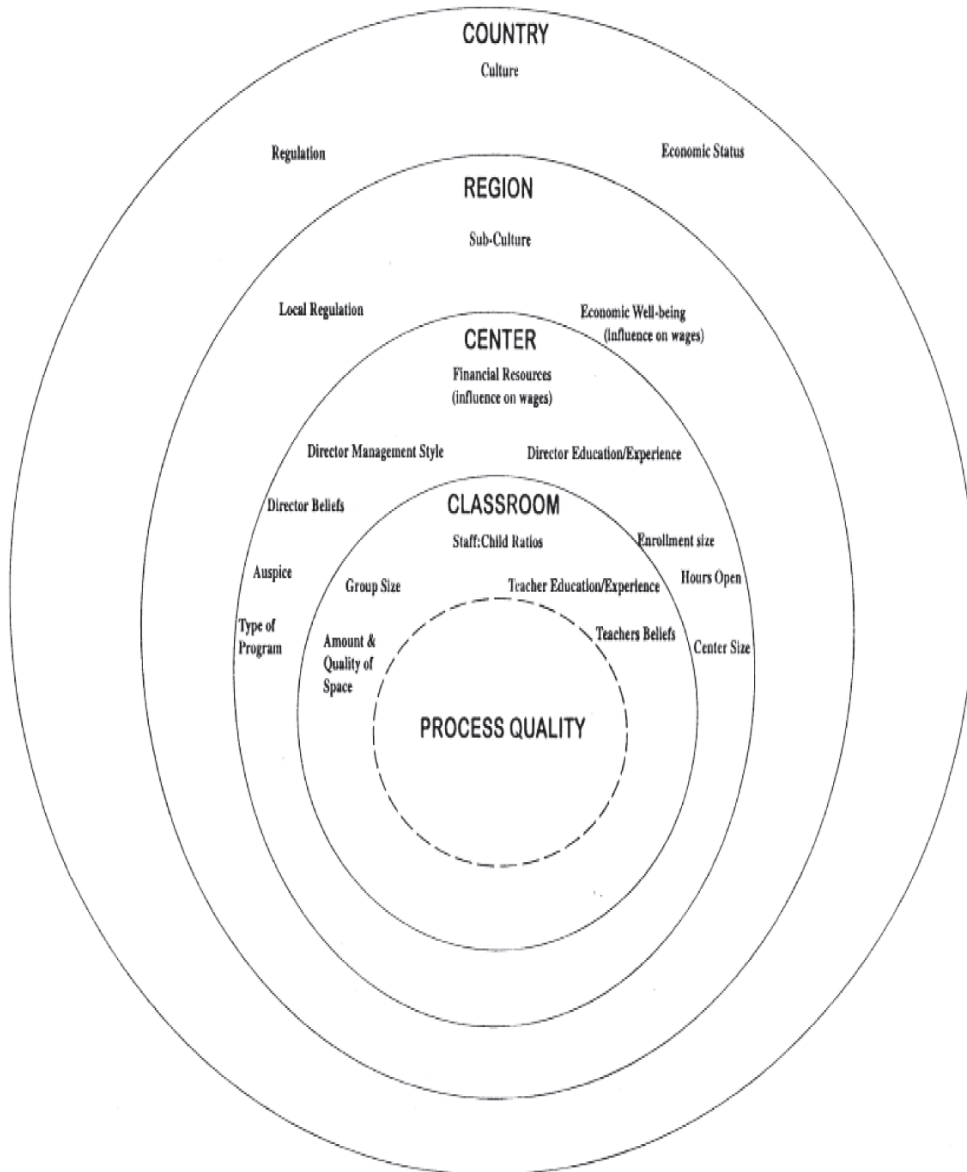


Figure 1: Spheres of influence on preschool education quality (in: Cryer et al. 1999)

individuals, and the broader social environment are in constant interaction at various levels of the environment. The ecological systems theory explains children's development and learning from a socio-cultural perspective, that is, from the aspect of various levels of functioning, from micro to macro levels. The central level of the environment is the microsystem, that is the immediate setting in which the child participates in the most direct interactions with significant others (e.g. parents,

preschool teachers, peers). At the level of microsystems, the child functions in different social contexts such as the preschool, the family, the neighborhood, which are, at the systemic level (i.e. at the level of mesosystems), interconnected and either directly or indirectly affect children's well-being, communication, thinking, social relationships, and learning. Exosystems, which include various institutions, for instance health and social-care institutions, do not include children directly, yet they influence them indirectly. Macrosystems include, for instance, the values, laws, norms, rules, and culture which influence children's interactions and experiences at the lower levels of functioning. The chronosystem functions similarly as a temporal dimension of the environment, leading to changed living conditions. Through various environment levels, children face complex interdependent effects that relate to their development and learning. The presupposition of Bronfenbrenner's theory (1979) is that all the levels influence the environment where preschool education takes place.

Based on Bronfenbrenner's systems theory, D. Cryer et al. (1999) developed a conceptual model representing various spheres of influence on preschool education in the preschool classroom (see Figure 1). The spheres include the structural variables that can have an influence on preschool process quality. These structural variables can be categorized as proximal (for example the size of a preschool classroom, the ratio of adults to children in the classroom), and distal (such as economic conditions at the local level, national culture, etc.). Proximal variables have a more direct effect on process quality in the preschool classroom than distal variables, which usually have a more indirect and weaker effect.

### **The interrelatedness of various preschool quality levels**

There exists a broad consensus among researchers (e.g. Helburn and Howes 1996; Howes and Smith 1995; Marjanović Umek et al. 2002a) about what makes a good preschool. Preschool quality is most frequently defined in terms of two interrelated areas, that is, process quality (experiences children gain in preschool, social interactions between children and preschool teachers, teachers' sensitivity, interest and inclusion of children in play and learning activities, teachers' attitudes toward children and their implicit theories of children's development and learning, age-appropriate activities, healthy and safe environments, routine activities, suitable didactic materials, etc.) and structural quality (size of the preschool classroom, adult/child ratio in the classroom, the space that children have to do activities, teachers' previous experiences of working with children, teachers' formal education, teachers' continuous education and training in the area of children's development and education).<sup>3</sup> In addition to structural and process quality, most

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<sup>3</sup> Structural quality indicators or objective conditions of providing preschool education are normally defined by the state or the local community. In its first comparative report on preschool education, *Starting strong* (2001), the OECD strongly emphasized the big differences in preschool quality, especially preschools for children aged one to three years, thereby drawing attention to the fact that even though all the participating countries recognize basic quality indicators, they do not always regulate them either locally or nationally.

researchers (e.g. Howes and Smith 1995; Marjanovič Umek et al. 2002; Pascal et al. 1998; Sheridan 2011) also define the indirect level of quality which includes the adults' environment (e.g. cooperation among the staff, preschool teachers' satisfaction with work, teachers' perception of work-related stress). The indirect quality level combines structural and process levels and indirectly affects children in preschools.

In spite of the strong consensus on what makes a good-quality preschool, the broader socio-cultural context in which preschool education takes place requires individual countries to look for their own quality assessment models and tools. Moss (1996) maintains that due to their diversity, preschool institutions in Europe cannot be given a common denominator even as regards relatively objective criteria, such as preschools' opening hours, the age when infants/toddlers enter preschools, let alone pedagogical goals, methods and forms of work. This, however, does not mean that a number of research studies carried out in the last 20 years has not recognized and directly examined preschool practice indicators that signal preschool process quality. Thus, based on over thirty-year-long considerations of the development and learning of children attending preschool, the NAEYC (The National Association for the Education of Young Children) stresses the following indicators as primarily related to the process:

- the number, kind, and content of interactions between children and educators and other members of workforce in the preschool classroom and the preschool (e.g. positive interactions such as smiling, touching, holding, speaking at the child's eye level, encouraging the sharing of experiences, feelings, and ideas);
- the emotional atmosphere in the playroom (e.g. how children feel and react in the classroom);
- how children form groups and participate in them (e.g. choosing children to participate in the group, offering activities that will "attract" all children, swapping roles in group activities);
- the types of activities for children (e.g. planned and free activities - either individual, in small groups, or as a whole class - , individualizing routine activities, integrating activities, evaluating activities) (Layzer et al. 1993).

An interesting concept of process quality was developed by a team of Belgian researchers (Laevers et al. 1997) who distinguish between two main indicators of preschool education process quality, namely the child's well-being and the child's involvement. The notion of involvement presupposes and takes account of the child's development of abilities and skills, since "to be involved" means to be able to reach the limits of one's development or to function in the zone of proximal development. The authors state that children with high levels of well-being, who feel "like fish in water" in their educational environments, will develop all their learning potentials (ibid., p. 15). If children do not feel well or if the level of their involvement is low, it is likely that the preschool does not offer sufficient support to their learning and development in various areas.<sup>4</sup>

<sup>4</sup> Laevers et al. (1997) also developed a two-step process quality self-assessment procedure. The preschool teacher observes a child repeatedly and monitors the child's behavior from the aspects of involvement and well-being and behavior. Observing and monitoring children is done with the use of scales including statements such as "The child is in a good mood"; "The child adapts and reacts to new environments and situations quickly"; "The child tries out different possibilities"; "The child is not bored, he/she focusses his/her attention on a specific activity"; "The child persists in an activity" (see also Marjanovič Umek et al. 2005).

High-quality preschool education at the process level is related to suitable working conditions, which are defined through structural quality indicators. Basic structural indicators have been recognized for decades, and they are ever more frequently made part of various international, comparative analyses of preschools. These comparative analyses demonstrate that Slovenian preschools are broadly comparable to European countries with highly developed preschool education, but not evenly in all structural indicators or all children's ages. The first two key, interrelated structural indicators are the size of the classroom (the number of children in the classroom) and the adult/child ratio in the classroom. Country comparison data (The provision of childcare ... 2009; Starting strong III ... 2012) show that in 30 European countries (27 EU member states) there are 10 to 14 children in the first age group, and 20 to 25 children in the second age group.<sup>5</sup> The adult/child ratio in the first age group, in Nordic as well as some other countries such as Portugal, the Netherlands, and Italy, is more favorable than in Slovenia. It is also important to notice that the 1:6/7 ratio in Slovenian preschools is specified only for the six hours of the preschool teacher's and the preschool teacher's assistant's joint work. The adult/child ratio in the second age group in all the compared countries is higher than in the first age group, and the adult/child ratio in Slovenian preschools (which is 1:11/12) is more comparable to the other countries (Key data ... 2012; The provision of childcare ... 2009; Starting strong III ... 2012). Here we must also note that in the second age group, the preschool teacher and the teacher's assistant are jointly present for only 4 hours (see also Kos Kecojević et al. 2012; Marjanovič Umek et al. 2011). Since the majority of countries do not regulate the adult/child ratio at either the local or national level, it is professional associations<sup>6</sup> that provide guidelines for the standards appropriate for the development and learning of children in preschools.

Indoor play area per child is another structural indicator that significantly influences preschool quality. In the majority of compared countries (Starting strong III ... 2012) play area per child in the classroom, for toddlers aged up to 3 years, is bigger than for children aged 3 to 6 years. Thus toddlers in Finland have 7 sq. meters of indoor space, and older children have 3 sq. meters. In Norway, younger children have 5 sq. meters, and older children have 4 sq. meters. In Estonia, both younger and older children have 4 sq. meters of indoor space. Except for new buildings, Slovenia has still not reached the goal set by the 1996 regulatory provision that stipulates a minimum of 3 sq. meters of indoor play area per child.<sup>7</sup>

<sup>5</sup> With the maximum number of children in the first age group being 12 or, depending on the local community's decision, even 14, Slovenia is, comparatively speaking, at the upper limit. Data in sources differ slightly, as sometimes they describe norms and regulations and sometimes the actual numbers of children in preschool classrooms. The same is true of the structural indicator describing the adult/child ratio.

<sup>6</sup> In 2006, the American Academy of Pediatrics and The American Public Health Association published the following recommendations: the age of toddlers from 6 months to 1.6 years – the ratio 1:6, the number of toddlers in a classroom 6; the age of toddlers from 1.6 years to 2 years – the ratio 1:4, the number of toddlers in a classroom 8; the age of toddlers from 2 years to 3 years – the ratio 1:7, the number of toddlers in a classroom 14 (Caring for ... 2006).

<sup>7</sup> The rules on norms and minimal technical conditions for premises and equipment of pre-school institutions, based on the 1996 legislation, have kept postponing the realization of the goal. The 2010 stipulation states that preschools must guarantee 3 sq. meters of play area for toddlers aged up to 1 year, 2.6 sq. meters for toddlers aged from 2 to 3 years, and 1.75 sq. meters for children aged from 3 to 6 years.

Process quality in preschools is also related to educators' levels of education.<sup>8</sup> International comparative analyses (Key data ... 2005; Starting strong II ... 2006) show that in the majority of EU and OECD member states, preschool teachers are educated at the tertiary level, either in higher education or university programs, which means that their education lasts three to four years. Another difference among the countries is to do with the organizational structure of preschools. The countries with integrated preschool systems (e.g. Finland, Sweden, Norway, Spain, Slovenia) require preschool teachers – regardless of the age group they teach – to have a tertiary level of education. Those with split preschool systems (caring preschools for children aged up to 3 years and educational preschools for children aged from 3 years to their entering school) regularly require teachers in educational preschools to have higher education than those in caring preschools.

Since the 1990s, researchers (e.g. Finn et al. 1989; Howes and Smith 1995; Layzer et al. 1993; Melhuis 2001; Mocan et al. 1995; NICHD 2005; Pascal et al. 1998) have increasingly seen preschool quality and family-environment quality as indicators of a clear, short-term and long-term positive influence on preschools. There have been numerous theoretical and empirical studies pointing out the relatively heterogeneous effects of preschools on children's development and learning. They have defined preschool quality with the help of structural and process quality indicators, but especially with the interdependence of these factors. For both infants and toddlers as well as older preschool children, classroom size, adult/child ratio in the classroom, teachers' education, as well as teachers' average salary are important process quality predictors. The quality also has an important correlation with toddlers/children's achievements. Higher process quality is demonstrated in higher-quality teachers' and children's behavior and responses. For instance, there is more spoken encouragement and response to toddlers'/children's speaking, more encouragement of children's social competences, as well as teachers' sensible participation in toddlers'/children's play. There is more social interaction coming from toddlers/children; there is more participation in groups and different activities; children cooperate more; there is more spontaneous speaking and narration; children are also more successful later in school.

Very few researchers perceive certain structural indicators as less important predictors in comparison with others, for instance classroom size in comparison with the adult/child ratio in the classroom (NIEER 2004). Nonetheless, Chetty et al. (2011) did not confirm the influence of classroom size on children's long-term achievements (after the age of 8 years) in standardized examinations or on individuals' salaries at the age 27 years. They did confirm, however, that the individuals who attended smaller preschool classrooms achieved better results in examinations until the age of 8 years. They also more frequently attended education at the age of 20 years, and they lived in better quality environments than those individuals who as children attended preschool classrooms with a higher number of children. When assessing the short- and long-term influence of preschool on

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<sup>8</sup> Researchers (Helburn and Howes 1996; Howes et al. 1992) argue that not only the level of education is important, but also other forms of knowledge acquisition, such as continuous education and training, and acquired experiences, which cannot be assessed in comparative studies.



individuals' achievements, we should pay attention to how the achievements are defined, but especially to the fact that this is not a cause-and-effect relationship, but one of interconnections among structural indicators, between structural and process indicators and the influence of preschool.

D. Cryer et al. (1999) carried out a comprehensive cross-cultural research study that examined the relationship between structural and process quality indicators. The authors were interested in whether, in the participating countries, relationships among structural indicators were the same as those that also defined process quality. The participating countries were Germany, Portugal, Spain, and the USA. Process quality was assessed with the internationally established standardized tools, the *Early Childhood Environment Rating Scale* and *Caregiver Interaction Scales*. Structural indicators were divided into variables at the level of the preschool classroom (adult/child ratio, indoor play area, teachers' education, teachers' work experience, teachers' age, teachers' average salary) and variables at the preschool level (share of children attending preschool, opening hours, head teachers' education, head teachers' salary, head teachers' experience and length of service, regional characteristics). The results showed that there were differences among the countries regarding the influence of individual structural variables on process quality, but the differences were not significant. Process quality was defined by different structural relationships among structural indicators. All the selected variables pertaining to the classroom explained from 9 to 27% of the variability in the process quality in the selected countries. In Germany, for instance, the indicator "adult/child ratio" was a stronger positive predictor of process quality than in Portugal and the USA. Quite the opposite, the indicator "teachers' experiences" was a negative predictor in Germany, but a distinctly positive predictor of process quality in Spain, the USA, and Portugal. When the authors added selected preschool variables to the model, they were able to explain a further 8% to 14% of the variability. Hierarchical regression was employed to test empirically the theoretical assumption that proximal variables (preschool-classroom variables) explain better the quality at the process level than distal variables (preschool variables). Their calculations confirmed the hypothesis, while they also showed that the model as a whole was good at predicting process quality with more related structural variables. Some of them had the role of indirect variables (i.e. they mediated the effects of a specific structural variable on process quality, for instance preschool teachers' education was mediated through the adult/child ratio onto process quality). Furthermore, the researchers confirmed that process quality is not related merely to structural quality, since it is also established by itself. Having developed a model of hierarchical regression, the researchers were able to explain from 25% to 45% of the variability in process quality in the four countries participating in their study. They also confirmed that in all the countries, proximal variables explain more variability in process quality than distal variables.



## Preschool quality and children's language competence: The Slovenian research study

The longitudinal research study that was conducted in Slovenian preschools from 2002 to 2006,<sup>9</sup> investigated preschool quality in relation to the influence of preschools on children's development and learning. The research included 274 three-year-old children, with roughly half of them having entered preschool at the age of one year and the other half at the age of three years. The children were assessed in different areas (social, personal, cognitive, and language) for four consecutive years. In the last year, we also assessed the children's readiness to enter school and their school achievements. When the children were five years old (i.e. at the third assessment), that is during their last year in preschool, we also assessed the quality of the preschool and again (this was first done when the children were three years old) the quality of the family environment (parents' education, conditions and functioning in the family environment). In the study, we were particularly interested in preschool's influence on the development of children's language<sup>10</sup> in relation to preschool quality and family environment quality. The preschool classrooms (in 17 Slovenian preschools) with the children from our sample were assessed according to the process quality of the preschool,<sup>11</sup> since the classrooms were comparable as to their structural quality. The preschool classrooms, whose quality assessment was above the median in both assessment scales, were assessed to be of high quality. Those where quality assessment was below the median in both assessment scales were assessed to be of low quality. The variability among the classrooms was considerable. The findings demonstrated that preschool quality had no significant influence on the language of five-year-old children. When an additional variable was included (the children's mothers' education), further analyses showed that the children attending low-quality preschools and having poorly educated mothers achieved significantly lower results on the *LSGR-LJ* language scale than the children whose mothers had high education. In the high-

<sup>9</sup> It was a goal-oriented research project conducted from 2002 to 2006 at the Chair of Developmental Psychology, Faculty of Arts, University of Ljubljana. L. Marjanovič Umek was responsible for the part of the project that focused on the influence of preschools (including preschool quality and family environment quality) on children's language development and their readiness to enter school. M. Zupančič was responsible for the part of the project that focused on the influence of preschools on children's social and personal development and their school achievements.

<sup>10</sup> Children's language development in relation to preschool's influence has often been problematized. Language development requires preschool quality both at the structural (adults/children ratio) and process (frequency of social interactions, talking to toddlers/children) levels. In our research study, language was assessed according to the standardized *Scales of general language development (LSGR-LJ)* (Marjanovič Umek et al. 2004).

<sup>11</sup> Preschool process quality was assessed by psychology students who were trained in observing preschool teachers' and children's behavior and actions as well as in using tools for assessing preschool classroom quality. They used two assessment scales, *Educators' assessment scale: Quality at the process level* (Marjanovič Umek et al. 2002b) and *Caregiver Interaction Scales* (Arnett 1989; adapted and translated into Slovenian by Marjanovič Umek et al. 2005), which were developed and used in previous research on preschool quality (see also Marjanovič Umek et al. 2002a; Marjanovič Umek et al. 2005). Preschools teachers' and children's behavior and actions were assessed during different activities between 7.00 a.m. and 2.00 p.m.

quality preschools, the differences in the language of the children whose mothers were more and less educated grew smaller. In other words, preschool quality was one of the factors contributing to the reduction in children's language differences that are related to their parents' education. The children of mothers with high education were more competent in terms of language than their peers with low-education mothers, regardless of the quality of the preschool they attended; however, the differences between them were smaller in high-quality preschools. Quality preschools were, therefore, a protective factor in the language development of the children whose mothers had low education.

In addition to the research findings mentioned above, it is worth calling attention to the result that points to the great variety of preschool classrooms regarding their process quality, even within comparable structural quality. What conclusions can be drawn from these results? Structural quality is, it seems, a necessary but not sufficient condition for high quality at the process level. The analyses from the study, in which researchers took part as external experts in self-evaluation in the preschools that volunteered to participate in the research study (see also Marjanovič Umek et al. 2005), show that indirect quality indicators are also important (e.g. participation of the workforce in education and training, their satisfaction with work, and cooperation of preschools with parents). Moreover, we should not ignore preschool teachers' implicit theories of children's development and learning,<sup>12</sup> as well as various other, unexplained factors which differentiate preschool teachers in their quality of working with children. Our findings also demonstrate that among the preschool classrooms where we assessed process quality, the majority of the classrooms were assessed as good and only very few as excellent. We can thus discern a degree of added value at the level of influence, which is likely to be a combination of all the quality levels and requires constant development and monitoring in the preschool classroom, the preschool, the local community, and the state.

## Conclusion

The concepts and various models of preschool quality are –as with other levels of education – situated in socio-cultural and ecological systems theories. Since the 1980s, quality indicators at various levels have been relatively unambiguously defined, and empirical studies have especially confirmed the connection between structural and process quality indicators, together with their joint, short- and long-term impact on outcome indicators (e.g. the toddler's/child's development in different areas, school achievement, education, social inclusion). At the end of the twentieth century, European and North American professional associations and international organizations working with preschool children formulated various recommendations on assessing and ensuring quality. Subsequently, individual

<sup>12</sup> In the conversations following the analysis of collected data in the process of self-evaluation, preschool teachers frequently expressed the opinion that encouraging infants/toddlers in the first age group to talk was less important than encouraging children in the second age group.

countries developed and disseminated quality assessment tools (at structural, indirect, and process levels). Preschool quality has also been increasingly made part of broader international comparative analyses (e.g. Starting strong II ... 2006; Starting strong III ... 2012). Preschool quality in countries with highly developed preschool education seems to have become part of wider, conceptual, and curricular considerations in the development of this area as well as in the internal development and everyday life in preschools.

If Slovenian preschools – which are recognized as good quality ones by some studies and comparative analyses (especially in terms of structural indicators)<sup>13</sup> – are compared with other countries with highly developed preschool education, we can note that Slovenia has no nationally established quality standards as part of preschool education legislation and regulation. To give an example, in the *White Paper No 41*, debated in parliament in 2009, the Norwegian government set three main goals related to quality: (1) to ensure equal opportunities and high quality in all preschools; (2) to strengthen preschools as the places of children's learning; (3) to secure for all children participation in an inclusive community. At the same time, the government committed itself to specific activities that would contribute to the realization of these goals, both at the educators' and ministry's levels. Comparable solutions are in place in Iceland and England. In Iceland, the 2008 *Preschool act, No 90* stipulates that each preschool must carry out internal and external evaluation, with the evaluation procedures specifically laid down in the national curriculum. Based on broad conceptual considerations, England made preschool quality part of the 2006 *Childcare act*, and national standards and procedures for preschool quality assessment were prepared by the National Assessment Agency.

Having “entered” the field of quality in research and experts' work more than a decade ago, the Slovenian state will have to define quality indicators transparently and legally, while simultaneously establishing the ways and procedures of quality assessment, ensuring cooperation among various levels (the preschool, the local community, and the state), and assuming responsibility. The conceptual and legal solutions pertaining to Slovenian preschool quality should also be internationally comparable and “sensitive” to the culture and tradition of Slovenian preschools.

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<sup>13</sup> One of the structural indicators was the share of children attending preschool. In Slovenia the share of children in the first and second age groups attending preschool has been increasing for over ten years and now equals the share recommended by the European Council of Ministers (by 2010, 33% of children aged up to 3 years and 90% of children aged from 3 years to their entering school; by 2020, 95% of 4-year-old children should attend preschool). On the other hand, Slovenia has been less successful with another structural indicator regarding the social structure of attending children – that is, their parents' education. Comparative data for Denmark, Sweden and Finland show small differences in the shares of three-year-olds attending preschool when their mothers' education is compared. So in Denmark, the share of attending toddlers whose mothers have low education is even slightly bigger than the share of attending toddlers whose mothers have secondary and high education. In Slovenia, preschool attendance of three-year-olds with mothers of low education is significantly smaller than the share of toddlers whose mothers have secondary and high education (Early childhood ... 2009).

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