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Effectiveness of a Danish early year preschool program: A randomized trial☆

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ABSTRACT

A significant number of studies indicate that early year preschool programs lead to positive long-term effects. Systematic quality improvement of early year preschool may enhance these outcomes. The ASP Program was built on this principle. In this program preschool staff are supported in their efforts to critically reflect on current practices and to change these. A randomized controlled study was carried out in Denmark from September 2006 to May 2008. The study encompassed 2323 children in 59 preschools in two municipalities. Children were assessed using the Strength and Difficulties Questionnaire at the start of the intervention, at mid term, and by the end. The results indicate that, in the intervention group, children developed fewer emotional symptoms, conduct problems, became less hyperactive and were more attentive. The effect sizes ranged between 0.15 and 0.2.

1. Introduction

A significant number of studies indicate that early year preschool programs lead to positive long-term effects with respect to academic achievements, employment and health (Barnett, 1998). In a number of countries, e.g. in the Scandinavian countries, almost all children aged between 1 and 3 already attend preschool. In these countries, the challenge is not to extend preschool coverage, but instead to improve the quality of care offered in preschools in order to further enhance child outcomes.

1.1. Systematic quality improvement

Different methods are used to improve the outcomes of educational institutions and the effects of some of these methods have been studied. For example, Hattie reviewed 800 meta-studies on interventions that were designed to improve academic achievements. The meta-studies built on 50 000 controlled or observational studies (Hattie, 2008). Most of the reviewed studies dealt with children in compulsory schools, where children typically start at age 6. Yet, these studies are probably also

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relevant for preschools. Hattie ranks the effect sizes of the 138 most studied interventions or determinants and found that interventions where teachers are offered opportunities for "formative evaluation" result in the largest effect size. Hattie describes "formative evaluation" as any activity that is used to assess the learning process, followed by a change in the teacher's activity after which the activity is evaluated. Hattie reports that the mean effect size of such interventions is 0.9, which is a large effect.

Formative evaluation is closely related to the system for systematic quality assurance that was developed in the Japanese auto industry in the 1950s (Maurer, 2012). Due to its Japanese origin, this approach is often referred to as "Kaizen", which means improvement or change for the better. This approach has been applied in a number of different fields, both in manufacturing and in service production. The core idea is the same as in formative evaluation: the process starts by examining aspects of existing practices, new approaches are tested, the effect of these new approaches are examined, based on the results alternative approaches are tried, evaluated etc. Since the 1980s this concept of quality improvement has also been advocated for educational institutions (Murgatroyd, 1989).

The concepts of formative evaluation and Kaizen are furthermore related to an evolutionary approach to organizational learning. Based on reflection, in this approach new ways of solving current issues are tested and evaluated (Sundbo, 2003). It is essential that the process starts with current practices, rather than with theories (Ellström, 2010), however including codified scientific knowledge in the process has proven effective (Jensen, Johnson, Lorenz, & Lundvall, 2007).

The concept of organizational learning does not seem to be widely used with regard to quality development of preschools, and the authors of this paper are not aware of any published controlled study of the effectiveness organizational learning in this setting.

1.2. Preschool for socially disadvantaged children

The social situation of the family affects a child's competences and health when starting school (OECD, 2009). Such competences include language skills, cognitive abilities and ability to interact with other people (Almond & Currie, 2011). Social differences often increase during the child's school years. Thus, in order to reduce long term social inequalities, there is a need to improve the competences of socially disadvantaged children already before they start school (Leseman, 2009). Offering preschool for all children may have this effect (Havnes & Mogstad, 2012; Leseman, 2009; OECD, 2009, 2011; Sammons et al., 2013). Yet, even in countries such as the Scandinavian countries where almost all children attend preschool, there are still social differences in competences and health at the time of school entry (Reinhardt-Pedersen & Madsen, 2001). Improving the quality of universal preschools may reduce these social differences.

1.3. Characteristics of effective preschools

No review on the effect of preschool characteristics on children's competences and health is as extensive Hattie's review of school interventions (Hattie, 2008). Yet, some studies on preschools have been presented. Favorable child outcomes seem to be promoted by an emotionally safe environment and sensitive, supportive, and verbal stimulating interactions between teachers and children (Leseman, 2009). Studies that have been carried out in US indicate that such characteristics are promoted by ensuring highly qualified teachers (NICHD Early Child Care Research Network, 2005; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2001). However, in these studies only a minority of the teachers had at least a bachelor's degree in early child education. In Scandinavia about half of the teachers in preschool have this level of training (The Swedish National Agency for Education, 2012). Thus, it is not clear if increasing the percentage of academically trained teachers will improve child outcomes in these countries. In a large prospective Danish study, the academic outcomes of children at age 15 have been related to characteristics of the preschools that these children had attended before school entry (Bauchmüller, Gørtz, & Wurtz, 2011). A high percentage of academically trained teachers improved outcomes at age 15, but the effect size was extremely small.

A low child-to-teacher ratio is also advantageous. Yet, there does not seem to be a linear relationship between the child-to-teacher ratio and child outcomes. One review indicates that less than 12 teachers per 100 children seems to be detrimental to child outcomes, but simply increasing the number of staff seems to have a limited impact (Bremberg, 2001). This finding is relevant for a Scandinavian context with typically 18 staff per 100 children in preschools in Sweden (The Swedish National Agency for Education, 2012). A relatively weak relationship between child-to-teacher ratio and child outcomes is consistent with the findings in Hattie's review of schools (Hattie, 2008). This conclusion is also coherent with the findings in the prospective Danish study (Bauchmüller et al., 2011). In the Danish study, the authors found that a higher number of staff per child improved outcomes at age 15, but also this effect size was extremely small.

A cross-national study indicates that a teaching approach that includes a high proportion of child-initiated activities promotes language and cognitive development (Montie, Xiang, & Schweinhart, 2006). In the Scandinavian countries, e.g. in Sweden, preschools already have this characteristic (Taguma, Litjens, & Kim, 2013).

Within the "Effective Provision of Pre-school Education" (EPPE) Project, Sylva and others studied the effect of preschools in the UK (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2011). They assessed a wide range of quality aspects of preschools (in total 61 aspects), including personal care routines, language-reasoning, activities, staff-to-child interactions, interaction between staff and parents, program structure and 'cognitive' curricula. They found a strong relationship between composite quality indices and child outcomes. The quality aspects that were included in the indices were highly correlated.