

Objective

The rationale for this Research School (RS) builds upon the consideration that existing research results from different international sources have shown that high quality early childhood education and early interventions have a positive impact on children's short term and long term outcomes in development and learning (Hall, et al. 2013; Muschkin et al. 2015; Dodge et al. 2016; Schindler et al. 2015; Shonkoff, 2011; Shonkoff et al. 2017). The viewpoint of the RS is also that early interventions are best addressed in a framework of multidisciplinary collaboration, and this approach has to be further developed in our context.

In Sweden there are accessible and comprehensive early childhood provisions that include children that have special educational needs (SEN) for psycho-social reasons, long term health conditions or impairments. National evaluations and research indicates however that there is a need for improvement in this field of practice (Swedish School Inspectorate 2015, 2016a 2016b; Persson, 2015; Sheridan et al. 2013). Serious insufficiencies in the educational system were described in a recent evaluation report by the Swedish School Inspectorate (SSI, 2016b). In certain schools the observations generated great "concern" (p. 4) with problems with teachers' support and care, safety, learning climate, and support to students with SEN. Inadequacies in preschools were identified recently in 72% of the investigated municipalities, which were related to lack of resources and lack of educational development (SSI, 2016b). There are thus differences in the services offered among providers, lack of qualified staff in many districts, in particular in the disadvantaged ones, and an occurrence of underperformances in the provision of support to children with special educational needs in the early years (Granlund et al. 2015), although the official reports in this last case are mainly from the school years (Swedish School Inspectorate 2015, 2016a; Allodi, 2016); the transitions between preschool, kindergarten (förskoloklass) and school may also generate issues for children with special educational needs (Lundqvist, 2016; Lundqvist et al. 2016; Sandberg, 2012).

Several studies have consistently reported that children with special educational needs without adequate support and specific strategies in their educational settings, risk to experience less participation in learning activities and play in early childhood education, which may further impair their learning outcomes (Odom et al. 2006; Janson et al. 2007; Granlund & Lillvist, 2015; Imms et al. 2016; Barton, 2016; Castro et al. 2017). Negative experiences, as marginalization, exclusion, or learning difficulties in educational settings may be a link between developmental risks, disadvantaged background factors and poor academic, health and social outcomes in adult life (Gustafsson et al. 2010; Hulme & Melby Lervåg, 2015). Early interventions in educational setting are necessary to break the links of disadvantage and vulnerability in the early years to later poor outcomes, and to support the establishing of healthy developmental spirals (Moffitt et al. 2010; Pedersen & Shonkoff 2011; Kington et al. 2013; Hirvikoski et al. 2015). Research on neuroplasticity indicates also that early environmental interventions may be successful in preventing difficulties, and in particular when they are made early in life (Nelson, 2010; Lake & Chan 2014; Sullivan et al. 2014; Guralnick, 2011, 2017).

The number of children that are identified as having special educational needs is reported to be increasing in several school districts, although a precise official statistics is lacking (Allodi, 2017). In addition, most children judged as needing additional support, on top of what is provided to all children by preschool teachers, are not formally identified (Lillvist & Granlund, 2010). There has been also a large influx of refugees, of which about 80 thousands were minors, only during 2015 (SNAE 2016). These children would need support in second language learning and sometimes would also benefit of psycho-educational interventions. Epidemiological studies are also showing that children with very low birth weight /or extremely preterm, who receive nowadays very effective intensive care and survive, meet higher risk to experience difficulties with executive functions, memory and learning, in preschool and school, and higher rates of autism diagnosis are reported in this group (Farooqi et al. 2013; Lundequist et al. 2015; Padilla et al. 2015).

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Previous research in Special Education in Sweden has been predominantly of descriptive nature thus the pursuing of research-based interventions building upon and expanding existing initiatives is highly needed in this field. Practitioners have indicated a need of introducing applicable and effective interventions in the learning environment, targeting in particular self-regulation, language and communication skills, socio-emotional learning, play and social skills, in order to support every child's development and well-being; the planning and application of tailored and effective curriculum adaptations for children with various disability is also an area to develop, according to our experience from the field.

Special educators working in early childhood education have an important role in providing support to the development of research-based systems of interventions for addressing a broad range of special educational needs in early childhood learning environments, also in collaboration with other professions. The Research School will give the opportunity to the participating PhD students to acquire refined tools of inquiry in Special Education. The programme will establish and strengthen a field of multidisciplinary applied research, and will develop tighter connections and exchange between Special Educational practice, research and professional development, and also through the collaboration with other related research such as Health Sciences and Disability Research.

The Research School in Special Education, with focus on early interventions in early childhood education, has the aim to develop applied research in educational inclusive settings, as well as to support research-based practices for children with special educational needs. In order to do that the Research School will have an emphasis on conducting studies with quasi-experimental methods in educational research and developing expertise on these topics (Odom & Wolery; 2003; Odom et al. 2011; Cook & Odom, 2013; Kratochwill et al. 2013).

The choice to focus the Research School in particular on early years education (preschool and primary school) is based on research showing that early intervention are effective in preventing later difficulties and changing developmental trajectories of disadvantage; furthermore this field of special educational intervention is not yet well developed in Sweden. In this work several professional groups and services are involved. Thus the content of the research school needs to be interdisciplinary. The Research School in Special Education has a multidisciplinary approach and comprises scholars that conduct research in Special Education, Disability Research, Psychology, Neuroscience, Child and Adolescent Psychiatry.

The Special Educational interventions will include activities at different levels (universal, group and individual). They may include observations and quality assessments of inclusive learning environments (ICP, Soukakou et al. 2014, Pianta et al. 2016), teacher coaching, engaging interactions and environments; research-based curricula and learning practices; child assessments; and individualized teaching and learning (Sandall et al. 2008, 2013, 2016;. Howard et al. 2017; Rogde et al. 2015; Odom et al. 2015). The Doctoral programme would involve issues of research, implementation, evaluation, service coordination and professional as well as policy development.

The policy makers, the stakeholders and the general society have high expectations on the contribution that the special educator profession, and special educational research at large, should give to the functioning of a democratic, accessible and inclusive educational system, in which fundamental ethical values are unconditionally fulfilled and in which education is truly a right for each citizen. The tasks of Special Education are in this sense to support children's optimal learning and well-being, increase their participation, counteract disadvantages, prevent school failure, and thus to contribute making the school system and society more fair and equitable. The aim of Special education Research School is to contribute to the development of the knowledge base that is indispensable in order to respond to these societal demands. In this effort the recruitment of PhD students with various experiences from the special educational field would be beneficial, while their studies would be linked to existing programs of research at our universities. The Research School will build on existing multidisciplinary and multisite

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National, Nordic and International partnerships and will also contributing to consolidating these collaborations.

The PhD students participating in the Research School will

- a) develop a broad knowledge of theories and quantitative, qualitative and mixed methods in the multidisciplinary field of Special Education;
- b) develop a capacity of integrating different models and collaborating with other professions;
- c) develop a specialized knowledge in a particular field of intervention;
- d) develop their skills in conducting applied research in early years education (preschool, kindergarten, primary school) to support participation, development and learning of children with SEN.

Research environment

The **Department of Special Education (DSE)** at Stockholm University (SU) offers special educational training in teacher education programs and professional exams at advanced level for special educators with all the specializations (language, mathematics, intellectual disability, deafness and hearing impairments, visual impairments and blindness).

DSE offers also master programs in Special Education. DSE is the largest provider of education and training in Special Education in Sweden. Since 2005 there is a PhD program in Special Education at the Faculty of Social Sciences at SU. The PhD program in Special Education has at the moment 18 PhD students enrolled – of which six were recruited in 2016 - and about 26 supervisors. DSEs staff has an international profile among its researchers. Two - soon four - fulltime Professors and two visiting Professors at 20%, plus 25 Senior Lecturers /Associate Professors are enrolled at DSE and some Professor emeriti are affiliated. The researchers at DSE have different professional backgrounds, but all their academic positions are specifically in the discipline of Special Education. The research environment is stable and the recruitment of new researchers, postdoc and PhD students is essential to guarantee a continuing growth of knowledge in Special Educational research. DSE is thus presently in a transition phase in which it would be possible to consolidate and strengthen its research milieu. There are four *field of research* at the DSE *Special Education and young children, Learning environment and didactics, Disability and impairments and Equity, democracy and ethics*. There are several ongoing studies in these groups that focus on the development of quality of learning environments, as a way to develop adequate adaptations to students with SEN, support learning and to prevent difficulties, in preschool and in school: a RCT in inclusive preschools with children with autism; a multidisciplinary RCT intervention for families with extremely premature infants with the aim of supporting interaction and self-regulation; an implementation of the preschool PATHS curriculum; researchers at DSE are conducting research also on early language development, school transitions and inclusive education for children with SEN, assessment of speech impairments; development of social and play skills in preschoolers; assessments of reading ability and interventions for students with dyslexia; longitudinal studies of children with blindness and the educational support that they receive, and a study of learning outcomes and support needed after brain tumor treatments. Also literature reviews, comparative studies, policy analyses and evaluations with a focus on special education and educational improvement are being conducted at DSE.

At JU the research school will include teachers, researchers and doctoral students from the **CHILD research environment at School of Education and communication and School of Health Sciences**. Courses in Special Education are provided on Masters level in School of Education and in Pediatric Nursing in School of Health Sciences. In addition a two year Masters of Childhood Intervention is provided in collaboration between the Schools. Doctoral training is provided in Disability Research, Health Sciences, Social Sciences and Special Education. In the last ten years about 22 Doctoral students from the CHILD program have been examined. Researchers in CHILD have published more than 120 publications in peer-reviewed journals in the last two years. The environment contain professors in Special Education, Psychology,

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Disability Research, Occupational Therapy and Health and Caring Sciences. Three research topics 1) Children and health, 2) Children and Disability, and 3) Children and preschool-school have participation in everyday life as a common topic. Ongoing international projects involve researchers from USA, Canada, Australia, Portugal and South Africa.

The **Department of Behavioural Sciences and Learning (IBL)** at Linköping University offers special educational training in teacher education programs and professional exams at advanced level for special educators and special educational needs teachers with specializations in language, mathematics, and intellectual disability. The research and doctoral training in the special education area has an interdisciplinary approach with researchers and PhD students with background in special education, and other areas like for example cognitive science, psychology and speech and language pathology. One research area is about understanding how different abilities develop in children with special educational needs. Many projects is about the interplay between cognition, language or school performance and the typical groups to investigate are children with intellectual disabilities, children with cochlear implants (and hearing loss), children with reading or mathematical problems.

The **Center of Neurodevelopmental Disorders at Karolinska Institutet , KIND** is a competence node for research, education, development and clinical work established in 2010 as a joint effort between the Stockholm County Council and Karolinska Institutet (KI) with the mission to generate new and high end evidence in Neuro-Developmental Disorders NDD, and bridge gaps between clinical services and academia in NDD, regionally, on a national level and beyond. KIND is headed by the applicant and includes a clinical unit (BUP-KIND) at the division of child and adolescent psychiatry Stockholm County, where novel, promising, research-based techniques are offered and evaluated in naturalistic settings. The unit is intended to serve as an incubator for translating basic and applied research into clinical and educational practices. Between 2010 and 2016, KIND published 160 original peer reviewed articles and generated > SEK 125 million in research grants. KIND conducts a complex mix of research, education and development activities on NDDs with a variety of paradigms ranging from genetics and environment, neurobiology, (dis-) ability/psychopathology assessment and epidemiology to diagnostic tools, intervention methods, implementation, and related societal/service issues. Academically, KIND is part of the **Neuropsychiatry unit at the Dept. of Women's and Children's Health at KI**, one of the largest and most prestigious medical universities in the world. The Dept Women's and Children's Health has about 180 employed and 350 affiliated researchers and deals with both basic and clinical science in women's and children's health. The research takes place in 9 units with separate scientific profiles, hosting about 110 PhD students. **The Stockholm County Council**, is KI's most important regional partner, and their missions are closely connected. Together, both create a well-integrated infrastructure for healthcare, education, research and development in Stockholm. **Interest Organizations:** Research conducted at KIND is coordinated with the four largest Swedish NDD interest organizations: the Autism and Asperger Society Attention Organized Asperger's and the Society for Intellectual Disabilities. Together, these IOs represent ~40,000 patients and stakeholders all over Sweden. The organizations have been very interested and supportive of our work.

Karlstad University hosts education for teachers, special educators and several research projects in Special Education. the research project focusing early years and interaction in deaf dyads was led by professor Roos. The Department of Special Education host in research projects on inclusion, special teachers' profession and role, teacher students attitudes towards children in the field of autism spectrum, and on family interaction with infants.

Programme description

The Research School will be hosted and coordinated by DSE. The PhD students will be admitted to the PhD programs at the respective Universities and will follow the requirements of these programs, in term of mandatory courses and other local recommendations that are to be included

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in the educational plans. On top of that, the Research School will organize mandatory shared activities (courses, meetings, seminars) that the doctoral students at the participating universities will have access to. PhD students from other national and international partner universities would also be able to participate, if places would be available. The PhD students, the supervisors and the Board members will meet each semester for a meeting at one of the participant universities or at another hosting university abroad, for instance in conjunction with international research conferences and relevant network meetings. The PhD students will attend, at the same time, 6 courses organized by the RS that will be distributed during six of eight semesters. Since the curriculum at LiU and JU requires 60 hp while at SU it requires 90 hp, 6 courses will be mandatory for SU and 4-5 for LiU and JU. The main part of the courses would be taught in English and lectures video-recorded to be available for online access later on. The topic of the courses (7,5 hp each) are:

1. Designs of Applied Special Educational Research
2. Theories and frameworks of Intervention and Implementation in Early Childhood Special Education
3. Neuroscience for Early Childhood Special Educational Research
4. Ethics in Interventions and applied Special Educational Research
5. Assessments and Analysis in Special Educational Research
6. Multidisciplinary cooperation and interdisciplinary approaches in Special Education Research

The PhD students will attend also other locally mandatory courses; they will plan and carry out their empirical studies and work at the dissertation at their local departments.

The Research School will announce 7-8 new PhD student positions, four of which will be placed at Stockholm University. If ongoing applications for external grants would be successful, more positions could be added. The RS courses will be attended also by recently recruited PhD students: of which, 6 at Stockholm University; 2 at Linköping University; 2 at Jönköping University and 1 at Karolinska Institute. There are several students at advanced and master level at our universities who are eligible for PhD studies and they would have interest for a PhD program with this content. A drawback in the recruitment of PhD candidates willing to study fulltime, could be the low remuneration for PhD studies, compared to other qualified employments in the school sector, but we are confident in the possibility to recruit them, through the enhanced conditions offered by the network of qualified involved parties.

Organisation

The organization of the Research School has a Steering Board with members from each university; a Coordinating Group made by the Leader and the Coordinator from SU; an Advisory Board with few external research experts /stakeholders; and an Evaluation Group, nominated by the Board, which will follow the activities and write a yearly report about costs and contents. Each PhD students will have at least two supervisors of the dissertation work. Each PhD will have the same amount of supervision hours (80 hours, 5 %). The supervisors would divide the resources equally, as a general rule.

Each semester there will be an intensive meeting for the supervisors and the PhD students, dedicated to seminars and planning. Each year the PhD students and some of the supervisors will participate and present papers /posters to International Research Conferences (possible options: the Inclusive Education network of ECER; the Early Childhood SIG of EARLI; the ISEI International Society of Early Intervention; the SCDR Society of Child Development Research; the EACD European Academy of Childhood Disability). The main activity of the RS will be six courses that will be shared by the PhD students. They will cover 45 hp, and will be developed by the participants of this application, according to the objectives of the Research School. They would be scheduled in each semester between August 2018 and December 2021. The main part of the courses will be placed in Stockholm, and 1 or 2 will be placed in Jönköping. Each course

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will have an amount of resources available covering planning, developing curricula, teaching, performing examinations and documentation.

The teacher responsible for the course will distribute the resources in concert with the coordinators. The evaluation and follow up of the ongoing work of the PhD students will be done according to the local regulations of the university, with the compilation and yearly update of the Individual Plan of Study. The examination of the PhD students' would be carried out by the teachers responsible for the courses. The procedure of the examination of the PhD thesis would follow the regulations of the Faculty at each University, with External Examination board, Faculty Opponent etc. These costs are taken by the Faculties and are not included in the RS budget. The courses that will be developed within the RS would enrich the broad and deep of the PhD program in Special Education and they will be given in the future as an integrated part of the regular curriculum. The RS will select the PhD students through usual application procedures in 2018. The cost for participation to meetings, courses and conferences for PhD students and supervisors would be reimbursed by the RS.

Significance

The RS would have a great significance in developing applied Special Educational research, in Sweden as a multidisciplinary field, and in collaboration with international partners. One reason is that this field of research is relatively young and there is potential and need for a major expansion. Furthermore, there are few openings for PhD students in Special Education in Sweden, and the field needs to be replenished with researchers as the actual numbers are low and many are in retirement age. The applied research focus responds directly to the great expectations expressed in the society for the contributions that special educational knowledge shall give to the functioning of the educational system, in supporting learning and in preventing school failure. The needs of development of knowledge in research-based practices and early interventions for various types of difficulties in preschool and school are pointed out by policy makers, stakeholders and practitioners. These multiple needs of innovative and practice-relevant research cannot be met with the existing national resources. The multidisciplinary character of the field implies challenges and would benefit very much of a common organizational platform in which PhD students, postdoc and senior researchers would network and strengthen existing national and international collaborations. The courses that will be developed within the RS would enrich noticeably the existing PhD programmes and would increase their national and international attractiveness, securing the continuing growth of this discipline. Additionally, Special Education has never received Research School grants in previous calls. The collaborative structure that would grow with the resources of the RS would make it possible to develop further joint research project applications and could be the start point of a national Special Educational Center, a hub linking together applied research, experimental practices and professional and policy development.

National coordination

The Research School will establish a Research School Board with representatives from each University that will plan the activities to be carried out. An Advisory Board with 3 external experts will also be established. An Evaluation Group will be appointed of carrying out regularly evaluations of activities and initiatives. The partnership between the Universities will be regulated by legal agreements between the participant agencies.

Professor Mara Westling Allodi is director of research at the Department of Special Education (DSE) at SU and will lead the RS with the support of **Associate Professor Jenny Wilder** as coordinator of the RS. Professors, associate professors and postdoc at the DSE will be engaged in the Research School as supervisors and teachers. The contribution from DSE will be in courses on various quasi-experimental methods in special educational research and implementation science with **Professor Samuel Odum** and other colleagues; and on systems of early interventions and assessments of learning environments with the participation of **Professor**

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Susan Sandall; DSE would also contribute on a joint effort in a course on Ethics in Special Education and Disability issues. Other expertise for courses are interventions in speech- and language development; early reading and writing; intellectual as well other developmental disabilities as well as inclusive learning environments.

Professor Sven Bölte is director of the KIND Centre at Karolinska Institute and has supervised about 60 PhD students and postdoc. The Center hosts more than 20 research projects, of which several are interventions in the early years. Professor Bölte and other researchers from the department (neuro-pediatrics, physiotherapy, and occupational therapy) are collaborating with researchers at the Department of Special Education in research projects on learning environments adapted to children with autism, and on family interventions with very preterm infants. Professor Bölte, his team, as well as other scientists from KI will contribute to the programme activities through participation in the Board, through development of courses, participation to research projects and through supervision of PhD students. Their contribution would be primarily in the area of Neuroscience, Disability, and Early Interventions.

Professor Mats Granlund is director of research at the School of Education and Communication at Jönköping University within the CHILD research programme which is also linked to the Swedish Institute for Disability Research. The research is focused on every-day functioning in children and young people in need of special support and their immediate environments. Mats Granlund is responsible for about 20 research projects focusing on the relation between positive functioning in children in need of special support and individual characteristics, interaction factors and environmental factors. In several studies the WHO health classification system ICF is used as a theoretical frame. CHILD has collaboration with researchers from several universities in Europe, North America, Australia and Africa. There is also collaboration with WHO and 13 European partners in the investigation of the utility of ICF. Nationally CHILD together with researchers from LiU and Örebro University organizes the Swedish Institute of Disability Research (SIDR) with about 150 researchers whereof 50 doctoral students. The contribution from CHILD will be in the area of instruments for Assessments, Multidisciplinary Cooperation in interventions and transitions.

Associate Professor Henrik Danielsson is the former Head of the disability research division and a member of the Swedish Institute for Disability Research at Linköping University. Much of the research in this environment is about cognitive and language characteristics in persons with disabilities. Henrik is involved in several projects about children with different special educational needs (Intellectual disabilities, ADHD, reading difficulties). Henrik's focus has been on cognitive and language characteristics in children with intellectual disabilities but much of the ongoing work is about interventions to compensate for weaker abilities. This includes both training of abilities and the use of assistive technology. Besides the competence in the research area, Henrik also has competences about advanced statistical methods and modelling. He is responsible for the Swedish Institute for Disability Research's annual summer schools about advanced statistical methods. Henrik is included in several of Mats Granlund's projects at Jönköping University about pre-school children. Henrik has several collaborators locally at Linköping University as well as internationally (UK, Canada, US).

Professor Carin Roos is working as teacher, researcher and is a supervisor of PhD students. Professor Roos, contributes as well as other scientists from the unit in teacher training courses in special Education and in Karlstad university other teacher training programmes. She will participate in the Board, through development of courses, participation to research projects and through supervision of a PhD student. The contribution to courses of KAU would be primarily in the area of Early Interventions and in Early School Years.

International and other national collaboration

The Research School will welcome PhD students of Special Education and allied disciplines from other Swedish and International Universities that have interest in the theme of early

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interventions in early childhood education. Frank Porter Graham Institute at the University of North Carolina at Chapel Hill; The Haring Institute at the University of Washington at Seattle are collaboration partners through shared projects, networks and exchanges; moreover we collaborate with Professor Julie Dockrell (Dockrell et al. 2010) and the doctoral training school the at the Institute of Education, University College London, which would support the RS with activities of exchanges, supervision and teaching of participation in specialist courses. Mats Granlund is professor at 20 % at the Department of Special Education at the University of Oslo, where Professor Monica Melby – Lervåg who has accepted to be part of the Advisory Board is working. She has experience of leading a Research School in Norway and of interventions on oral language and effect studies in mathematics, language, reading comprehension, working memory skills in the early school years (see e.g. Rogde et al 2016). The Research School on quantitative analysis that is applied for at Gothenburg University, would also be a partner. We have close partners at the Department of Psychology, of Statistics, and of Child and Youth Studies at Stockholm University. Researchers and PhD Students from the Nordic countries, for instance from the Department of Special Education at Wasa and Helsinki in Finland and from Inland Norway University of Applied Sciences will be invited to courses and seminars organized by the RS. DSE has also an Erasmus agreement for student exchanges and other research collaborations with The Department of Educational Sciences at the University of Bergamo (Italy). A Researcher from DSE is also representative of Sweden in the international COST network LUDI with members from 30 countries, a multidisciplinary network on the theme of *Play for children with disability*. CHILD collaborates with Can Child within CeDDR (Centre for Developmental and Disability Research) including Radboud University Holland, Australian Catholic University and Columbia in the US. JU has research collaborations on SEN in preschool and participation for disadvantaged children with researchers from Vanderbilt University USA, University of North Carolina at Chapel Hill, Porto University Portugal and University of Pretoria South Africa; and on rehabilitation of children after cancer treatment with the School of Nursing, UNC at Chapel Hill. The unit Special Education at Karlstad university has cooperation with Oslo university Norway (LISA-project), Canterbury Christ Church University UK, University of Eastern Finland, FI (STAPA-project).

Equipment

The participants to the Research School will have access to digital and traditional research literature resources from the University Libraries, to personal computers and software, printer, internet, e-mail and telephone services, and to other web-based platforms for communication, teaching, learning, documentation, evaluation, data-storage services that are offered through the participating Universities.

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