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Teaching Children with Intellectual Disabilities: Analysis of Research-Based Recommendations

Lauri M.O. Räty[1], Elina K. Kontu[2] & Raija A. Pirttimaa[1]

[1] Department of Education, University of Jyvaskyla, Jyvaskyla, Finland

[2] Department of Teacher Education, University of Helsinki, Helsinki, Finland

Correspondence: Lauri M.O. Räty, University of Jyvaskyla, Department of Education, Jyvaskyla, Finland. Tel: 358-40-527-6994. E-mail: lauri.raty@jyu.fi

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Abstract

The purpose of this qualitative study was to produce an overview of topics and practical recommendations that have been presented for teaching for students with intellectual disabilities in educational research articles published from 2000 to 2013. The sample of peer-reviewed research articles considering this topic was selected using a database search of the Educational Resources Information Center (ERIC). To represent the richness of this research area, the topic was purposely left broad, and the outline was made by focusing on the practical implications of research articles. These recommendations were identified, classified, synthesized, and evaluated. The implications for practice and research are presented based on the findings of this study.

Keywords: intellectual disability, education, teaching, school practices

1. Introduction

The conversation about why inclusion is important and should be reinforced is very familiar to all researchers and practitioners in education. The Convention on the Rights of the Child (United Nations, 1989) and the Salamanca Statement (UNESCO, 1994) have guided politicians and schools to seek and create solutions for organizing schools and education for all (McGuire et al., 2006). In addition, many studies have claimed that inclusive schooling produces good learning outcomes (e.g., Hattie, 2009; Kvalsund & Bele, 2010). Several other studies have supported policies for inclusive education (Allan, 2005; Lindsay, 2007). The positive attitudes of teachers and principals are beneficial for building inclusive schools (Jordan et al., 2009; Saloviita, 2009). Other arguments claim that teaching exceptional children does not demand special skills, only general teaching abilities and sensitivity to all children (Woolfolk, 2009). Jordan et al. (2009) argued that effective teaching is valid for the majority of students with special needs. Mortier et al. (2010) suggested being critical about transferring special education knowledge to the general education system and instead considering the possibilities of partnership and local knowledge.

However, there is a contradiction between the views of scholars and practitioners in the field. Despite researchers' arguments, teachers have stated that they do not feel confident offering fully inclusive classrooms if they lack specialized skills and knowledge (Florian & Linklater, 2010; Kamens et al., 2003; Mortier et al., 2010), and they feel anxious when teaching diverse students (Avramidis & Norwich, 2002; Blecker & Boakes, 2010). There are no accurate statistics of inclusive education, but it seems that full inclusion of students with intellectual disabilities is not common in countries that do not legally prescribe inclusion as the only option (Anderson et al., 2011; U.S. Department of Education, 2013; Kokko et al., 2014). Globally valued definition for intellectual disability is launched by American Association on Intellectual and Developmental Disabilities (2015). It states that "intellectual disability is a disability characterized by significant limitations in both intellectual functioning and in adaptive behavior, which covers many everyday social and practical skills. This disability originates before the age of 18".

It is argued that the most reliable knowledge can be found in peer-reviewed research articles. If we try to see this from the point of view of the average teacher, we may find ourselves buried in an insurmountable swamp. Teachers don't feel that research articles are advantageous (Shkedi, 1998; Williams & Coles, 2003); we can only guess at the reason for this opinion, but perhaps articles are difficult to access or written using language that is

too cumbersome. Furthermore, teachers' everyday workload, including dealing with children and parents, may hinder them in the important task of reading research articles. Instead of using this study to debate the existence of "special educational knowledge", we want to uncover the kinds of recommendation that have been given for teaching in the latest research. The topic of teaching children with intellectual disabilities is too broad for a fully rigorous analysis. We can't find, analyse, and summarize all content of this research area because it would be inconceivably laborious. However, as commonly performed in quantitative research, we can take a representative sample of the population and use that sample for our research data.

The purpose of this study was to produce an overview of the research concerning teaching students with intellectual disabilities. Instead of focusing on why inclusion is important, this study explored how inclusion can be implemented, which is also convenient with the revolution in understanding intellectual disability, because the focus has shifted from assessing individuals' deficits to identifying helpful support (Buntinx & Schalock, 2010). Research on how these students can be better supported in practice is needed based on the emerging support paradigm and the finding that students with intellectual disabilities are not included in general education classrooms as often as students with other disabilities (Ferguson, 2008).

The research questions of this study were:

1) What topics are covered in intellectual disability-related educational research?

2) What kinds of recommendations are given in existing intellectual disability-related educational studies?

This study can be seen as one response to the challenge of developing effective ideas for using research in practice, which the president of the International Association for the Scientific Study of Intellectual and Developmental Disabilities, Vianne Timmons (2013), has presented.

2. Methods

The method of this qualitative study is original. The sample of research articles was sought, and practical implications were identified, analysed, and synthesized. In the chapters 2.1-2.8., the study procedure, selection of the articles, identification of practical implications, and the method of analysis are expanded upon. The validity of the study method is assessed as well.

2.1 Procedure

The study process is presented in Figure 1. First, the sample data was collected by retrieving all articles that were classified as dealing with intellectual disabilities in an educational research database (ERIC). These 333 research articles were compared twice against established selection criteria to ensure that they truly addressed teaching students with intellectual disabilities. After the abstract and full text phase screening, 87 articles were included in the sample.

Under the established norms of scientific journals, researchers are advised to discuss the practical significance of their findings (American Psychological Association, 2010, p. 36) and give recommendations, suggestions, and implications for practice. Because of the large sample and the background of the study, the analysis focused on these practical implications, which were identified with the help of established guidelines. Relevant information from the selected studies was recorded in a computer program. Studies were classified based on similarities, and a synthesis of the findings based on categories was written. In the following sections, the search strategy, selection criteria, guidelines for identifying implications for practice, and an analysis of the data are expounded.

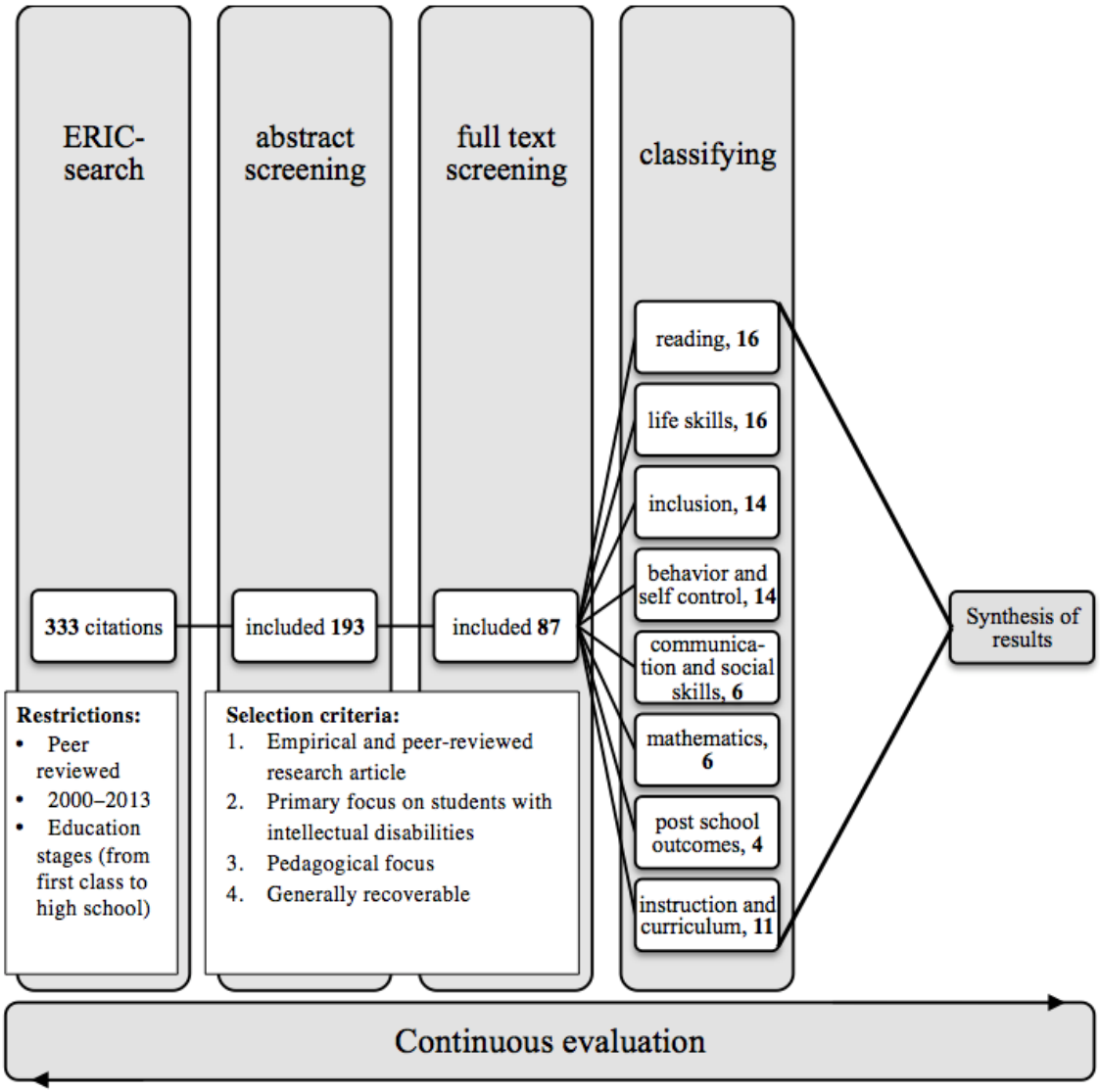

Figure 1. An overview of the study process, selection criteria, data classification, and the number of included articles

2.2 The Sample Selection Process

Similar to limitations often found in other studies focused on the social sciences (Gobo, 2004), it would be an impossible mission to draw a purely random sample of intellectual disability-related studies, because no one can occupy the totality of research and the topic cannot be defined on absolute merit. The purpose of the study was to provide a broad overview of this research area, therefore the heterogeneity of selected studies was essential. It is impossible to generate a overview of every relevant research article in the world, so a realistic sampling procedure is necessary. Thus, we conducted a search in one database to obtain a sufficient sample of articles. Then, to control suitability, criterion-based selection (Patton, 2002) was conducted. To make most of the richness of this research area, the selection criteria included the possibility of making interpretations as usual in qualitative inquiries.

2.3 Search Strategy

Professionals in local scientific library information services were personally consulted before the search strategy was established. A database search was conducted to identify studies that covered teaching and children with intellectual disabilities in an electronic database: the Education Resources Information Center (ERIC). This database was chosen because it is the largest education database in the world and is focused on education-related topics (Proquest, 2014).

The search was simple. An outmoded term ("mental retardation") that is still used in the thesaurus was included as well as the term "intellectual disabilit*". The search was restricted to peer-reviewed articles published between 2000 and 2013. Results were also narrowed in ERIC within educational level; elementary education, primary education, middle schools, intermediate grades, secondary education, elementary secondary education, junior high schools, high schools, and grades 1-12 were included. This phase produced 333 citations.

It is impossible to find all relevant articles on the topic using this method. Journals that are not included in ERIC cannot be found via a search of the database. However, we can argue that because ERIC contains 93 of the top 100 educational journals (Thomson Reuters, 2014), and the seven that are not included are not related to the topic, the sample is representative of well-made educational research. Additionally, if a study is not correctly classified under the thesaurus, it cannot be found using this method. However, the kind of systematic error that would lead to the correct classification of some articles and the incorrect classification of others is considered highly unlikely. Therefore, it may be thought that there is some kind of contingency if an article appeared in search results, thus the sample can be considered well-drawn and representative.

2.4 The Selection Criteria

The selection criteria are presented in Figure 1, but can be further elaborated. The first criterion was that the study must be an available peer-reviewed empirical research article. Therefore theoretical discussions, and grey literature were excluded. Systematic reviews were not included, because the analysis would been too complicated (some studies would have been included in our study twice).

The second criterion was that the focus must be school-aged students with intellectual disabilities. Because of the diversity of the studies, exact criteria were not appropriate. Therefore, the following guidelines were used: studies were excluded if greater than 50% of the participants had other disabilities or intellectual disability and comorbid autism. In addition, comparative articles were excluded in which the focus was comparing the performance of two groups of students with different disabilities. Articles that focused on intellectual disabilities could not contain any subjects with intellectual disabilities, for example, when assessing teachers' attitudes toward inclusion of students with intellectual disabilities.

The third criterion was that the article must have a pedagogical focus, which is defined as related to teaching or learning in a school environment. Therefore, medical, technical, and leisure-time-related studies were excluded.

The fourth criterion was that the study must provide generally recoverable recommendations. Therefore, studies that examined students with very rare disabilities or a specific issue of a particular country's school system and results that could not be generalized were rejected. Thus, studies that did not offer practical recommendations (e.g., surveys, brief reports), as described in the following section 2.5., were excluded.

In the full-text screening phase, 42 articles were excluded based on the first criterion, 28 based on the second criterion, 28 based on the third criterion, and 8 based on the fourth criterion. Some articles were excluded based on more than one criterion, but only the most explicit was recorded.

2.5 Guidelines for Identifying Practical Recommendations

The critical issue of this procedure was how recommendations were identified. It was initially assumed that researchers would provide clear recommendations or implications for practice, but this was often not the case. Most authors commented, at least on some level, on the practical relevance of the study findings. Because texts were diverse, the following guidelines were used to confirm the validity of interpretations: (a) Recommendations were for teacher or school activities, or could be easily applied for that purpose (i.e., development of reading). If clear recommendations, proposals, or implications were not offered, they were explicated from the conclusion (e.g., "the intervention was effective and convenient"). (b) The recommendations were the authors' own words (not cited) and based on their results.

2.6 Analysis

The full texts of 193 papers were analysed more precisely against criteria. The data was encoded in Microsoft Excel 2010 to allow a filtration process. The encoding comprised the reference, name of article, subject, target group, age group, level of intellectual disability, research type, and recommendation for practice.

The data was classified based on study similarities. The classification was cyclical process that demanded continuous evaluation. Seven subject-based categories were composed. Papers that did not fit in any subject-based category were classified in the category that included instruction planning support assessment methods, overall suggestions for school work, and instructional methods. These eight categories formed the basis of data synthesis. The categories and classification of articles are presented in Figure 1.

2.7 The Validity of Method

If the reader is familiar with the method of systematic reviews (e.g., Torgerson, 2003), he or she may recognize a consistency of methods between this study and systematic reviews. However, it is not appropriate to evaluate the validity of this study against the principles of systematic reviews. Validity in this study refers to the trustworthiness, as well as rigorous and transparent decisions and procedure during the research process. Contrary to systematic reviews, the goal of this study was not to find and synthesize all research evidence of a particular narrow topic, thus the search process was kept simple and the selection criteria were somewhat open and broad as described earlier. To both achieve our purpose and keep the amount of work conceivable, the study was not designed to rigorously evaluate the methodological strengths and weaknesses of reviewed studies, but rather to synthesize implications for practice derived from research results. The basis of the validity of this study was that researchers are experts on the strengths and limitations of their own work and are able to interpret appropriate implications. The data used in this study was also peer reviewed, and is therefore dependable.

The representativeness of our sample is discussed above, and the search process can be considered valid. It is reasonable to suppose that if an article is primarily focused on intellectual disabilities, it is classified under intellectual disability in the thesaurus. The ERIC database contains the majority of top education journals; therefore, our search adequately represents well-made educational research. It seems that there is a contingency if an article appeared in our search results, but readers should take these issues into consideration when generalizing our findings and also notice that there are always critical issues in sampling methods in social sciences (e.g., Gobo, 2004).

The effects of the aforementioned issues on the validity of the study are outlined in the discussion section. However, despite these weaknesses, this unique study has many strengths. We consider any systematic errors in the sampling procedure highly unlikely. The sample size is large, and the search and selection procedures have been evaluated by local information specialists, other authors and other experts of the field. Meticulousness has been one of the key principles in the procedure of the data handling process; authors have used computer-based data management programs and evaluated the meticulous of their actions constantly. The identification of practical implications and all citations have been systematically checked several times. Also the rejections of articles of the selection have been double-checked. Clear cases were handled by the first author, but in unclear cases the expertise of whole working group was used. Finally, in addition to all previously mentioned revisions, inter-rater evaluation of classification and identification of practical implications for 20% of selected studies was conducted and 100% agreement was found. The sample contains methodologically heterogeneous studies, but rather than methods, we have focused on implications that can be drawn from these studies. We cannot claim that our sample was the full picture of intellectual disability-related educational research, but we can assert that it was a good overview of covered topics and implications given by intellectual disability-related educational research.

2.8 Description of the Sample

Of the selected 87 papers, 36.8% included children who were under 13 years old, 42.5% included adolescents over 13 years old, and 16.1% included both children and adolescents. In 4.6% of the studies, the age group was undefined. The studies considered, among other topics, teacher attitudes toward students with intellectual disabilities. Among the chosen studies, 62.1% considered students with mild to moderate intellectual disabilities, 12.6% included participants with severe to profound intellectual disabilities, and 25.3% of the studies did not define the type or severity of the participant's intellectual disabilities. The sample offered a good representation of the general population, as all age groups and levels of intellectual disability were involved and studies examining participants with severe to profound intellectual disabilities are within the statistical minority.

3. Findings

Findings, as a synthesis of the recommendations, are presented within the categories introduced in Figure 1. If the participants of the study were under 13 years old, the word "children" was used; if the participants were over 13 years old, the word "adolescents" was used. When the age of the participants was undefined or children and adolescents were included, the word "students" was used. Studies that examined students with severe to profound intellectual disability were highlighted.

3.1 Reading and Literacy

Literacy was widely researched. Sixteen studies involved reading or writing. Implications covered sight word and phonological reading, efficient teaching strategies, and features of efficient teaching.

Several articles took a stand on whether students with intellectual disabilities should be taught to read by sight word or by phonics decoding strategies. Although sight word teaching is efficient (Burns, 2007; Coleman et al., 2012; Waugh et al., 2011), decoding strategies have also proven effective in children with mild intellectual disabilities (Riepl et al., 2008) or students with moderate intellectual disability (Bradford et al., 2006; Peterson et al., 2008; Waugh et al., 2009). Phonics-based instruction can be presented efficiently in children's early school careers (Riepl et al., 2008) or even to adolescents who have experienced previous failure (Peterson et al., 2008). Instruction should not be limited to sight word memorization (Allor et al., 2010a), which limits the potential of children with intellectual disability (Coyne et al., 2012). Wise et al. (2010) observed that children with mild intellectual disability can learn to read in similar ways as typically developing children, through phonological decoding. As Allor et al. (2010a) suggested, expectations for reading for students with moderate intellectual disability should be raised.

Three studies highlighted the use of scientifically based interventions for children with intellectual disability (Allor et al., 2010a; Lemons et al., 2013). Methods such as drill models with increased repetition (Burns, 2007), the technology-based Literacy by Design approach for children (Coyne et al., 2012), teacher-directed and computer-assisted constant time delay (Coleman et al., 2012), and simultaneous prompting for teaching letter-sound correspondences and blending skills (Waugh et al., 2009, 2011) were effective. Staples and Edmister (2012) strongly recommended using process and social interaction models in writing activities as an approach in which the process of collaboration is as relevant as the product.

Teaching aids were also discussed. Graphic organizers were recommended (Douglas et al., 2011), and combined visual- and discussion-based intervention, using pictures and discussion while reading a text, was useful for increasing the comprehension abilities of students with moderate intellectual disability when they read age-appropriate texts (Shurr & Taber-Doughty, 2012). Lemons et al. (2013) suggested that focusing on improving reading outcomes was important, and the use of curriculum-based measures can be beneficial for student progress and instruction. Researchers suggested the system used in their study, which considered assessment with early-grade measures and advancing to the next grade level when a benchmark is achieved.

Several studies defined a type of efficient instruction. Instruction should be explicit and systematic (Allor et al., 2010a; Peterson et al., 2008), intensive and implemented with fidelity (Allor et al., 2010a; Allor et al., 2010b; Browder et al., 2011), and highly motivating and modified (Allor et al., 2010b; Browder et al., 2011). Instruction should be based on a data-based evaluation (Allor et al., 2010a).

Only one paper investigated the comprehension abilities of students with significant intellectual disability who also need opportunities for literacy learning. Browder et al. (2011) introduced efficient intervention, which used systematic prompting and the steps of the lesson as a task analysis. Teachers were encouraged to develop a scripted lesson and to mention that books should be interesting, relevant, and age appropriate.

3.2 Life Skills

Sixteen studies were classified as examining life skills. Most prominent in these studies was the frequency of technology and video-based instruction, which was used in 11 studies. Commonly examined life skills were community skills and cooking and food preparation skills.

Computer-based instruction may be workable and resource-effective for teaching purchasing skills to students with mild to moderate intellectual disability (Ayres et al., 2006; Hansen & Morgan, 2008) and to students with moderate to severe intellectual disability (Mechling et al., 2005). Students can be supported while shopping with audio recorders (Bouck et al., 2012). Taber-Doughty et al. (2009) compared the effectiveness of simultaneous and delayed video modeling in library tasks: both systems were effective, but the systems preferred by each student were slightly more effective. The same result was also found in Taber-Doughty's (2005) research: different prompting systems (least prompts, auditory, and pictorial) were effective for adolescents with moderate intellectual disability who were learning to use copy or debit machines, but the system preferred was the best. Taber-Doughty (2005) gave also two practical tips for teachers: pretraining should be offered before the preferred system chosen, and community instruction should begin when there are few other customers, which may have a negative impact on the students' performance. Combining picture-simulated and community-based instruction on the same day seemed to be more efficient than simulated or community-based instruction or a combination on consecutive days when teaching adolescents with moderate intellectual disability to use

functional skills (Cihak et al., 2004). Another efficient method of increasing independence in vocational tasks is a photo activity schedule book (Carson et al., 2008).

Cooking and food preparation can also be efficiently instructed with video-modeling strategies. Video-modeling and video-prompting were successful in adolescents with mild intellectual disability who were completing novel recipes (Taber-Doughty et al., 2011). In Mechling and Gustafson's (2009) study, video-prompting promoted more independence in completing cooking recipes than picture prompts, which were also efficient. Ayres and Cihak (2010) observed that video-based instruction can be useful in reiterating life skills (i.e., food preparation) taught earlier. In addition, Personal Digital Assistant (PDA) devices can be used in cooking as a self-prompting device by students with moderate intellectual disability (Mechling et al., 2010). Constant time-delay procedures were also effective for teaching adolescents with moderate intellectual disability how to prepare snacks (Bozkurt & Gursel, 2005).

Although technology can be useful in teaching various life skills, today technological skills are an important area of life skills. Hammond et al. (2010) proved video modeling was as effective for teaching use of portal technology devices to students with moderate intellectual disability. Walser et al. (2012) provided evidence that video modeling can be used to teach smartphone or other multistep fine motor tasks. Telephone calling skills can also be taught effectively with a system that involves the least prompt procedure. However, in contrast to the study, instructors might want to use peers for the answerers, limit the type of telephone used most often by the family, and consider the use of small-group settings in which students may observe each other making calls (Manley et al., 2008).

3.3 Inclusion

Fourteen articles investigated the inclusion of students with intellectual disability. Articles covered attitudes toward inclusion, the impact of inclusion, and participation in inclusive settings.

Positive attitudes influence the success of inclusion. But what factors are related to positive attitudes? Four studies examined the attitudes of children with typical development toward children with intellectual disabilities and interpreted that increased experience in engaging with students with intellectual disabilities is related to positive attitudes (Georgiadi et al., 2012; Rillotta & Nettelbeck, 2007; Siperstein et al., 2007). There were not many concrete practical recommendations in these articles, but Siperstein et al. (2007) recommended educators engage in a programmatic and systematic approach to develop positive attitudes among youth and perhaps use an Awareness of Disability training program. This program was considered efficient in Rillotta and Nettelbeck's (2007) study. In China, adolescents had negative perceptions of the competence and inclusion of students with intellectual disabilities. Thus, researchers discussed that adolescents need increased opportunities to witness the competence of students with intellectual disabilities, and inclusion in nonacademic classes might be the beginning. Adolescents were willing to interact socially with students with intellectual disabilities (Siperstein et al., 2011). Researchers also concluded that because including students with intellectual disabilities is becoming more common, academic support and flexibility are needed.

Memisevic and Hodzic (2011) examined teachers' attitudes in Bosnia and Herzegovina, which were positive but at the same time concerned. Researchers recommended additional support, such as more appropriate didactic material or consulting by special education teachers, be given to teachers. Attitudes about inclusion of students with physical disabilities were also surveyed from the perspective of students with mild intellectual disabilities (Yildirim & Guven, 2012). Researchers observed that the story completing technique used in the study was effective, and teachers could increase the social acknowledgment and sensitivity of special needs students by arranging story activities.

Four studies analyzed the participation of students with intellectual disabilities in inclusive settings and other impacts of inclusive practices. The findings were not completely positive. For meaningful engagement, the researchers recommended that school communities use a broader and more inclusive conceptualization of performance, which means that different strength-based working methods, such as pointing to pictures or acting as an option instead of writing, are accepted (Ashby, 2010). In addition to expanding the conceptualization, teachers should reflect and modify their view of particular student participation, because contextual factors influenced the participation of students with severe disabilities in inclusive settings (Carter et al., 2008). Cooney et al. (2006) reported that students with intellectual disabilities in mainstream schools experienced more stigmatized treatment than their peers in segregated schools, and therefore, schools should pay greater attention to young people's experiences. One concern regarding the negative impact of including children with intellectual disabilities in primary regular education classrooms can be alleviated, because it seemed not to be detrimental to

the academic progress of children without disabilities (Sermier Dessemontet & Bless, 2013). Studying in inclusive education was related to attending postsecondary education (Baer et al., 2011).

Only three studies examined how to implement inclusion. Morcom and MacCallum (2012) presented an example of building an inclusive classroom culture with explicit teaching of values, development of student leadership skills, and examination of their personal values. In this study, two children with intellectual disabilities attended the Educational Support Unit in the morning and returned to mainstream classrooms in the afternoon. Facilitation of social interaction of students with moderate to severe intellectual disabilities, for example, within peer support programs for promoting social interaction, was also recommended (Carter et al., 2005). These interventions should consider conversational topics that are context-appropriate and similar to those of general education students. Mortier et al. (2010) suggested that the shared expertise of teachers, specialists, and parents working as a community can be empowering and helpful for inclusion. In that study, the communities met once a month and discussed a child's school experience and what they could do to support it.

3.4 Behavior and Self-Control

Thirteen articles examined self-control and task engagement, support methods for behavior problems, and self-determination. Bierbaum et al. (2005) found that children with intellectual disabilities misbehaved more frequently when they faced difficult tasks. The researchers stated that teachers must emphasize that children with intellectual disabilities do not look different from their peers, and teachers should support task engagement when presenting difficult exercises.

Several effective methods for supporting task engagement were introduced. Use of noncontingent escape access for children with moderate to severe intellectual disabilities was effective (Cihak & Gama, 2008). Self-control may be trained by increasing the duration of the required behavior to achieve the preferred reinforcement (Passage et al., 2012). Coughlin et al. (2012) introduced a self-monitoring strategy and claimed it was efficient for decreasing the off-task behavior of children with mild intellectual disabilities. The use of picture activity schedules as in the study of Duttlinger et al. (2013) may help students with intellectual disabilities self-manage their daily tasks; creating a "to do list" with picture symbols does not require writing skills. Kim and Hupp (2007) showed that in one-on-one instruction teacher directions are related to students' active task engagement, but the researchers also discussed the negative aspects.

Other recommended methods included the adapted power card strategy for facilitating transitions (Angell et al., 2011) and literacy-based behavioral interventions and social stories for decreasing negative behaviors (Keeter & Bucholz, 2012). There was also a recommendation that although stereotyped habit behaviors are perhaps not the most worrying situations in classroom, teachers have an opportunity to help students with stereotyped habits, for example with simple intervention, which included habit reversal and a secret word that the teacher prompted when the target behavior occurred (Waller et al., 2007). It is clear that adolescents with intellectual disabilities have an increased risk of emotional and behavioral problems, and the well-known and easy-to-use Strengths and Difficulties Questionnaire (SDQ) questionnaire can be used to screen these problems in students with intellectual disabilities (Emerson, 2005).

Washington et al. (2012) emphasized the need to teach self-advocacy and self-determination skills, especially to students of color with severe disabilities, and provide support to teachers for instruction. Jones and Hensley (2012) suggested several practical strategies for improving self-determination: students must be given opportunities to make choices about their school day, and they must have access to positive role models and their schools' natural environments such as hallway and lunchtime conversations. The self-competence of students with mild intellectual disabilities can be examined with the pictorial scale; thus, the original test was intended for children aged 4-7, but it was used for children older than 8 years (Elias et al., 2005). Pepi and Alesi (2005) recommended that the development of an adaptive attributional style should be emphasized.

3.5 Communication and Social Skills

Six articles examined communication or social skills in school. For improving social skills, adolescents with intellectual disabilities can benefit from being a tutor or teacher assistant (Borisov & Reid, 2010), and for teaching how to solve social problems, the training program presented in Crites and Dunn's (2004) study may be effective. Leffert et al. (2010) suggested that interpreting intentions should be considered an important aspect of social skills assessment and intervention programs and when teaching social perception skills, teachers should base their instruction on the child's strengths and abilities and identify situations in which the child already applies the skills.

When teaching communication skills, the right level is important. In instruction planning, Browder et al. (2008) classification scheme or McLaughlin and Cascella's (2008) dynamic assessment structured sampling may be useful. When teaching social-pragmatic language skills for adolescents with moderate intellectual disabilities, a systematic approach may effective (Angell et al., 2008).

3.6 Mathematics

Six articles evaluated mathematics instruction. Several teaching methods were recommended. Technological aids, such as FlyPen (Bouck et al., 2009) and the Touch Math Technique (Calik & Kargin, 2010) were recommended for teaching basic mathematic skills for children with mild intellectual disabilities. McCallum and Schmitt (2011) suggested the taped problems intervention, which includes listening to recorded problems and answers and trying to answer faster than the recording, for increasing math fact fluency.

Task analytic instruction seems to be useful for math instruction. Browder et al. (2012) observed that students with moderate intellectual disabilities can learn middle school mathematics standards with a read-aloud of word problems, task analytic instruction, and graphic organizer, which may need to be modified for students' physical limitations. In a study by Jimenez et al. (2008), teaching algebraic education was successful for high-school students with moderate intellectual disabilities. The algebra problem was presented as a concrete problem with visual cues and concrete manipulatives, and task analytic instruction and time delay were used. These interaction components might have contributed to the outcome.

When teaching math to students with mild intellectual disabilities, student attention can increased, for example, by directing attention, indicating the important factors, strengthening resistance to distractions, and stimulating the end of the task (Djuric-Zdravkovic et al., 2011). It is also very important that school mathematics is related to everyday life (Browder et al., 2012; Djuric-Zdravkovic et al., 2011).

3.7 Transitions and Post School Outcomes

Four articles examined post school outcomes and transitions from school to adult life. In the United States, large National Longitudinal Transition Study-2 (NLTS2) survey showed that the type of curriculum (academic or functional) is not related to the post school outcomes of students with mild intellectual disabilities (Bouck & Joshi, 2012) or with moderate to severe intellectual disabilities (Bouck, 2012). Bouck and Joshi (2012) suggested focusing on transition issues and specifically areas that help students achieve post school goals. Curriculum decision making can draw from both curriculum perspectives that help students succeed in adult life (Bouck, 2012). From the parental perspective, transitions from school to adulthood were worrying, and researchers confirmed that much had to be done to aid in this situation (Davies & Beamish, 2009).

Only one study examined methods that could be used to improve post school outcomes. Mazzotti et al. (2010) suggested that computer-assisted instruction can be used to increase students' knowledge of post school outcomes and methods for improving post school success.

3.8 Curriculum and Instruction

Ten papers could not be classified in any specific category. Of these articles, three focused on assessment methods that could be used to support planning instruction, three articles gave suggestions for school work overall and four articles focused on more specific instructional methods.

Different assessment methods can also be used when designing instruction. The dynamic testing with graduated prompts technique, compared to plain IQ, gives more accurate information about the potential for learning and instruction (Bosma & Resing, 2012). For scaffolding instruction, the Skills Checklist can be used (Goldstein & Behuniak, 2012). Karvonen et al. (2007) introduced the Curriculum Indicators Survey, which can be used when evaluating access to the general curriculum for students with intellectual disabilities and help teachers design instruction.

Soukup et al. (2007) suggested that for promoting access to the general curriculum, students with intellectual disabilities should be educated with their nondisabled peers but emphasized the importance of one-on-one instruction and seating arrangements in which students were placed in the same seating pattern. Instructional rubrics, which were successfully used to develop class engagement, were suggested as an assessment tool and as a strategy that facilitates students with mild intellectual disabilities to make progress in the general curriculum (Lee & Lee, 2009). Researchers also recommended reading for specific considerations to address students' individual needs. Sit et al. (2008) suggested that school environments should be arranged in a manner that promotes physical activity.

Several instruction methods, such as video self-models for teaching concepts such as prepositions (Mechling & Hunnicutt, 2011) and simultaneous prompting for teaching object naming, in a group format or pull-in strategy in inclusive settings (Tekin-Iftar et al., 2008), and constant time delay for teaching grade-level core content (i.e., heredity) for adolescents with moderate or severe intellectual disabilities were recommended (Riggs et al., 2013). Inquiry in science lessons can also be taught to students with moderate to severe intellectual disabilities with task analytic instruction, and teachers should target the generalization of these skills (Courtade et al., 2007).

3.9 Conclusion of Findings as Implications for Practice

This conclusion is based on the implications of the sample studies. Readers should be aware that this study has not been a systematic review, appreciate the study limitations and respond with the relevant level of criticalness.

- Teachers would benefit from using scientific intervention methods that are grounded in systematic, data-based evaluation. According to our study, these methods are effective in instruction ranging from academic (e.g., reading) to functional skills (e.g., life skills) and supporting good behaviour.
- Instruction methods based on applied behaviour analysis (e.g., prompting procedures) are efficient and appropriate in instruction for various discrete and chained skills. Still, according to our sample, researchers have not determined how these procedures can be implemented in inclusive settings.
- Various technological aids (e.g., tablets, smartphones, computers, and music players) can be used successfully, for example, as self-operated prompting systems or for simulated instruction when community-based instruction is not possible.
- There are various ways to use prompting systems such as pictures, videos, and voice recordings, and all seemed to be effective. Optional prompting systems can be offered, because the students' preferred systems may be the most efficient. Teachers may consider instructing students to make their own prompting systems, because this skill may be viable in independent living.
- The frequency of social interactions between students with intellectual disabilities and those with typical development should be increased, because increased experiences are related to positive attitudes. Students with typical development have the opportunity to acknowledge the competence of their peers with intellectual disabilities. Teachers can promote the development of positive attitudes by ensuring that students with typical development have the opportunity to acknowledge the competence of their peers with intellectual disabilities and explicitly instruct values and social interaction.
- Instruction should be based on students' strengths. An appropriate method for assessing the correct level on which to base instruction is the use of standardized assessment methods, which are extremely important in communication and social skills instruction.
- Preventing problems is typically better and more positive than treating them. In practice, for example, preventing behaviour problems could mean supporting task engagement.
- Teachers should ensure that their standards are not too low. For example, reading expectations for students with moderate intellectual disabilities should be raised.

4. Discussion

This study was conducted to offer an overview of the topics and practical implications of the recommendations of current intellectual disability-related educational research. The final sample contained 87 articles, the practical implications of which have been recognized, classified, synthesized, and evaluated. Implications have been presented within subject-based categories. The findings were concluded as implications for practice of this study. Next, a discussion of several critical questions is presented.

Although this article was not systematic review and the purpose of this article is not to discuss the situation of intellectual disability-related educational research, it seems that applied behavioural analysis based methods are popular in contemporary research. The popularity of applied behavioural analysis-based methods in contemporary research raises various questions. For example, simultaneous and delayed prompting procedures were provided efficiently and appropriately in several meta-analyses and reviews in the 1980s (Handen & Zane, 1987; Morse & Schuster, 2004; Schuster et al., 1998). The popularity would be understandable if new studies had significant new perspectives, such as developing methods for implementing these procedures in inclusive settings; however, based on the sample of this study, this was not the case. This study, which was full of small interventions, tested whether the prompting procedures were effective in teaching various discrete or chained tasks, usually cooking-related. Is it necessary to examine if these procedures are effective in teaching every

possible type of situation? In practice, the viability of these methods has been confirmed (Kontu & Pirttimaa, 2010).

This research was based on the assumption that knowledge of special educational research would help teachers in inclusive environments. Although only a minority of the studies in this sample addressed teaching in inclusive environments, the findings are still useful because the principles of efficient teaching in segregated environments can be used in inclusive environments. Findings could be more credible if the research field, which supports inclusion quite widely, conducted studies that consider efficient intervention methods in inclusive environments. However, research on some topics, for example, the development of mathematical reasoning, could be justifiable in "undisturbed", segregated environments for validity.

As Timmons (2013) stated, the ultimate goal of research is improving the lives of people with disabilities. Could the considerations of the practical significance of research results be further developed? Teachers do not consider the findings of research concerning inclusive pedagogy relevant (Rix et al., 2009), so it seems that there is room for development. The same can be observed in the findings of this study. Many of the recommendations were composed of superficial conclusions, for example, that pupils' individuality must be considered, working as a community should be improved, or that instruction should be clear and motivating. These principles are familiar to every teacher, but the question of how these principles could be implemented still remains.

There were several limitations of our study that, though they can be accepted, should be taken into consideration. Although the amount of data was very large, the search procedure was evaluated and deemed appropriate by the information specialist. Furthermore, the inclusion criteria were clear and the exclusion of articles was evaluated by other authors. It is impossible to create fully generalizable interpretations of the state of educational research on intellectual disabilities in its entirety; the base population is so nebulous that a sampling method reaching every study on this topic cannot be developed. Therefore, articles that were not included in ERIC or filed under accurate thesaurus words remained outside the sample. In addition, some parts of the selection criteria included the possibility of making interpretations, but other authors were involved in the selection of different articles. If explicit criteria had been used, more studies would have been excluded, and thus, this study would not have been as extensive and the richness of the field would not have been represented in the overview.

The limitations in sampling procedures and the flexibility of selection criteria resulted in some studies being left outside of our sample. These potential flaws are commonly accepted in quantitative research, so it logically follows that the same acceptance should hold true when the articles are used as a research subject. We do not consider this effect strong enough to significantly affect the validity of this study, because the sample was carefully collected. If a particular article was not selected for our study, its exclusion does not affect the validity of the implications derived from other studies that were included. If fully rigorous and explicit selection criteria were applied, more studies would have had to be excluded, resulting in a malignant effect to the purpose of the study. We argue that the concept of teaching is so broad that defining it strictly causes us to lose more than we achieve.

We know the topic of this study is wider than usual and a narrower focus would have allowed a more rigorous and critical in-depth review. Additionally, systematic reviews have been critiqued for phrasing questions too narrowly (MacLure, 2005). We propose that by broadening the requirements of rigor and focusing on implications, we have been able to offer a broad overall picture of this research area. Sometimes you have to go far to see closer.

In qualitative research, it is important to demonstrate how the effect of bias was minimized. In this study, two authors compared the articles with the inclusion criteria, and the inclusion criteria were developed in collaboration. Another good indication of minimized bias is the change in the authors' opinions. At the beginning of the study, the purpose was to seek recommendations for practice that could help teachers instructing students with intellectual disabilities. The first minor disappointment was discovering that it is not a common practice to provide practical implications; the second minor disappointment was that even when practical suggestions existed, the quality was often low. However, there were also many innovative and carefully considered recommendations; thus, this study was certainly worth conducting. This unique study has many strengths, including a large amount of information and the provision of a specific, practice-oriented point of view.

There are also several implications for researchers. This method could be used in many other areas of educational research. It would also be helpful to establish the same sampling procedure in other databases and languages. In addition, it would be valuable to conduct a rigorous analysis of trends in educational research on intellectual disabilities. Practical recommendations should be examined with a discourse analysis. Perhaps the

most important implication of this study is, as stated before, that the quality of practical suggestions, especially in an applied discipline such as special education, must be improved. Instead of what should be developed, recommendations could focus more on how these developments could be implemented. A good illustration of compelling and explicit implications for the practice can be found in the paper of Cobb et al. (2006). Further research should focus on how inclusive education can be arranged, including a study of the usability of intervention methods in inclusive settings. These improvements could help fill the gap between research and practice.

Finally, we want to emphasize that the perspective of this study provided only a narrow view of the importance of research. It is valuable to have diverse perspectives in research. Some papers were practice-oriented and some papers are oriented in other ways. Research without any explicit practical recommendations can also be advantageous and help students with intellectual disabilities to succeed, perhaps not directly but on a higher level.

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