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Characteristics of primary teacher training programmes on inclusion: a literature focus

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Background: The implementation of inclusive education creates challenges for classroom teachers who have to meet the learning needs of students with and without special educational needs (SEN). Research has revealed that teachers' readiness and willingness to accommodate the learning needs of students with SEN was determined by their training. Though much research on teacher training and inclusive education has been conducted over two decades, less is known about the adequacy of such training in terms of components and effectiveness.

Purpose: The purpose of this review is to present a focused analysis of: (1) studies that examined, in detail, the components of teacher training programmes for pre-service or in-service teachers in regular primary schools in terms of content, length, etc., and (2) consideration of the effectiveness of these training programmes.

Design and methods: The literature review was restricted to empirical studies published in international peer-reviewed journals after 1994 (i.e. since the Salamanca statement was signed) by using the electronic browser 'EBSCO host Complete'. After applying the keywords 'teacher' and 'educator', they were combined with the following terms: training, disabilities, inclusion, inclusive education, impairment, special educational needs, children with special needs and disorder. The search was deliberately restricted to papers where study participants were pre-service or in-service teachers in regular primary schools, and ultimately yielded a small core of 13 studies for detailed review. The first research question was analysed in terms of the training programme's structure and content, covering aspects such as type of disability, topic, length, medium of course delivery and learning activities. For the second research question, the effectiveness of the quantitative studies was evaluated based on the Cohen's *d* effect size, whereas the qualitative studies were considered as effective based on the calculation of percentage of non-overlapping data (PND).

Conclusions: Analysis indicated that the majority of training programmes focused on attitude, knowledge and skills. The training programmes were also centred on what might be considered short-term practice and supplemented with field experiences. Although the training programmes appeared to have positive effects on teachers' attitudes, knowledge and skills, follow-up sessions and students' outcomes measures may increase training effectiveness.

Keywords: teacher training programme; primary school; inclusive education; literature review

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Introduction

Approaches to the education of students with a range of learning needs (often called special educational needs, SEN) have changed dramatically over the past two decades (e.g. UNESCO 1994; United Nations 2006). Many countries all over the world have adopted policies that foster the inclusion of these students into regular classrooms (Vislie 2003). As a result, a growing number of students with SEN have been educated in regular school environments (Forlin and Chambers 2011; McLeskey and Waldron 2011). Within an inclusive perspective on teaching, students with SEN are not only physically integrated, but also socially, culturally and emotionally integrated (Moen, Nilssen, and Weidemann 2007). The concept of inclusion thereby becomes part of a broad human rights agenda that values the education of students with SEN in regular education systems, as stated in the UN Convention on the Rights of Persons with Disabilities (2006) and the UNESCO Salamanca Statement (1994).

It is widely agreed that the co-operation and commitment of those directly involved, particularly teachers, is very important for successful implementation of inclusive education (Hegarty 1994; Meijer 2003; Forlin 2010). Teachers play a decisive role in the inclusive context (Jerlinder, Danermark, and Grill 2010). In some countries, by law, teachers are required to provide the necessary and appropriate services to ensure successful outcomes for students with SEN (Patterson 2005). Teachers are in charge of implementing and facilitating any innovation at the classroom level (Florian and Spratt 2013). In line with this, Hegarty (1994) has argued that teachers might influence the students in their classes, as well as their colleagues and the parents of their children. They may also act as facilitators and managers of educational environments (Morley, Bailey, Tan, and Cooke 2005; Block and Obrusnikova 2007). Taken together, these suggest that teachers are responsible for ensuring the success of all their students, including those with SEN.

The implementation of inclusive education creates challenges for classroom teachers who have to meet the learning needs of students with and without SEN. The classrooms, therefore, have to be transformed in ways that increase their capacity to accommodate every child irrespective of their need and ensure that all learners belong to a school community (Avramidis, Bayliss, and Burden 2000). Implementation of this school reform requires teachers to acquire new skills, behaviours and beliefs (Bransford, Darling-Hammond, and LePage 2005). However, results of research on teachers working in inclusive settings have demonstrated that they have serious reservations about including students with SEN in their classrooms (Ring and Travers 2005; Pijl 2010). Teachers vary significantly in their ability or willingness to make adaptations (McLeskey and Waldron 2002). In their study, McLeskey and Waldron (2002) revealed that while some teachers stressed the importance of curricular and instructional adaptations, other teachers reported continuing difficulties in making all of the necessary adaptations in order to meet the needs of such students. Moreover, teachers also strongly expressed a need for more information, knowledge and expertise to support their attempts to include students with SEN into inclusive classrooms (De Boer, Pijl, and Minnaert 2011; Subhan and Sharma 2005). It has been argued that when teachers gain the extensive professional knowledge needed to implement inclusive programmes, they may support the inclusion of students with SEN (Avramidis, Bayliss, and Burden 2000; Winter 2006).

Research on inclusive education suggests that one of the greatest barriers to effectively implementing inclusion is that many teachers feel that they are inadequately trained to provide quality services to students with SEN (e.g. Avramidis, Bayliss, and

Burden 2000; Pijl 2010). The movement toward inclusive education, therefore, has challenged teacher preparation programmes to better prepare teachers for dealing with students with SEN as well as other students in classrooms. In many educational systems, teacher training programmes are now required to produce graduates who are able to respond to diverse student populations in their mainstream classes (Rouse 2010). There has been debate and discussion about which components should be addressed in teacher training programmes (Florian 2009; Harriott 2004; Rouse 2010), such as the development of behaviour management skills; the construction of effective learning experiences and the management of inclusive curricula for all students, and an understanding of teaching theories, disability characteristics, attitudes towards students with SEN and the legal and ethical issues involved in inclusive education.

Though research on teacher training programmes and inclusive education has been conducted over two decades, no consensus has been reached about how programmes can best prepare teachers to be inclusive teachers (Kim 2011). Because teacher training programmes are prepared for, and conducted in many ways (Causton-Theoharis, Theoharis, and Trezek 2008; Kim 2011), it is important to consider what such training programmes actually consist of, and in what ways they may be considered 'effective'.

The aim of this study, therefore, was to examine literature focusing on teacher training programmes for the inclusion of students with SEN in regular primary education. The following research questions were addressed: (1) What are the components of available teacher training programmes on the inclusion of students with SEN in regular primary education? (2) What was considered to be the 'effectiveness' of these teacher training programmes?

Methods

Search procedure

This review study aimed to review recent empirical studies published in international peer-reviewed journals after 1994 (i.e. since the Salamanca statement (UNESCO 1994) was signed). The electronic browser 'EBSCO host Complete' was used to search for relevant articles, which includes about 30 databases among which ERIC, MEDLINE, Psych ARTICLES, Psych INFO and Soc INDEX.

A number of keywords were used to search for relevant literature. The terms 'teacher' and 'educator' were combined with the following terms: training, disabilities, inclusion, inclusive education, impairment, special educational needs, children with special needs and disorder. The combinations of those keywords were used to search in both abstracts and titles, resulting in 2077 references.

Selection procedure

In order to answer the first research question, each study had to meet the following criteria:

- (1) Study participants were either pre-service or in-service teachers in regular primary schools.
- (2) The study was focused on teacher training programmes in inclusion or inclusive education.

After reading the title and/or abstract and applying the selection criteria, 2048 references were discounted because they were clearly irrelevant to the current review. These studies did not satisfy the inclusion criteria for a number of reasons (see details in Table 1): for example, they involved participants (i.e. pre-service teachers, in-service teachers) of special school settings (914) rather than regular school settings; they did not focus on teacher training programmes (406). Twenty-nine references were retained and became subject to further analysis. Four of these references were untraceable, resulting in a database of 25 studies. After carefully reading these 25 studies, 10 were excluded because they did not meet the selection criteria: they did not focus on teacher training programmes (two studies); they focused on special education teachers (four studies), school counsellors (one study) and high school teachers (one study); or they included participants from different levels of school settings, so we could not split up the results (two studies).

One criterion was applied to the remaining 15 studies to address the second research question about ‘effectiveness’: the study must consist of a pre- and post-test design. Two studies did not meet this criterion, so 13 studies were reviewed for this research. These formed a small core of studies for detailed further analysis.

Study analysis

To investigate the first research question, we analysed the studies in terms of the training programme’s structure and content, covering aspects such as type of disability, topic, length, medium of course delivery and learning activities. Several studies involved *both* regular education teachers and those with other qualifications (e.g. special education teachers). In those cases, this review only reported the findings related to regular education teachers. This also applied to studies that included teachers from both primary schools and other educational levels (e.g. middle or secondary schools). In line with our research questions, we only reported findings related to primary school teachers.

In order to investigate the second research question, it was necessary to consider the concept and meanings associated with ‘effectiveness’. Effectiveness of teacher training programmes in the field of special education/inclusive education could be measured in different ways, such as by student outcomes (e.g. Browder et al. 2012), attitude change (e.g. Chong, Forlin, and Au 2007), knowledge and skills improvement (e.g. Chandler

Table 1. Reasons for rejection of the studies not included in the analysis.

No	Reasons	Numbers
1	Involved participants (i.e. in-service teachers, pre-service teachers) of special school settings	914
2	Did not focus on teacher training programme in inclusion or inclusive education	406
	(a) Focused on the development or preparation of teacher training programme	141
	(b) Focused on the effectiveness of specific instructional programme or curriculum change	340
	(c) Included the implementation of inclusive education at certain region	97
	(d) Focused on the policy or legislation of inclusive education	110
	(e) Suggested the importance of teacher and parent partnership and teacher collaboration in inclusive education	40
	Total rejected	2048

2000), teachers' concerns (e.g. Forlin, Keen, and Barrett 2008) or teachers' self efficacy (e.g. Lancaster and Bain 2010). This current study focused on the effectiveness of teacher training programmes in changing teachers' attitudes, knowledge and skills in relation to the inclusion of students with SEN in regular education. The effectiveness of the quantitative studies was evaluated based on the Cohen's *d* effect size (Cohen 1988). An effect size represents study findings in the form of standardised mean differences between two groups (Lipsey and Wilson 2001). Effect size is particularly valuable for quantifying the effectiveness of a particular intervention. To calculate the effect size, we recorded statistical data from each study, including mean scores and standard deviations. When a study had several mean scores and standard deviations, they were averaged and the averages were used to calculate the effect size (Bernard et al. 2004). The guidelines for interpreting effect sizes were $ES = 0.2$ (small effect), $ES = 0.5$ (medium effect) and $ES = 0.8$ (large effect) (Cohen 1988). For studies with follow-up data, effect sizes were calculated by comparing the follow-up phase to the baseline phase.

The effectiveness of the qualitative studies was analysed based on percentage of non-overlapping data (PND) (Scruggs, Mastropieri, and Casto 1987). To interpret PND, we used criteria as outlined by Scruggs, Mastropieri, Cook, and Escobar (1986): PND < 50% (ineffective); PND 50–70% (minimally/questionable effective); PND 70–90% (moderately/fairly effective); PND > 90% (highly effective). A similar method was also applied to measure students' outcomes.

Results

The first part of the results section reports on the first research question: it provides an overview of the studies (Table 2) and describes their components. The second part of the results section reports on the second research question: an overview of the effect sizes of each quantitative study is summarised in Table 3a whereas the outcome of qualitative studies is presented in Table 3b.

Three main categories were assessed to answer the research questions: attitude, knowledge and skills. Attitude has been described as 'an individual's viewpoint or disposition toward a particular "object" (a person, a thing, an idea, etc.)' (Gall, Borg, and Gall 1996 273). Attitudes are considered to have three components: (1) cognitive, (2) affective and (3) behavioural (Eagly and Chaiken 1993). The cognitive component consists of an individual's beliefs or knowledge about the attitude object, the affective component refers to feelings about the attitude object, while the behavioural component reflects someone's predisposition to act toward the attitude object in a particular way. In this study, the attitude object was students with SEN and inclusive education. Knowledge refers to descriptive knowledge and procedural knowledge (Anderson 1981). Descriptive or declarative knowledge describes how things are, including its process, attributes and relations between things whereas procedural knowledge relates to how to perform or operate things. In the context of inclusive education, descriptive knowledge covers knowledge about students with SEN, such as characteristics, causes and prevalence. Procedural knowledge relates to teaching strategies that are associated with successful inclusion, including differentiated instruction; cooperative learning strategies; peer support, activity-based learning and classroom management strategies (Florian 2009; van Tartwijk and Hammerness 2011). Meanwhile, skills refer to the ability to use or integrate knowledge about teaching strategies into practice.

Table 2. Overview of components of teacher training programmes in the selected studies ($N = 13$).

Author(s)	N	Target groups*	Type of disability	Content†			Length	Delivery mode/ activities‡
				A	K	S		
Allday et al. (2012)	3	IST	Emotional/ Behavioural Disabilities			X	30–40 minutes training with performance feedback given every 3 days via email	Coursework and intervention activities
Carroll, Forlin, and Jobling (2003)	220	PST	All categories of students with SEN	X			10-week course involving a 1-hour lecture and a 2-hour small group tutorial per week (a total of 30 hours)	Coursework and field-experience
Edwards, Carr, and Siegel (2006)	13 & 19	PST, IST	All categories of students with SEN	X	X		One day (group of student teachers) and two days (group of elementary teachers) (a total of 7–14 hours)	Coursework
Gürsel (2007)	81	PST	Physical disabilities	X			14-week course (a total of 42 hours)	Coursework and field-experience
Leblanc, Richardson, and Burns (2009)	105	PST	Autistic Spectrum Disorder (ASD)	X	X		A total of 200 minutes	Coursework
Lieberman and Wilson (2005)	27	PST	Visual impairment and deaf-blindness	X			A one-week sports camp practicum (a total of 56 hours)	Coursework and field-experience
Male (2011)	48	PST	All categories of students with SEN	X			A 10-week course (a total of at least 40 hours)	Coursework
Miller, Wienke and Savage (2000)	64	IST	All categories of students with SEN		X		Ten 2.5-hour weekly seminars (a total of 25 hours)	Coursework
Rae et al. (2011)	19	IST	Intellectual disability		X		A half-day training session (less than 5 hours)	Coursework
Renshaw et al. (2008)	3	IST	Behavioural and attention problems		X		Four 1-hour group training sessions over a 10-week period, two private individual consultation sessions lasting 5–15 minutes (a total of 12 weeks)	Coursework and intervention activities
Sari (2007)	112	IST			X			Coursework

(Continued)

Table 2. (Continued).

Author(s)	N	Target groups*	Type of disability	Content† A K S	Length	Delivery mode/ activities‡
			Hearing impairments		21 hours over eight days, one day each week	
Sharma, Forlin, and Loreman (2008)	603	Five groups of PST	All categories of students with SEN	X	A total of at least 20 hours	Coursework
Wolery and Anthony (1997)	3	IST	All categories of students with SEN		X One 30–45-minute individual training session and verbal feedback on implementation for five days	Coursework and intervention activities

Notes: *IST = in-service teachers; PST = pre-service teachers.

†Content: A = attitude, K = knowledge, S = skills.

‡Coursework includes lecture, discussion, tutorial, workshop etc.

As stated earlier, the effectiveness of quantitative studies was evaluated based on the effect size. For the qualitative studies, the training was considered effective if there was a substantial change in the intervention compared to the baseline measurement.

The components of the teacher training programmes

In the 13 papers under investigation, training programme components were described in terms of content, target groups, type of disability, length and delivery mode.

The content of four studies focused on inclusion in relation to changing participants' attitudes. Other studies aimed at improving teachers' knowledge (four studies) and skills (two studies) related to students with SEN and teaching strategies. Two studies measured the effects of teacher training programmes on a combination of attitude and knowledge. The final study was devoted to examining changes in attitudes, sentiments and concerns towards the inclusion of students with SEN.

The target groups involved in the reviewed studies were pre-service teacher groups, in-service teacher groups or combinations of both groups. Six out of 13 studies examined pre-service training, while another six looked at in-service programmes. The study by Edwards, Carr and Siegel (2006) involved both pre- and in-service teachers. In addition, a range of providers was involved in delivering teacher training programmes: universities were the largest, followed by government and researchers themselves.

Seven out of 13 studies specified the type of pupil learning need in the training content: three involved students with behavioural, emotional and attention problems, and four included communication, physical, visual, intellectual or hearing impairments. The other six studies addressed all categories of need.

Table 3a. Overview of outcomes of teacher training programmes in the quantitative studies ($N=10$).

Author(s)	Target Groups*	Knowledge†									
		Attitude			SEN			TS			Skills
		Pre-test‡	Post-test‡	Effect size§	Pre-test‡	Post-test‡	Effect size§	Pre-test‡	Post-test‡	Effect size§	
Carroll, Forlin, and Jobling (2003)	PST	2.94 (0.42)	3.12 (0.41)	0.43							
Edwards, Carr, and Siegel (2006)	IST	4.45 (0.57)	4.43 (0.52)	-0.04							
	PST	4.49 (0.45)	4.63 (0.42)	0.32							
Gürsel (2007)	PST	56.5 (12.9)	61.3 (13.6)	0.36				3.60 (0.85)	3.87 (0.58)	0.37	
Leblanc, Richardson, and Burns (2009)	PST	5.3 (1.6)	6.9 (1.6)	1	3.85 (2.1)	6.36 (2.75)	1.03	3.50 (0.68)	4.11 (0.40)	1.09	
Lieberman and Wilson (2005)	PST	2.78 (0.94)	1.60 (0.57)	-1.52				0.40 (0.81)	1.49 (1.37)	0.97	
Male (2011)	PST	4.23 (0.86)	4.86 (0.78)	0.77							
Miller, Wienke, and Savage (2000)	IST										
Rae et al. (2011)	IST				0.3 (0.16)	2.29 (1.04)	2.67	3.81 (0.86)	4.16 (0.75)	0.43	
Sari (2007)	IST							33.20 (9.07)	59.03 (11.68)	2.47	
Sharma, Forlin, and Loreman (2008)	PST1	4.13 (0.62)	4.60 (0.62)	0.76							
	PST2	4.16 (0.68)	5.04 (0.68)	1.29							
	PST3	4.57 (0.65)	4.85 (0.65)	0.43							
	PST4	3.53 (0.53)	3.97 (0.53)	0.83							
	PST5	3.59 (0.59)	3.62 (0.59)	0.05							

Notes: *IST = in-service teachers; PST = pre-service teachers; PST1 = 1st group of pre-service teacher; PST2 = 2nd group of pre-service teacher; PST3 = 3rd group of pre-service teacher; PST4 = 4th group of pre-service teacher; PST5 = 5th group of pre-service teacher.

†SEN = knowledge about students with SEN; TS = knowledge about teaching strategies.

‡Pre- and post-test scores are presented in Mean (SD).

§Effect sizes are expressed in d indexes (Cohen, 1998): 0.2 = small effect; 0.5 = medium effect; 0.8 = large effect.

The effect was reported in line with the authors: negative scores indicate increased, positive outcomes.

Table 3b. Overview of outcomes of teacher training programmes in the qualitative studies ($N = 3$).

Author(s)	Teachers' outcomes*			Students' outcomes
	Attitude	Knowledge	Skill	
Allday et al. (2012)			Voice recording data revealed that the training increased all participants' BSP† praise by 83–100%	Observation data revealed that the training increased the on-task behaviour of all participating students with or at risk for emotional/behavioural disabilities (EBD) by 11–100%.
Renshaw et al. (2008)		Knowledge test data revealed that the training improved teachers' knowledge by 100%		Observation data revealed that all students made positive gains by 17–100%
Wolery and Anthony (1997)			N/A	N/A

Notes: *Effectiveness of the training was expressed in PND criteria (Scruggs et al. 1986): < 50% = ineffective; 50–70% = minimally/questionable effective; 70–90% = moderately/fairly effective; > 90% = highly effective. †Behaviour-specific praise (BSP) is defined as ‘providing students with praise statements that explicitly describe the behavior being praised’ (Allday et al. 2012 87).

Most programmes were at least 20 hours long. The majority of studies used the stand-alone unit, and others were infused programmes. The infused programmes embedded modification of the curriculum for students with SEN within and across all curricular areas (Loreman, Forlin, and Sharma 2007). However, the study by Sharma, Forlin, and Loreman (2008) compared the effect of training programmes in terms of these two different training approaches. This review classified the mode of course delivery into coursework and field experience: seven studies delivered the training content through coursework and the other six used a combination of coursework and field experiences. Two of the 13 studies involved follow-up activities in order to monitor the implementation (Wolery and Anthony 1997) and to request feedback on impact (Rae, McKenzie, and Murray 2011), while the other studies had no information about this.

The effectiveness of the teacher training programmes

Consideration of ‘effectiveness’ in the 10 quantitative studies

The effectiveness of these studies was evaluated by the effect size (Cohen 1988). The distribution of the effect sizes is presented in Table 3a, in which the effect sizes ranged from –0.04 to 2.67. The medians of attitudes’ and knowledge’ effect sizes were 0.60 and 1.03, respectively.

Seven studies measured the attitude content. Two studies (Leblanc, Richardson, and Burns 2009; Lieberman and Wilson 2005) identified a large effect size ($ES \geq 1$), whereas another one (Male 2011) had a medium effect size ($ES = 0.77$) and two others (Carroll, Forlin, and Jobling 2003; Gürsel 2007) present small effect sizes (between 0.2 and 0.5). Edwards, Carr, and Siegel (2006) reported different effect sizes for two groups

of participants: a group of pre-service teachers had a higher effect size ($ES = 0.32$) than in-service teachers ($ES = -0.04$). The study conducted by Sharma, Forlin, and Loreman (2008), which involved five groups of participants, found effect sizes between 0 and 1. In sum, the mean effect size of the attitude was 0.64, suggesting that the training had medium positive effects in changing the attitude of teachers towards the inclusion of students with SEN in regular primary schools.

Out of 10 studies, five measured the knowledge content. Two studies (Rae, McKenzie, and Murray 2011; Sari 2007) showed large effect sizes (more than 1) whereas Miller, Wienke, and Savage (2000) reported an effect size of 0.43. One other study, conducted by Edwards, Carr, and Siegel (2006), indicated effect sizes of 1.09 for a group of pre-service teachers and 0.37 for a group of in-service teachers. In their study, Leblanc, Richardson, and Burns (2009) demonstrated effect sizes of 1.03 for knowledge about SEN and 0.97 for knowledge about teaching strategies. In addition, the study conducted by Sharma, Forlin, and Loreman (2008) reported the effect sizes of different training contents, namely 'sentiment' (ES of -1.01 to 0) and 'concern' (ES of -1.71 to -0.07). Since this study measured the sentiment and concern in a negative way, the negative effect sizes indicated increased and positive training outcomes. Besides pre- and post-tests, one study also carried out a follow-up test (Rae, McKenzie, and Murray 2011). This study reported a large effect size ($ES = 0.86$) on pre-test and follow-up test data. To sum up, the effect size mean of 1.29 on the knowledge content suggested that training contributed large positive effects to teachers' knowledge about SEN and teaching strategies.

Consideration of 'effectiveness' in the three qualitative studies

All three qualitative studies examined the effects of training about behavioural management strategies (e.g. function-based support, behaviour-specific praise (BSP)) and instructional strategies on teachers' knowledge and skills in educating students with SEN (Table 3b). However, the effectiveness of a study by Wollery and Anthony (1997) could not be assessed in this regard.

The findings revealed that training was thought moderately to highly effective in increasing teachers' knowledge and skills. In addition, findings suggested that training increased students' performance in terms of on-task behaviours (Allday et al. 2012) and a decrease in students' behavioural problems (Renshaw et al. 2008). However, none of the studies reported the effect that training had on attitudinal change.

Discussion

Researchers have recognised the importance of teachers in effectively implementing inclusive education (Forlin and Lian 2008; Avramidis and Norwich 2002). Teachers' readiness and willingness to accommodate the learning needs of students with SEN was determined by their training (Arthur-Kelly et al. 2013; Avramidis, Bayliss, and Burden 2000). However, there is a concern about the adequacy of such training in terms of the programme components and the effectiveness of training. This current study aimed to address both aspects by: (1) presenting a small core of 13 studies, which examined the components of teacher training programmes on inclusion for regular primary in-service/pre-service teachers in terms of content, length, etc., and (2) considering the effectiveness of the training.

With regard to the first aim, the findings revealed that the majority of the reviewed studies had a number of common characteristics. First, the studies were performed on what might be considered relatively short-term training (a total training time between 200 minutes and 56 hours). Second, the field experiences were provided to participants. Third, most studies focused on attitude, knowledge and skills. In terms of the second aim, the analyses of effect size suggested that the majority of quantitative studies appeared to have positive effects on participants. Similar findings were also indicated by the qualitative studies.

Changing attitude, knowledge, skills and combinations of these topics were a focus in the majority of reviewed studies. As previous studies showed that the majority of teachers held a neutral attitude and had limited knowledge and skills in dealing with students with SEN (Rose 2001; De Boer, Pijl, and Minnaert 2011), these training topics appear to be relevant to increasing teachers' capability and willingness to educate students with SEN in inclusive settings. Moreover, several authors argued that attitude, knowledge and skills as prerequisites for inclusive teachers (Cook 2002; Forlin 2010; Loreman, Sharma, and Earle 2007). However, for teachers benefitting from the training, it was argued that such training should be carefully planned and well structured (Desimone 2009); this is a point that, we suggest, should be emphasised in teacher training programmes.

Several studies used field experiences whereby participants had direct and systematic contact with students with SEN. Although other studies employed coursework as the main medium of course delivery, further analysis revealed that other special need-related learning activities (e.g. school visits, guest lectures by people with SEN) were also provided. Therefore, participants also had opportunities to make contact with students with SEN. These experiences might reduce teachers' concerns and improve their attitudes towards inclusion, as indicated by previous research (e.g. Richards and Clough 2004; Winter 2006). These kinds of experiences might also increase participants' knowledge and skills, since they provide the learning opportunities that are necessary for teachers to integrate new knowledge into practice (Brunero, Lamont, and Coates 2010). A number of researchers (Birman et al. 2000; Garet et al. 2001) have echoed how important it is that teacher preparation programmes provide teachers with rich content and opportunities to practise what they are learning. These findings are also consistent with the theory on the formation of attitudes that states that attitudes are created by direct experience (Eagly and Chaiken 1993). The results also showed that in the quantitative studies, the effect size mean of 'knowledge' (mean ES = 1.29) was found to be higher than 'attitude' (mean ES = 0.64). As most studies were more information-based courses, this outcome is not surprising. Results of other studies also demonstrated that information-based courses are more likely to lead to changes in knowledge (Tait and Purdie 2000). Another possible explanation for this outcome is that attitudinal change needs a more structured programme, since attitudes are likely to be resistant to change (Campbell, Gilmore, and Cuskelly 2003; Ajzen 2005). Hence, it may be the case that such training programmes are less effective in terms of attitudinal change.

Training programmes focused on specific types of need or impairment had greater effect sizes (Leblanc, Richardson, and Burns 2009; Lieberman and Wilson 2005; Rae, McKenzie, and Murray 2011; Sari 2007) than training programmes that addressed all categories of need or impairment. This result partially supports Cohen and Hill (2000) and Desimone et al. (2002), who showed that training focused on specific teaching strategies, materials and assessments associated with particular curricula was far more effective in promoting change in teachers' practice than training addressed to regular

teaching strategies. When teachers might be confronted with difficult classroom experiences with students with a growing range of behavioural and learning difficulties, it seems logical to conclude that such training is very helpful for teachers. Hence, such teachers are more supportive towards the inclusion of students with SEN.

Research suggests that more effective teacher training programmes need to be long-term and provide direct support as teachers implement instruction (e.g. Yoon et al. 2007). Long-term training and follow-up sessions might ensure that teachers sustain changes in practice. In this review, the majority of quantitative studies looked at what were considered to be relatively short-term practice sessions (between 200 minutes and 56 hours) and only two studies included follow-up sessions (Rae, McKenzie, and Murray 2011; Wolery and Anthony 1997). Further analysis, however, indicated that follow-up sessions without adequate feedback or supported practice sessions resulted in a significant decrease in participants' knowledge, compared to knowledge levels measured immediately after training (Rae, McKenzie, and Murray 2011). This finding might indicate a loss of knowledge over time, suggesting that positive changes arising from the training may only be temporary. From these data it can be concluded that a combination of long-term training and follow-up with adequate supports may increase the effectiveness of in-service training sessions. Similarly, more recent studies state that ongoing coaching and technical assistance are imperative to support teachers' use of best teaching practices in applied settings after the training is carried out (Fixsen et al. 2013; Odom, Cox, and Brock 2013).

Although student outcome has been proposed as one indicator of training effectiveness (Browder et al. 2012; Crosskey and Vance 2011; Fishman et al. 2003), only three of the reviewed studies examined the impact of training on student achievement. This lack of evidence about how teacher learning affects student achievement has already been identified by researchers (e.g. Desimone et al. 2002; Fishman et al. 2003). For example, Yoon et al. (2007) reported that of the 1300 studies on teachers' professional development they examined, only nine studies demonstrated the impact of teacher training programmes on students' achievement. In order to understand the effectiveness of training programmes on teachers, future research should also examine the students' outcomes.

We calculated the effectiveness of the training based on pre- and post-training data. Before training, the majority of studies showed that participants tended to have positive attitudes towards SEN. Their knowledge and skills about SEN were low and medium, respectively. After training, the scores became more positive for all contents. A possible explanation for this outcome might be related to the participants' characteristics. As the majority of the participants were pre-service teachers enrolling in a special and inclusive educational programme, they might have a particular interest in this field. Consequently, they may have already held a more positive attitude towards inclusion before the training and be more open to attitudinal shift during the training. In a similar vein, previous findings demonstrated that a compulsory university course was more likely to result in a significant attitude change among student teachers (e.g. Chong et al. 2007).

While it seems that university training positively impacted pre-service teachers' attitudes, Edwards, Carr, and Siegel (2006) found a different result for the in-service teachers they studied. Interestingly, those teachers' attitudes were less positive after the training. It seems reasonable to argue that as teachers' knowledge and skills increased, they were more aware of the classroom challenges that may be created by SEN and more concerned about the type of support required to assist such students in the regular classroom. From this point of view, it seems likely that more experienced teachers may

need a different approach during their teacher training in order to become more positive toward inclusion.

The present study has a number of limitations, which suggest a need for caution in interpreting the results. The first is that the majority of the reviewed studies used self-reported scales whereby the participants were asked to indicate their level of agreement on attitude and knowledge items. This means that the expression reflected perceptions of teachers about their attitudes and knowledge what may not necessarily correspond with their behaviour. For example, participants may have given answers that they felt to be politically and socially 'correct'. They might also have possessed more or less knowledge than they realised in practice. Future research should include another measure of empirical evidence, such as observation, which was used in the reviewed qualitative studies.

Second, the reviewed studies differed in, for example, target groups, type of need or impairment, and delivery mode/activities. Moreover, the studies were also conducted in different countries, which may have different educational policies and types of training programmes. Although this makes comparison difficult and may limit the generalisation of the findings, the calculation of effect size might help to assess and identify the critical features of effective teacher training programmes.

Third, the effectiveness of the reviewed studies was assessed in terms of changing teachers' attitudes towards inclusive education and their knowledge and skills about SEN. Although the outcomes showed statistically significant improvement on teachers' attitude, the effectiveness of training programmes at practice level is still unknown. As it has been argued that the concept of effectiveness can be interpreted and measured in different ways, any conclusions drawn about the effectiveness of training programmes examined in this current study cannot be conclusive. We underline the importance of using different perspectives in the examination of the effectiveness of training programmes, as stated above, in future research.

Despite the limitations mentioned above, this study showed the effectiveness of short-term teacher training programmes on changing teachers' attitudes, knowledge and skills. However, we suggest that training programmes with longer term and followed by follow-up sessions and students' outcome measures will be more likely to sustain teachers' implementation and increase the effectiveness of training.

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