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Forty Years Later, a Systematic Literature Review on Inclusion in Physical Education (1975–2015): A Teacher Perspective

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Abstract. The first objective of this work is to systematically list the international studies about the inclusion of students with disabilities in physical education (PE) from the teachers' perspective. Sixty studies met our selection criteria and are listed. The second objective is to analyse the content of the literature according to the inductive and thematic approach of Thomas and Harden (2008). Our thematic analysis highlights: a) the factors that influence PE teachers' positive or negative attitudes and predispositions towards the inclusion of students with disabilities and b) the factors that can positively influence the inclusion of students with disabilities in PE classes, according to the teachers' representations. Based on these sets of factors, we propose some adapted PE training content for PE teachers. These training content proposals form the basis of research perspectives.

Keywords: Inclusion; Physical education; Teachers; Attitudes; Representations.

1. Introduction

In numerous countries, educational policies have evolved towards inclusive education and encouraging mainstream schools to include students with disabilities, i.e., allowing those students to truly follow the course of their typically developing classmates.

Indeed, the UNESCO Salamanca Statement (1994) shows that international authorities agree that inclusive education is not simply placing students with disabilities in regular schools; rather, the statement refers to the students' social and active participation in class and to the full development of their potential through access to teaching according to the students' special educational needs (SEN). Therefore, the inclusive education of students with disabilities targets the education of all students in community classes and schools, which are considered the best places for experiencing diversity and learning about one another. Inclusion considers heterogeneity not as a problem but as a chance to transform schools to better respond to their students' diversity (Booth & Ainscow, 2002). The development of this educational philosophy combined with an increasing amount of inclusive legislation has led to an increase in the number of students with disabilities who participate in traditional learning environments.

Among these traditional classes, physical education (PE) seems to be an interesting context for inclusion. Indeed, PE is often, along with music and art education, one of the first courses to "experiment" with inclusion (Alquraini & Gut, 2012). Moreover, the participation of students with disabilities in PE activities increases their sense of belonging to a class or a school community, optimizes their physical functioning and motor skill acquisition and enhances their overall well-being (Murphy & Carbone, 2008). Another advantage is that as a socially structured environment, PE classes provide a unique opportunity for the development of students' social behaviour (Sherrill, 2004).

These elements contribute to the increasing frequency with which PE teachers are entrusted with the mission to take up the challenge of inclusion. This increased involvement explains why two literature reviews regarding inclusion in PE have already been published in the 2000s. Indeed, Block

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and Obrusnikova (2007) reviewed studies pertaining to the inclusion of students with disabilities in PE from 1995 to 2005. Thirty-eight studies were retrieved, and after an analysis, six focus areas were selected. One of these areas focused on PE teacher attitudes (n = 12); that is, their predispositions and intentions towards the inclusion of students with disabilities in their courses. The authors concluded that a lack of adapted physical education (APE) training and a lack of teaching experience with students with disabilities were two factors that negatively influenced the attitudes of PE teachers. For their part, O'Brien, Kudláček, and Howe (2009) reviewed the literature on the inclusion of students with disabilities in PE over a period of eight years (2000–2008). Twenty-seven studies were selected. Thirteen studies focused on teacher perceptions and suggested that PE teachers believed that inclusion could be achieved if:

-training were more appropriate,

-PE teachers received more assistance from an APE specialist,

-the PE curriculum supported inclusion.

These interesting results highlight two complementary topics regarding inclusion in PE: a) the factors that influence PE teachers' attitudes and predispositions towards the inclusion of students with disabilities and b) the factors that can positively influence the inclusion of students with disabilities, according to teachers' representations.

However, these reviews cover a relatively short period (1995–2008). It would be interesting to review a larger period, especially from 1975 (the date of significant relevant laws: Public Law 94–142: The Education For All Handicapped Children Act in the United States and Law 75–534, June 30, 1975, in favour of the disabled people in France). Moreover, since 2008, other studies on this topic have been published that could enrich a new review of the literature. Finally, these two previous reviews of the literature examined all parameters of inclusion and not specifically the attitudes and representations of PE teachers. However, among the factors that contribute to the success of inclusion (class size and composition, teaching context, etc.), the most influential are undoubtedly the teachers' attitudes and representations of inclusion (European Agency for Development in Special Needs Education, 2010). For all these reasons, a number of studies may not have been included in previous reviews. To our knowledge, no such review of PE teachers' attitudes and representations since 1975 has ever been performed.

Thus, our first objective is to systematically list the high-quality international scientific studies on the connection between PE teachers' attitudes and inclusion over a period of 40 years. Our second objective is to thematically analyse the content of this literature to answer three research questions:

1) What are the factors that influence PE teachers' positive or negative attitudes and predispositions towards the inclusion of students with disabilities?

2) What are the factors that can positively influence the inclusion of students with disabilities in PE classes, according to PE teachers' representations?

3) Based on this set of factors, how can PE teachers can be more inclusive and accessible in their teaching?

2. Method

2.1. Search procedures

To reach our first goal, we identified potentially relevant studies published between January 1975 and January 2015 via computer-assisted document research. The following eight databases were consulted: PubMed, Education Resources Information Centre, Academic Search Premier, Science Direct, Web of Science, Education Research Complete, Psychology and Behavioural Sciences, and PsycINFO. The keywords used for the electronic searches were "inclusion" or "mainstreaming" or "integration" & "physical education teachers". The bibliographic references of each of these studies were also manually searched to identify possible additional studies. To be included in our literature review, each article had to fulfil the following seven inclusion criteria:

a) be published between January 1975 and January 2015,

b) be published in English,

c) include at least one primary or secondary school pupil clinically diagnosed with a disability (for example, studies of preschool children or disabled adults were excluded),

d) include at least one PE teacher in the sample (for example studies, exclusively centred on initial teacher-training students or specialized teachers were excluded),

e) be published in periodic publications (for example, books, unpublished documents, doctoral theses, master's theses, conference proceedings or book chapters were excluded),

f) be based on field research (for example, studies that only developed new instruments were excluded),

g) include information in the methodology about the following four elements in enough detail to allow replication:

-sample(s),

-measured variable(s),

-data collection instrument(s) used,

-data analysis method(s) used.

To ensure that reliability of the selection process, two researchers independently evaluated all of the selected studies according to these seven criteria. The absence or presence of each criterion in each study was noted on a dichotomized scale. In instances of disagreement, the studies were jointly reassessed to reach 100% consensus between the assessors.

2.2. Procedures for analysing studies

To achieve our second objective, we conducted a thematic analysis of the results of selected studies according to the approach of Thomas and Harden (2008). The analysis procedure was divided into 3 stages:

-coding text: a line-by-line coding of the main results of each study,

-developing a descriptive theme: thematic grouping by code and categories related to a) the factors that influence the attitudes and predispositions of PE teachers towards inclusion and b) the factors that can positively influence inclusion, according to the PE teacher representations. After defining each code and category, the two reviewers revisited the raw data of each study to validate this inductive and thematic analysis.

-generating analytical themes: Structuring all factors related to the attitudes and representations of PE teachers in a way that helps them be more inclusive and accessible in their teachings.

To ensure a maximum of rigour, we used the blind parallel coding procedure described by Lincoln and Guba (1985). To this end, each author performed each of the three steps blindly and in parallel. At the end of each step, both authors discussed their analyses.

2.3. Study selection

Fig. 1 shows results of the study selection procedure. Of the 510 studies identified from the databases, 60 met our selection criteria (selection rate = 11.8%). The main criteria leading to the rejection of studies were scientific rigour (for example, the sample and/or data collection and analysis techniques were missing from the methodology) and the absence of the PE teachers' attitudes and representations from the measured variables. Regarding the journals, 36 studies came from journals with an average impact factor (Journal Citation Reports 2014 of Thomson Reuters) of 1.03; the average impact factor for all 60 studies was 0.62.

3. General results

3.1. PE teachers' descriptions

Table A1 (appendix) presents the demographic data of the PE teachers in terms of attitudes and predispositions, and Table A2 (appendix) presents the demographic data for the representations of PE teachers. The total number of PE teachers was 6495. Of these 6495 teachers, 1865 (28.7%) had experience with students with disabilities (based on 32 studies), and 2208 (34%) had APE training (based on 31 studies). Based on 48 studies, there were 2551 male teachers (49.6%) and 2594 female teachers (50.4%). The average age of the teachers was 36.4 years (based on 26 studies). The average duration of PE teaching experience was 11.8 years (based on 31 studies). Regarding teaching level, 22.2% of the teachers taught at the elementary level, 37.8% of the teachers taught at the secondary

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level, and 40% of the teachers taught at multiple levels (based on 45 studies). The studies were based on teachers from all 5 continents but with very different repartitions. Indeed, most of the studies examined teachers from the United States (n = 34), followed by the United Kingdom (n = 8). Ireland, Greece, Finland, Turkey and Japan were represented by 2 studies each. Germany, Sweden, Latvia, Israel, China and Australia were represented by 1 study each. Two studies focused on several countries at the same time: Germany and the United States for one, and Puerto Rico, the United States, Japan and Ghana for the other.

3.2. Thematic procedure

Table 1 presents the tree diagram of our thematic analysis. The line-by-line coding of the results of each study identified 24 codes. These 24 codes were grouped into 6 categories which divided into two themes: factors that influence PE teachers' attitudes and factors that the PE teachers reported could influence their representations.

The theme of the PE teachers' attitudes and predispositions regarding inclusion (n = 28 studies) adopts Allport's definition (1935), i.e., that an attitude is not a behaviour as such but a predisposition to act, i.e., "a mental and neural state of readiness, organized through experience, exerting a directive and dynamic influence upon the individual's response to all objects and situations with which it is related" (Allport, 1935, p. 810). In other words, these studies try upstream to list the factors that influence the teachers' attitudes (positive or negative) towards inclusion and downstream to measure the impact that the PE teachers' positive or negative attitudes has on their teaching practices.

The theme of the PE teachers' representations (n = 32 studies) is defined as "the product of processes of mental activity through which an individual or group reconstitutes the reality with which it is confronted and to which it attributes a specific meaning" (Abric, 1994, p. 13). In other words, these studies try to understand the factors that can positively influence inclusion, according to the teachers' perceptions of their inclusion experiences.

3.3. Methodological approaches used

3.3.1. Studies on attitudes

The factors that influence the PE teachers' positive or negative attitudes and predispositions towards inclusion of students with disabilities are based on quantitative studies that collected data via questionnaires. The most frequently used ones are the Physical Educators' Attitudes toward the Handicapped (PEATH, PEATH II) and the "Physical Educators' Attitudes toward Teaching Individuals with Disabilities" (PEATID III) from the academic works of Rizzo (1983). These questionnaires consist of a series of twelve statements to which the teachers respond according to their intentions to include pupils with a particular type of disability (associated or not with a severity level) in their PE courses. The responses are made on a five-level scale (from strongly in disagreement to totally in agreement) underneath each statement. These measures are based on the theory of reasoned action (Fishbein & Ajzen, 1975) and the theory of planned behaviour (Ajzen, 1985).

Other questionnaires have also been developed to study the attitudes of teachers, such as the Teacher Integration Attitudes Questionnaire (TIAQ) of Sideridis and Chandler (1995), which asks teachers to express their attitudes in response to 12 statements that fall into 4 areas of inclusion (skills, benefits, acceptance and support). The responses are given on a 4-point Likert-type scale (from strongly agree to strongly disagree). Contrary to the PEATH, the TIAQ is not based on a particular theory. All of these questionnaire-based studies included rather significant samples (M = 176 ± 181) that allowed statistical analyses with a not-insignificant strength and supported the reliability of the results.

3.3.2. Studies on representations

Two types of methodologies are used to define and understand the factors that, according to the teachers' representations, can positively influence the inclusion. First, studies that took the form of a survey (n = 8) and had a relatively significant sample size (165 teachers ± 98) were analysed via descriptive statistics, thus allowing a general inventory of the teachers' representations regarding inclusion. For example, Klavina, Block, and Larins (2007) surveyed 250 PE teachers and found that they were concerned about their level of training in APE, practical considerations (for example, the

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absence of an individual inclusion plan or the lack of accessibility and adapted sports equipment) and the absence of a teacher assistant to develop an APE approach.

Then, to investigate these representations in depth, qualitative approaches were developed (n = 24). Most of the time, data collection was performed through interviews (semi-structured interviews, focus groups); however, these were sometimes associated with observations of sessions or analyses of documents such as lesson plans, which were then qualitatively analysed (using content analysis, constant comparative method, thematic analysis, and mixed methods). The teacher samples are smaller (12 teachers ± 13) in the studies on representations compared with the studies on attitudes because of the considerable amount of time needed to collect and analyse the data. The use of the qualitative approach is understandable because of the need to perform a deep and thorough analysis of representations that cannot be easily assessed or defined with a classic questionnaire approach. Indeed, unlike attitudes, which can be defined either as positive or negative, teachers' representations are less clear and more variable and can often be considered contradictory. Several studies agree that teachers generally have common a representation of inclusion as an ideal, but they ask themselves many questions about its practical implications, and they quickly feel helpless and concerned when facing the reality and complexity of inclusion (Ammah and Hodge, 2005, Hersman and Hodge, 2010, Hodge et al., 2004 and Hodge et al., 2009).

4. Specifics results of the thematic analysis

4.1. Attitudes and predispositions
4.1.1. Teacher-specific factors that influence their attitudes

Neither the teachers' level of experience in teaching general PE (Jerlinder et al., 2010, Obrusnikova, 2008 and Tripp and Rizzo, 2006) nor their degree earned in teaching general PE (Rizzo and Vispoel, 1991, Rizzo and Wright, 1988 and Rizzo, 1985) showed a significant effect on the attitudes of the teachers towards the inclusion of students with disabilities.

In the same sense, most of the studies showed no link between the PE teachers' age and their attitude toward including a student with disabilities (Jerlinder et al., 2010, Rizzo and Vispoel, 1991, Rizzo and Wright, 1988 and Tripp and Rizzo, 2006). Only Rizzo (1985), who questioned 194 PE teachers using the PEATH, indicated that younger teachers showed a more favourable attitude towards the inclusion of students with disabilities compared with their older colleagues in the United States. Rizzo (1985) added that recent policies (the Education for All Handicapped Children Act of 1975) may have allowed these young teachers to become more aware of these questions during their initial training, which led them to have more positive attitudes than their older colleagues.

Likewise, most of the studies showed no link between the teacher's gender and their attitude toward including students with disabilities in general (Doulkeridou et al., 2011, Duchane and French, 1998, Jerlinder et al., 2010, Patrick, 1987, Rizzo and Vispoel, 1991, Rizzo and Wright, 1988, Rizzo, 1985 and Tripp, 1988). However, the studies concerning specific types of disabilities qualified these results (Aloia et al., 1980, Meegan and MacPhail, 2006 and Schmidt-Gotz et al., 1994). For example, Schmidt-Gotz et al. (1994) used the PEATH to question 722 PE teachers and 369 students (Physical Education and Sport University). They showed that the attitudes of female teachers were more favourable than those of their male colleagues only in regard to the students with physical or learning disabilities.

Contrary to the previously discussed elements, the factor that most strongly predicted the teachers' attitude seemed to be their perceived competence in teaching students with disabilities. All of the studies that examined this factor specific to teachers showed that it had a significant influence on their favourable attitudes towards inclusion (Block and Rizzo, 1995 and Obrusnikova, 2008; Papadoupoulou et al., 2004; Rizzo and Vispoel, 1991, Rizzo and Wright, 1988, Schmidt-Gotz et al., 1994 and Tripp and Rizzo, 2006). In fact, the PE teachers who perceived themselves as more competent in inclusion (that is, they considered themselves to have a certain level of knowledge and control regarding inclusion) had more positive attitudes because they perceived inclusion as a rewarding and interesting professional challenge. On the contrary, a lack of perceived competence was considered a major obstacle to inclusion (Heikinaro-Johansson & Sherrill, 1994).

Strangely enough, the studies concerning the relationship between the teachers' experience with students with disabilities and their predispositions towards inclusion were reserved. Five studies showed a positive effect of experience teaching students with disabilities on teachers' attitudes (Marston and Leslie, 1983, Meegan and MacPhail, 2006, Obrusnikova, 2008, Rizzo and Vispoel, 1991 and Özer et al., 2013), while four others showed no effect (Block and Rizzo, 1995, Rizzo, 1985, Schmidt-Gotz et al., 1994 and Tripp and Rizzo, 2006). However, according to Rizzo and Wright (1988), certain studies did not obtain a direct correlation between the experience of teaching students with disabilities and positive attitudes because positive attitude were sometimes developed indirectly. However, experience with teaching students with disabilities was directly linked to perceived teaching competence in inclusion, which represented the most significant predictor of a positive attitude.

Following the same logic, the studies that examined the relationship training in adapted physical education (APE) and the teachers' attitudes towards inclusion were contradictory. Six studies showed a positive effect of training in APE on the teachers' attitude towards the inclusion of students with disabilities (Block and Rizzo, 1995, Doulkeridou et al., 2011 and Obrusnikova, 2008; Papadoupoulou et al., 2004; Patrick, 1987 and Tripp and Rizzo, 2006), while three others showed no effect (Bird and Gansneder, 1979, Meegan and MacPhail, 2006 and Rizzo and Vispoel, 1991). According to Rizzo and Wright (1988), it is important to emphasize that training in APE was strongly correlated with perceived teaching competence in inclusion. Moreover, the quality of the APE training seemed to strongly influence attitudes. Jarvis and French (1990), who replicated a study by Jansma and Shultz (1982), showed the ineffectiveness of short in-service trainings (2 days) for influencing attitudes. Additionally, concerning initial APE training for future teachers, Maeda, Murata, and Hodge (1998) showed that late training (during graduate studies) more positively and significantly influenced teachers' attitudes than early training (during undergraduate studies) did.

To summarize these results, the teacher-specific factor that most influenced their positive attitude towards the inclusion of students with disabilities was perceived teaching competence. Having said that, factors based on APE training or experience with teaching students with disabilities could influence the teachers' attitudes either positively and directly or indirectly, by contributing to the teacher's feelings of competence. However, it seems that other factors could influence PE teacher's attitudes. It is very likely that teachers' attitudes toward inclusion depend at least on the type and the severity of the student's handicap (Qi & Ha, 2012a).

4.1.2. Factors specific to the students with disabilities that influence teachers' attitudes

One factors associated with the students with disabilities was the disability label itself. Indeed, Tripp and Rizzo (2006) used a revised version of the Physical Educators' Intention Towards Teaching Individuals with Disabilities questionnaire (PEATID III) with two groups of 34 teachers: those who were given a description of a pupil with cerebral palsy symptoms who was labelled as a "pupil with cerebral palsy" and those were given only the description of the pupil without the label. The study showed that the teachers whose descriptions included the label were significantly less enthusiastic about including the student compared with their colleagues who received student information without the label.

Another factor specific to the student with disabilities was his/her age or class level. Indeed, students with disabilities were more favourably perceived in lower-level classes than in higher grades (Minner and Knutson, 1982 and Rizzo, 1984). For example, using the PEATH with 194 PE teachers, Rizzo (1984) showed that the higher the class level was (from primary school [K-3] to an intermediate class [K4-6] then to high school [K7-8]), the less favourable the teachers' attitudes gradually became.

An hypothesis could be that as the students' levels increased, the teachers paid greater attention to the growing dissatisfaction of the typically developing students, particularly secondary school students, when PE sessions were adapted (Block, 2007).

The third student-specific factor was the type of disability. For example, although PE teachers were more positive than music teachers about including students with behavioural or emotional disorders (Sideridis & Chandler, 1996), studies agreed that PE teachers showed negative attitudes toward the

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inclusion of these children (Obrusnikova, 2008, Rizzo and Vispoel, 1991 and Tripp, 1988). For Obrusnikova (2008), it was not surprising that teachers were less inclined to teach pupils with behavioural and emotional disorders (such as aggressive or impulsive behaviour, depression, hyperactivity, or social maladjustment) because these pupils required greater organization, management of the class, and involvement in relationships between pupils; consequently these students were considered too complex of a challenge and were negatively impacted teachers' attitudes.

In contrast, PE teachers' attitudes toward pupils with learning disabilities were often favourable (Meegan and MacPhail, 2006, Obrusnikova, 2008, Rizzo and Vispoel, 1991 and Rizzo and Wright, 1987). Indeed, for Rizzo and Wright (1987), teaching PE to students with learning disabilities (such as dyslexia, dysphasia or dysorthographia) seemed to be less challenging than teaching to students with physical disabilities, sensory disabilities or mental retardation.

In summary, studies have showed that teachers seemed to present a negative attitude towards students with emotional disorders and a rather favourable attitude toward students with learning disabilities. However, teachers adopted a mixed attitude towards students with physical, sensory or mental disabilities (Obrusnikova, 2008, Rizzo and Vispoel, 1991 and Tripp, 1988). This mixed attitude towards these types of disability arose partially because the type of disability was an important factor that, in association with the severity of disability, could evoke different attitudes.

Indeed, the final student-specific factor that influenced teachers' attitudes was the severity of the disability (Block and Rizzo, 1995, Duchane and French, 1998 and Meegan and MacPhail, 2006). To illustrate this point, Block and Rizzo (1995) examined (using the PEATID III) the relationship between the attitudes of 91 PE teachers towards pupils with a severe or profound mental disability. For the authors, the adjective "severe" described people who had relatively good levels of consciousness and a capacity to respond adequately to environmental constraints with significant support. The term "profound" described people with little consciousness or capacity to adapt to the environment, even with considerable support. The results revealed that teachers were undecided about teaching students with severe mental disabilities, and they disagreed about teaching pupils with profound mental disabilities in their regular classes. Similar results were also reported by Meegan and MacPhail (2006) and by Duchane and French (1998).

To synthesize these findings, we could say that the attitudes of PE teachers depended at least partly on whether the disability was labelled, the student's age (class level), and the type and severity of the disability. It goes without saying that the combination of these factors could have an even greater influence on the attitudes of teachers, and thus, a posteriori, on the efficiency of their teaching practices.

4.1.3. Influence of teachers' attitudes on their teaching practices

Three studies more specifically examined the influence of PE teachers' attitudes (positive or negative) on their objectives and teaching practices. The first study (Duchane & French, 1998) examined the relationship between the attitudes of 182 teachers and the participation objectives of the students with disabilities compared with those of the typically developing students (via a questionnaire about grading). The results showed that regardless of the nature (positive or negative) of the attitude measured via the PEATID III, teachers reported using different grading criteria for the pupils with disabilities versus those without disabilities. In fact, pupils with disabilities were first judged in terms of their effort or participation, while typically developing pupils were judged in terms of their fitness and performance on skills tests. In other words, this difference in assessment could be considered a reduction of the requirements and objectives for students with disabilities.

However, another qualitative study showed different results. Combs, Elliott, and Whipple (2010) used the PEATID III to identify two PE teachers with positive attitudes and two others with negative ones towards the inclusion of students with mental disabilities. Semi-directive qualitative interviews showed that both teachers who presented a positive attitude constantly insisted on the motor performance and success of the students with disabilities. They identified in their practices several ways to present class situations, various types of intervention, and multiple objectives, and they developed lesson plans that integrated several strategies to adapt the environment to the students with

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disabilities. In contrast, the two PE teachers who presented negative attitudes defined inclusion in terms of the participation of the students with disabilities in traditional sport and not adapted physical activities.

These results were confirmed by the study by Elliott (2008), which dealt with the relationship between the attitude of the teachers (regarding including pupils with low or moderate mental disabilities) and the efficiency of their interventions in terms of the following:

-the participation of pupils with disabilities in the session (number of attempts) compared with that of typically developing pupils,

-the level of success achieved by pupils with disabilities compared with their typically developing peers. To examine this factor and determine the nature of the teachers' attitudes, 20 PE teachers completed the PEATID III and then were observed during PE sessions. The observers systematically collected data on the number of attempts completed by students with disabilities compared with typically developing students and associated them with the percentages of success and failure. The results showed a relationship between the teachers' attitude toward inclusion and the efficiency of the teaching. Indeed, the teachers with a positive attitude towards inclusion presented:

-higher expectations in terms of motor performances for all the pupils (with and without disabilities),

-a higher number of attempts, which was associated with a more significant rate of success for all the pupils (with and without disabilities).

To synthesize these findings, only three studies examined the impact of the nature of PE teachers' attitudes on their practices. It seemed that the teachers who favoured inclusion adapted their teaching to the specific needs of the students with disabilities without reducing the level of motor requirements. This implementation of inclusive practices seemed to be effective for students with and without disabilities. However, additional research on this topic is clearly needed.

4.2. Teachers' representations

4.2.1. Educationally inclusive policies and PE curriculum

Several studies showed that teachers were extrinsically motivated to conform to inclusive educational policies and to the directives of the school administrators (Qi and Ha, 2012b and Sato and Hodge, 2009). However, numerous studies in United Kingdom or in Japan noted problems with the inadequacy of the inclusive principles described in general texts when applied to the curriculum content or expectations of certifications in PE (Haycock and Smith, 2010a, Haycock and Smith, 2010b, Haycock and Smith, 2011, Sato and Hodge, 2009, Smith and Green, 2004 and Smith, 2004). Indeed, these studies agreed that the curriculum contents focused too broadly on competitive and collective activities (soccer, basketball, netball), thus creating a paradoxical situation that the teachers denounced. For example, Smith and Green (2004) interviewed 7 PE teachers via semi-directive interviews followed by a thematic analysis. The results showed that the teachers intended to provide the students with disabilities the same opportunities to participate in activities along with their typically developing peers; however, this did not occur in practice. Instead, students with disabilities were excluded from the class's sports activities because the official curriculum was very focused on competitive and collective activities, which the teachers said were not suitable for inclusion. Moreover, the teachers noted that students with disabilities could more easily be included with their typically developing classmates in individual activities that were not focused on comparing interpersonal performances. This situation was confirmed by Morley, Bailey, Tan, and Cooke (2005), who organized a focus group of 12 PE teachers, followed by a thematic analysis. The results showed that the increase in the number of students with disabilities in mainstream schools did not radically modify the contents of physical activity programming, which continued to be widely dominated by competitive team sports and a strong emphasis on performance, excellence and technical skills. The authors showed that this programming seemed to have reduced, rather than improved, the opportunities for students with disabilities to participate in the same activities as their typically developing peers. On the whole, pupils with disabilities took part in a limited number of physical and sports activities compared with their classmates. In some cases, students with disabilities practised PE without other pupils, during hours that were specially designed for them with the aim of meeting their

special needs and motor capacities. Programming centred on collective and competitive activities hindered the participation of students with disabilities, especially students with autism spectrum disorders. Indeed, Obrusnikova and Dillon (2011) showed that the 43 PE teachers (examined using an elicitation questionnaire) reported that instructional tasks were more often challenging during social and competitive activities because first, impaired social relationships and social behaviour constitutes a main characteristics of individuals with autism spectrum disorders and second, because these students often failed to develop a sense of competition.

In addition to programmes based on sports activities, several studies showed that certifications were also in inadequate with regard to the principles of inclusion (Haycock & Smith, 2010b), in the United Kingdom; Sato & Hodge, 2009, in Japan. For example, Haycock and Smith (2010b) studied 12 teachers using the same data collection and analysis technique that was applied by Morley et al. (2005). They showed that despite the significant experience of the interviewed teachers, the criteria they used were inadequate and inappropriate for identifying the acquisitions of pupils with disabilities. In reality, according to the teachers, the requirements, which were essentially based on performance, were only reachable by a limited number of pupils (including students without disabilities).

Given these difficulties of teaching PE using traditional physical and sports activities, Grenier, Collins, Wright, and Kearns (2014) suggested integrating units on teaching sports to people with disabilities units into PE programmes. To this effect, the authors conducted a qualitative study via multiple sources (focus group, semi-structured interviews, field notes and documents) and conducted a thematic analysis to compare the representations of the pupils and the teachers in 3 primary school classes (n = 41) who practiced a disabled sports unit (wheelchair basketball, goalball, sit-volleyball, and sledge hockey) for 5 weeks compared with 3 primary school classes who practiced games and traditional sports (n = 46) over the same period. The results showed that scheduling a disabled sports unit was an effective strategy for favourably shaping the representations of both typically developing students and teachers. More flexible programmes that are open to adapted and disabled physical activities seemed to be an effective strategy for helping the teachers build favourable representations and offer pupils with and without disabilities a way to practise PE together.

4.2.2. Collaboration and communication with colleagues

Numerous works have studied the influence of the communication and the collaboration among the partners in inclusion and the PE teachers on representations (Aydin, 2014, Fejgin et al., 2005, Heikinaro-Johansson et al., 1995, LaMaster et al., 1998, Lienert et al., 2001, Murata and Jansma, 1997, Pedersen et al., 2014 and Sato et al., 2007). However, most of these studies highlighted numerous concerns regarding the effectiveness and quality of these collaborations. For example, Aydin (2014) surveyed 55 PE teachers and found that their primary concern was the lack of information they had about the special educational needs of students with disabilities before the inclusion began because of a lack of communication. More particularly, the PE teachers seemed worried by their collaborations with paraprofessionals (APE specialists or teacher assistants). For example, Lienert et al. (2001) questioned 30 PE teachers to determine their concerns, and they clearly showed the difficulty of collaborating with the specific members of the support staff. For example, most of the teachers estimated having collaborated with an APE specialist once or twice at the most during the school year and over a short teaching period. This limited cooperation led to professional concerns about the negative consequences for teachers' representations of inclusion. In another study, LaMaster et al. (1998) questioned and observed 6 PE teachers. In this case, the role of the APE specialist was essentially consultative. A thematic analysis revealed the PE teachers' frustration about the lack of availability of the APE specialist because of the significant number of individual cases that they had to address. As a result, the consultations were too short and too far apart to have a positive impact on the PS teachers' representations. However, the frequency and quality of the communications was an essential element in favour of the effectiveness of the inclusion. Heikinaro-Johansson et al. (1995) tested two models of communication between the PE teacher and the APE consultant with two teachers for 2 months. The following models were examined:

a) a model that qualified as intensive (face-to-face meetings every week, observations of the PE sessions every week and regular phone conversations), and

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b) a model that qualified as limited (a meeting at the beginning and at the end of the teaching sequence).

The evaluation of these two models of communication (in the form of a case study) clearly showed the positive impact of the intensive model. The PE teacher who benefitted from this intensive model presented positive representations of inclusion, and he was more effective in his teaching (for example, in terms of instruction time, feedback, encouragement). The efficiency of the inclusive practices that arose from the intensive model of communication strengthened the positive representations of the teacher and the pursuit of inclusion.

Along with the frequency of the exchanges between the teacher and the APE specialist, the quality of the collaboration with teacher assistants was also important. Pedersen et al. (2014) questioned 14 teachers about the strategies they used to develop working relationships with the teacher assistants helping the students with disabilities in their everyday life at school. Although the teachers generally had a favourable attitude towards the teacher assistants, the collaboration was often limited by the teacher assistant's lack of knowledge about general PE and about APE in particular. This lack of teacher assistant training in APE was confirmed by Vickerman and Blundell (2012) who showed via a questionnaire that 63.3% of teaching assistants received general information about inclusion, whereas only 5.5% received specific information about APE.

Therefore, for Grenier (2011), one of the solutions is co-teaching. This situational collaboration was the result of his study of two PE teachers and an APE specialist over a period of 16 weeks. During this period, interviews, observation notes and teachers' documents were analysed. Grenier (2011) showed the efficiency of the cooperative model of co-teaching between a PE teacher and an APE specialist on the ground. This cooperation allowed the student to make an efficient transition from special or segregated education to an inclusive setting via a thorough dialogue regarding the preparation of the sessions, a wide range of teaching adaptations during the sessions, and numerous reflections on their teacher's own inclusive practices. The objectives of both teachers in co-teaching were to achieve a certain quality of social relationships among the pupils and to allow motor learning to occur at the best possible level. This type of co-teaching encouraged more favourable representations of inclusion for both the teachers and the pupils with and without disabilities.

4.2.3. Training in APE

Another very important concern that the teachers had regarding inclusion rested on the quality of their professional preparation for inclusion in PE through either initial training or continuing education (Chandler and Greene, 1995, Crawford, 2011, Fitzgerald et al., 2004, Hardin, 2005, Lieberman et al., 2002 and Vickerman and Coates, 2009).

Regarding the initial training, Vickerman and Coates (2009) examined the representations of 19 recently qualified PE teachers and 202 student PE teachers via a survey. They noticed that the teacher judged their representations of their training experiences in a rather negative way. Indeed, 84% of the recently qualified PE teachers and 43% of the student teachers considered that most of their initial training did not allow them to develop a truly inclusive environment for students with disabilities in their classes. These concerns were confirmed by the study by Hardin (2005). He studied five recently qualified teachers using semi-structured interviews that were analysed thematically. The original finding of this study was that teachers consistently considered practical training the most efficient way to acquire inclusive strategies. Another significant aspect inferred from these interviews was that advice and examples about inclusion from experienced teachers would allow new teachers to quickly and efficiently incorporate efficient inclusive adaptations.

Regarding continual training, Fitzgerald et al. (2004) questioned 105 teachers and then selected 8 PE teachers who took continuing education training courses in this particular field to participate in face-to-face interviews. Although the continuing education training significantly helped the teachers improve in terms of inclusion, numerous teachers remained sceptical about the relevance and utility of this training. In reality, despite these continuing education courses, the teachers felt insufficiently informed or experienced to include students with disabilities in their classes. Lieberman et al. (2002) also questioned 148 teacher volunteers who participated in a training on the inclusion of pupils with visual disabilities. The authors noticed that the teachers' most frequently identified obstacle to

inclusion was their lack of professional preparation (66%). In addition to addressing the quantitative lack of training, the authors suggested that the training should focus more on the didactic strategies and pedagogical adaptations necessary to address inclusion problems in a real classroom and reduce the amount of instructional time spent on theoretical aspects of the disability (for example, the physiology of the eye, the causes and consequences of visual diseases). Along similar lines, in Ko and Boswell's (2013) qualitative study of 7 teachers, they suggested that the experience acquired during inclusive practices could be reinvested in a continuous process of collaboration with other teachers during regular professional trainings. An example of inclusive experience was described by Grenier (2006), who conducted a case study over a six-month period with a PE teacher whose class (n = 16) included a pupil with severe cerebral palsy and a pupil with visual deficiency. The data resulted from interviews, observations, and lesson plans. The thematic analysis showed that the teacher, who was trained in inclusive strategies and adaptations, focused primarily on the development of social skills among the students. To this end, the teacher first and foremost used cooperative learning in the reduced-sized class to amplify the social interactions between pupils. She also often taught small groups (even pairs, using the format of peer-tutoring between the student with disabilities and a classmate volunteer) to achieve a common motor objective that could only be reached if all group members participated. The objectives shifted toward motor learning and socialization and avoided a climate of competition that could aggravate interpersonal performances. The class climate that the teacher established was clearly directed towards progress and control to amplify amount of time that the students spent cooperating on the same common lessons, which were adapted to everyone's needs.

In summary of the thematic analyses, it seems that the representations that are favourable to inclusion are shaped by the following:

-the quality and the consistency of the professional training,

-the frequency and quality of the exchanges between teachers and colleagues,

-the adequacy of training programmes, and inclusive texts in particular, to provide a curriculum that is open to adapted physical activities and sports participation for people with disabilities.

5. Discussion and practical implications

At this stage, our thematic analysis highlights the following factors:

-that influence the PE teachers' positive or negative attitudes towards the inclusion of students with disabilities (first research question),

-that can positively influence the inclusion of students with disabilities in PE classes, according to teachers' representations (second research question).

The aim now is to highlight the limitations of this work and to structure all of the factors related to PE teachers' attitudes and representations around a central element to help them become more inclusive and accessible in their teaching.

5.1. Limitations and central element determination

The first limitation is based on the focus of this work on a single discipline: PE. As a result, the impact on inclusive education is limited. Indeed, this review showed the need for better exchanges between the inclusion partners (parents, administration, medical staff, etc.) and all teachers (general education teachers of different subjects, specialized teachers and teacher assistants) to collectively develop an individualized plan according to the SEN of the student with disabilities as a starting point for inclusion.

Another limitation concerns the small number of studies on the impact of inclusive practices (peer tutoring, cooperative learning, disabled sports programming, teaching adaptations, sport modifications, etc.) on the attitudes and representations of PE teachers. It is likely that the lack of APE training among PE teachers greatly limits the opportunity for research on the impact of inclusive practices (still undeveloped) on the attitudes and representations of PE teachers.

Therefore, it seems that the central element around which the inclusive practices could be developed and that could positively influence the attitudes and representations of teachers is APE training. APE training is a common factor of the two themes. Thematic analyses have previously shown that PE teachers need regular APE training focused on inclusive didactic strategies and

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pedagogical adaptations and the support of teachers with inclusion experience (co-teaching) throughout their careers (starting at the university level). To answer our third research question, we propose 3 types of training content for PE teachers to help them be more inclusive and accessible in their teaching: multidisciplinary training, didactical disciplinary training and pedagogical disciplinary training.

5.2. Multidisciplinary training

An essential part of the thematic analysis is based on collaboration and communication with colleagues and partners of inclusion (section 4.2.2) to collectively identify the SEN of the student with disabilities (Aydin, 2014), to create his individual inclusion plan (Klavina et al., 2007) and to help PE teacher to be effective in his teaching (Heikinaro-Johansson et al., 1995). These results could be structured inside a multidisciplinary training.

Given the singularity of each individual plan of inclusion, the multidisciplinary training could be performed locally in the regular school with the different partners in the educational community (Qi & Ha, 2012b). This training could be conducted in two stages.

The first step involves collecting information about all of the characteristics of the student with disabilities. To do so, it seems crucial to include an administrator (as listed by Sato & Hodge, 2009) who would:

-bring together all of the partners that could help the teachers and the members of the educational community to precisely determine the student's SEN and help the educators understand the consequences of the disability on education (as suggested by Lieberman et al., 2002). The active participation of the student's family and the specialist or medical staff seems decisive.

-bring all of the partners together as a team to define the organization of the individual inclusion plan (adaptation of the schedule, accessibility of the classrooms, support of a teacher assistant, teacher training, etc.). From this perspective, the exchanges between the PE teacher, the parents and the medical staff could be important to ensure that the student can safely perform the class activities.

The second step is to define the pedagogical aspect of the individual plan of inclusion. To do so, it is necessary that all of the teachers (the general teachers of different subjects, specialized teachers and teacher assistants) work together (as supported by the study of Grenier, 2011) to:

-define specific learning objectives (cognitive, motor, social, emotional, etc.) according to the SEN.

-develop a common educational strategy adapted to the class to achieve these specific learning objectives.

-increase exchanges regarding effective teaching practices. Regular exchanges between the teachers are important ensure that the individual plan of inclusion is reviewed on a regular basis. The participation of the PE teacher on the educational team seem to be important for establishing a complete plan, that is, one that addresses motor skills, physical capacities, cooperation with others, and other skills.

Ultimately, this multidisciplinary training is based on the recognition of team work as an essential part of the mission of teachers.

5.3. Didactic disciplinary training

The results of the thematic analysis highlight different effective strategies for successfully including students with disabilities in their PE courses which could be grouped within a didactic disciplinary training, such as:

-the modification of one or more parameters of traditional sports activities (the size of the field, the number of players, the rules of the game, etc.) as reported in the study of Combs, and (2010). For example, in soccer matches, the teacher could reduce the number of players to decrease the cognitive and emotional burden for students with mental retardation. However, Block (2007) cautioned that if the modifications change the nature or the challenge of the game too much, it could cause dissatisfaction among the typically developing students, particularly those with a competitive spirit.

-the programming of disabled sports units to implement reverse inclusion (as showed Grenier et al., 2014). Reverse inclusion allows typically developing students to participate in a sport usually reserved for people with disabilities (Hutzler, Chacham-Guber, & Reiter, 2013). For example, the

teacher may teach wheelchair basketball instead of basketball to successfully include a student with paraplegia.

-the use of an inclusion teaching style (Mosston & Ashworth, 2002) that aims to provide students with the opportunity to engage in an activity at an appropriate skill level (as reported in the study of Elliott, 2008). For example, during an indoor climbing activity, the teacher determines several levels of difficulty among the climbing routes (relative to the distance between holds, the size of the holds or the inclination of the wall). Each student, including a visually impaired student, tests the different routes to determine his/her initial level and works to gradually reach the next level. Moreover, in this example, the belayer (a student without a disability) verbally communicates with the visually impaired student to guide his/her ascent.

5.4. Pedagogical disciplinary training

In the thematic analysis, Ko and Boswell (2013) show that different effective instructional adaptations could be grouped within a pedagogical disciplinary training to help PE teachers to increase the motor skill acquisitions of students with disabilities and to strengthen social relationships among students in the PE course.

The content of this pedagogical training could refer to the use of the following:

-a mastery climate that facilitates students' concentration on their own learning process (Valentini & Rudisill, 2004) rather than on the performance (as suggested by Morley et al., 2005 or Smith & Green, 2004). For example, during performance activities (athletics, swimming races, etc.), the teacher could assess the progress of each student (in terms of motor skill acquisitions or the evolution of his/her performance) rather than comparing performances among students. This could be particularly appropriate for students with locomotor disabilities, such as cerebral palsy.

-Cooperative learning, which is the instructional use of small groups of students (in our case, with and without disabilities) who must work together to achieve a common goal (as developed in the study of Grenier, 2006). This common goal can only be accomplished if each student in the inclusive group works together (Grineski, 1996 and Johnson and Johnson, 1999). This pedagogical strategy is useful for collective activities that amplify social relationships among students. For example, in an orienteering team activity with a student with Down syndrome, the students could discuss the distribution of beacons according to their cognitive complexity in a way that allows them to be more efficient during the team race.

-Peer tutoring (as listed by Grenier, 2006) is an instructional strategy that provides a trained peer tutor to support a student with disabilities in PE courses. For example, in fitness choreography with a hyperactive student, the teacher could train a volunteer classmate to provide unidirectional tutoring. In this case, to increase the hyperactive student's concentration step by step, the peer tutor uses repetitive and rhythmic demonstrations. In fact, peer tutoring can promote equal participation among students with and without disabilities (Murata & Jansma, 1997) by increasing the activity engagement times for all students (Klavina, 2008) and by amplifying the instructional and physical interaction between students with and without disabilities (Klavina & Block, 2008).

6. Implications for further research

Ultimately, this systematic literature review on the inclusion of students with disabilities in PE from a teacher perspective highlighted the following:

-the factors that influence PE teachers' positive or negative attitudes and predispositions toward the inclusion of students with disabilities,

-the factors that can positively influence the inclusion of students with disabilities in PE classes, according to teachers' representations.

From this set of factors, we identified three types of training content to help PE teachers become more inclusive and accessible in their teaching. This training content forms the basis of the following research perspectives.

Regarding multidisciplinary training, it would be interesting to conduct a study to compare the representations and attitudes of PE teachers and those of their colleagues that teach other subjects. A quantitative study in the form of survey could be considered.

Regarding disciplinary didactic training, it would be important to investigate PE teachers' points of view regarding the changes and differentiations in their teaching content and didactic choices (disabled sports programming, modifications of traditional sports, individual goals, etc.) that they find necessary to ensure the participation of children with disabilities in their course. A qualitative approach involving interviews after the teachers are given descriptions of different students with disabilities (for example, their age and the type and severity of their disability) could help the teachers share their points of view and justify their educational choices.

Finally, regarding pedagogical disciplinary training, it would be interesting to observe the different types of instruction (classroom climate, style of intervention, the use of cooperative learning, the use of peer tutoring, etc.) that PE teachers have available to implement. Multiple case studies with observations and postsession interviews could add rich information for analysing teaching practices.

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When Inputs Are Outputs: The Case of Graduate Student Instructors

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Abstract. We examine graduate student teaching as an input to two production processes: the education of undergraduates and the development of graduate students themselves. Using fluctuations in full-time faculty availability as an instrument, we find undergraduates are more likely to major in a subject if their first course in the subject was taught by a graduate student, a result opposite of estimates that ignore selection. Additionally, graduate students who teach more frequently graduate earlier and are more likely to subsequently be employed by a college or university.

Keywords: Higher education; Graduate student teaching.

1. Introduction

There are few cases in economics where inputs into the production function are also outputs in the production function. However, such is the case in the production of doctoral students. Doctoral students are essential inputs to significant outputs in higher education. They provide research support, generate peer effects on each other, and often teach undergraduate students. Doctoral students are also an important output in education. Graduate programs define and often rank themselves by the quality and quantity of doctoral students they produce. Moreover, among those who go on to work in higher education, the productivity of graduate students in their subsequent careers is another important "output" of doctoral programs in that it increases the prominence of the doctoral-granting organization, increases the status of the doctoral adviser, and contributes to the subsequent education of new scholars in the field.

To date, there is very little research on the productivity of graduate students and on the relationships between their graduate activities and subsequent careers, particularly with regards to their teaching responsibilities while enrolled in school. What research there is with regards to the teaching function of graduate students, however, suggests that undergraduates that have a graduate student as their instructor, particularly non-native English speaking graduate students, suffer worse outcomes than comparable students that have faculty instructors (e.g., Borjas, 2000). Moreover, there exists no evidence on how graduate students' teaching experiences contribute to their subsequent careers.1

This paper examines graduate student teaching as an input to two production processes: the education of undergraduates and the development of graduate students themselves. As such we attempt to answer two related research questions. First, we quantify the effect of graduate student instructors on the academic outcomes of the undergraduate students they teach. As outcomes we examine students' choice of major, course taking, and credits earned. While graduate students participate in several facets of knowledge production and instruction, this is perhaps the most common avenue for their participation. In this paper, we are distinguishing between the roles of being a teaching assistant (i.e., course support) versus serving as the primary teacher of a course (i.e., the

instructor); our analysis focuses on the latter. About 46% of undergraduate students at four-year colleges take courses that have graduate students as their primary instructors,2 and in 2000, over 70% of graduate students had some teaching responsibility. At issue is whether using graduate students as instructors relative to other possible types of instructors (faculty or adjuncts) is a good way to allocate resources as measured by the outcomes of undergraduate students.

Second, we examine how teaching experience contributes to graduate students' subsequent academic careers. One of the justifications for using graduate students as instructors is that it provides essential training for their subsequent careers. We measure the relationship between teaching experiences and the subsequent academic outcomes and career choices of the graduate student. We examine the likelihood the graduate student completes their doctorate and is later employed at a college or university.

For our analysis, we use administrative data from Ohio's public universities. To answer the first question, we track the outcomes of undergraduate students who initially enrolled in college in the fall of 1998 or 1999. We identify the first course (e.g. Introductory Economics) that an undergraduate student took in a specific department (e.g. Economics) and observe whether these courses were taught by graduate students as opposed to full-time or part-time faculty. Using exogenous variation in faculty availability, we estimate the causal impact of graduate student instructors on undergraduate students' subsequent course-taking behavior.

To answer the second question, we study students who began their graduate program in 1998 or 1999, and who subsequently taught at least one course. We link university administrative data with data from the Ohio Department of Jobs and Family Services (ODJFS). ODJFS tracks employment outcomes throughout the state, and these data allow us to measure graduate students' subsequent earnings and location of employment, so long as they stay within the state. We use the combined data to relate the number of teaching opportunities graduate students experience to their subsequent academic and professional outcomes (within six years of starting graduate work). Although our data are limited to observing subsequent behavior in Ohio alone, six years after the start of their graduate program, we find 82.5% of graduate students in either our employment data (52.6%) or university administrative data (29.9%, Table 4). Therefore, we believe we are observing subsequent outcomes for the vast majority of students. Moreover, while limitations remain, this is the first large-scale study to shed light on the relationship between teaching and outcomes after graduate school.

Our research questions are fraught with concerns about selection. Graduate students are unlikely to randomly choose to teach a course, and other work suggests that undergraduates may actively shy away from taking courses taught by certain kinds of instructors (Bettinger & Long, 2010). We use multiple strategies to deal with these issues. To address the fact that students may sort non-randomly across courses, we present the results using (a) course-by-department fixed effects, which limits the identifying variation to students who took the same course at the same institution but from different instructor types, and (b) course-by-department-by-term fixed effects, which limits identification to students who took the same course at the same time but from different instructors. Additionally, we estimate the results using an instrumental variables approach that capitalizes on the natural fluctuations from term to term in the faculty available to teach. In terms of whether a graduate student chooses to teach, we use department fixed effects to look within departments. However, there may be residual selection bias and so we caution about the interpretation of the results. Still, using a variety of assumptions about the size and direction of this bias, we still believe these results shed light on this understudied issue.

Our results suggest that graduate students are effective instructors relative to faculty members—at least as judged by the measures of their student's subsequent academic progress we can observe. Undergraduates taught by graduate students in a given subject are more likely to subsequently major in the subject compared to their peers who take the same course from full-time faculty. However, we find no statistically significant differences in the number of subsequent credits earned in the subject. Given that we use random variation in students' exposure to graduate students, we argue that our estimates suggest causal relationships. Second, graduate students who teach more frequently are more likely to complete their doctoral degree in a timely manner and more likely to be employed

subsequently by a college or university. Regardless of whether we interpret these as causal or selection, the results suggest graduate student teaching benefits the sector. If our results only reflect selection, that selection, at least in our sample, identifies and incorporates effective future faculty into undergraduate production. By contrast, if our results reflect causality, then they suggest that undergraduate instructional experiences positively impact the short-run, academic job prospects of graduate students.

In the next section, we discuss existing academic literature on graduate student teaching. In Section 2 we describe our empirical strategies and the Ohio sample and setting. Section 3 presents and discusses the results, and Section 4 concludes.

2. Existing literature

The input-output duality of graduate student teaching has long been recognized in American colleges and universities. During the rapid growth of graduate student teaching after World War II, one presenter at the 1966 annual meeting of the American Council on Education stated that "universities, in their need to staff elementary courses, have thoroughly abused…the chief means of training prospective college teachers—the teaching assistantship" (Wise, 1967). Scholars in education, economics, and sociology have contributed to an academic literature on the topic which has largely followed the two research questions at the heart of this paper.

The first set of results has focused on the effectiveness of graduate students as instructors. Ex-ante, it is unclear what we should expect about the quality of graduate student teaching. On the one hand, teaching experience can be a meritocracy of sorts, and department administrators may attempt to place the "best" teaching graduate students in prime teaching slots. Yet some researchers have highlighted the poor working conditions of graduate students (e.g. McLeod & Schwarzbach, 1993). These researchers document how low wages, large workloads, and working without training or guidance may actually generate negative effects (Koehnecke, 1991). In fact, these stresses coupled with the underlying trend toward increased reliance on graduate student instructors have led to recent efforts to strengthen graduate student teacher unions at universities across the nation (Mattson, 2000, Sharnoff, 1993 and Vaughn, 1998).

Most of the empirical literature of graduate student instruction quality has focused on the effects of foreign graduate students on undergraduate students' outcomes. Borjas (2000) studied graduate student instruction in economics at a large public institution in the United States. In that setting, undergraduates taught by foreign-born teaching assistants received lower final grades by about 0.2 grade points relative to US-born graduate student instructors. However, the negative effect was muted for foreign-born undergraduates and when the graduate student was given higher class-preparedness ratings by the undergraduates. Borjas' (2000) results are consistent with preceding findings in economics instruction (Watts & Lynch, 1989), though in other subjects the limited evidence is mixed (Jacobs and Friedman, 1988 and Norris, 1991). Subsequently, Fleisher, Hashimoto, and Weinberg (2002) found no differential, and possibly positive, effects of foreign graduate student instructors when they received training and completed at least one year of their own graduate study prior to taking-on teaching responsibilities.

Beyond comparisons of foreign and native graduate students, empirical evidence on instructional effectiveness in the college setting is scarce. This is in stark contrast to the American K-12 setting, for which there are numerous studies estimating the range of outcomes students with different teachers have and how this variance is related to teacher characteristics such as training level and certification. There are two studies that document the variation in instructor effectiveness. For example, using variation in instructor quality at the US Air Force Academy and benefitting from the random assignment of cadets to course sections, Carrell and West (2010) estimate the standard deviation in instructor effectiveness as approximately 0.052 student standard deviations on a common end-of-course exam. Hoffman and Oreopoulos (2009) find similar estimates for common exam courses (0.055 standard deviations), but the standard deviation is larger for all courses. These estimates are somewhat smaller than the evidence on variability in K-12 teacher effectiveness (Hanushek & Rivkin, 2010).

Beyond the general variance of outcomes across instructors, the above two studies also look at the effects of particular instructor characteristics. Carrell and West (2010) find that students assigned less-experienced instructors and instructors without a terminal degree (two correlated characteristics) score higher in the short-run but perform less-well in subsequent classes that build on content from the first. Hoffman and Oreopoulos (2009) find that part-time instructors, which include both adjuncts and graduate students in their sample, have no differential effect on undergraduate outcomes compared to full-time faculty. Another study focuses on the relative effects of full-time versus part-time faculty. The authors find small positive effects for adjuncts compared to full-time faculty in terms of students' subsequent interest in the subjects; however, the effects vary by subject (Bettinger & Long, 2010). However, other work using the same data find that the percentage of instructors a freshman student has that are adjuncts during their first year is negatively related to college persistence (Bettinger & Long, 2006).

Our primary outcome of interest is students' subsequent engagement in a course as measured by decisions to major, decisions to take additional courses, and the total number of subsequent classes that students took. Our data limit us from being able to track performance in the current or any subsequent course. However prior literature on teaching quality in K-12 frequently equates good teaching with subsequent engagement in courses (e.g. Reeve and Jang, 2006 and Skinner and Belmont, 1993), and similar connections exist in higher education (e.g. Coates, 2005). While subsequent engagement may be the result of other graduate student characteristics (i.e. generating interest through entertainment, ease of grading or other mechanisms), the prior literature certainly finds a correlation with overall teaching quality.

A second set of papers focuses on the role of graduate student teaching as an input to their own course of study and development. Researchers have long-argued that graduate student teaching experience is essential to training future professors (e.g. Knotts and Main, 1999, Meyers and Loreto Prieto, 2000, Prieto and Altmaier, 1994, Slevin, 1992 and Smith, 2001). Most existing empirical evidence measures proximate outcomes for doctoral students, including degree completion and time to completion, which are a present concern for American higher education (Bowen & Rudenstine, 1992). A few studies have found that graduate students who receive teaching assistantships, as compared to other forms of financial aid, are less likely to complete their degree and those who do finish take longer to do so (Ehrenberg and Mavros, 1995 and Seagram et al., 1998). These effects may differ from discipline to discipline, and students with teaching assistantships do better than those who have no institutional support (Bair & Haworth, 2004).

By contrast, there is little empirical evidence on how teaching during one's time as a graduate student affects long-run outcomes, including subsequent labor market prospects, research productivity, and other academic and professional outcomes. In this paper, we begin to address this hole in the empirical literature using data which track graduate students' employment after degree completion.

3. Empirical strategy

3.1. Outcomes for undergraduate students

Our first objective is to identify the effects of taking a class taught by a graduate student on undergraduates' future course-taking behavior and choice of major. We focus on variation in the instructors of undergraduate students' initial, often introductory, course in a given subject because that early experience may affect long-term interest and success in the subject area.

Eq. (1) describes the core of our approach: predict different outcomes, $y_{ijk(t+1)}y_{ijk(t+1)}$, for undergraduate student i in subject k at campus j at time $t+1$ as a function of whether they were taught by a graduate student in their introduction to the subject at time t.

Operationally, $GradStu_{ijkt}$, the explanatory variable of interest, will be equal to one if the student took her first course in the subject from a graduate student and zero if she took the course from someone other than a graduate student. If she took multiple courses in a given subject during the first term of exposure $GradStu_{ijkt}$ will equal the proportion of courses taught by a graduate student.

We use this structure to study three different outcomes: (i) whether student i took any additional courses in subject k beyond time t, (ii) the total number of credit hours taken in subject k beyond time t, and (iii) whether student i majored in subject k. Since undergraduate students' course and major choices often lay the groundwork for future careers, graduate student instruction may affect long-run labor market outcomes for both individuals and at a more macro-level, through these nearer-term decisions. These mechanisms could, for instance, change the composition of available types of labor if undergraduates sort among disciplines as a result of exposure to high- or low-quality graduate student teaching.

In addition to the explanatory variable of interest, we control for a vector of student characteristics, X_i, which includes demographics (gender, race/ethnicity), initial ability (measured by ACT score), state of residence, and year of college entry (an indicator for being in the fall 1999 versus 1998 cohort). We also account for each students' expressed interest in and exposure to subject k with the vector Z_{ik}, which captures whether the subject is the student's intended major and the number of credits hours taken in the subject during the first term of exposure. Our specification also includes fixed effects for the term during which first exposure occurred, π_t, the subject, τ_k, and campus, σ_j. Finally, we also include a control for exposure to adjunct instructors in initial courses, $Adjunct_{ijkt}$, which we define in the same way as $GradStu_{ijkt}$. Separating out $Adjunct_{ijkt}$ clarifies the interpretation of our coefficient of interest so that β only measures the effect of graduate student instructors relative to full-time faculty. 3

Because students are observed in multiple subjects, we address within-student correlation by clustering the standard errors at the student level. Additionally, since the treatment of interest (which type of instructor the student is exposed to) varies by section, we also report standard errors clustered at the section-by-course level.

To interpret our estimate of β causally requires the assumption that undergraduates taught by graduate students are not systematically different from other undergraduates, at least conditional on the included variables in Eq. (1). A likely violation is the non-random way in which students and instructors are sorted into course sections. Such sorting may occur across courses within departments, across terms, or across sections of a course taught in the same term. For example, students may have prior beliefs about the relative effectiveness of graduate student instructors and so may try purposely to avoid them and enroll in course taught by full-time faculty members. Thus we report estimates which develop our core approach (Eq. (1)) in three ways.

First, we present results which add course-by-department fixed effects; we define departments as the interaction of subject and campus. This limits the identifying variation to students who took the same course at the same institution, but from different instructor types. The restriction addresses differences in the distribution of instructor types across departments and differences in how departments assign courses to different instructor types. Still, student decisions about which term to take a course may be influenced by expectations of future instruction type options. Thus, second, we report estimates with course-by-department-by-term fixed effects, limiting identification to students who took the same course at the same time but from different instructors. To the extent students are randomly assigned to course sections in a given term, these course-by-department-by-term fixed effects estimates will be unbiased. But even this assumption is potentially too strong. For example, full-time faculty may be more likely to teach honors sections or daytime sections with regular or late-hours sections left to graduate students. Students planning to major in a given subject may actively seek-out full-time faculty per se or honors sections.

To address the remaining selection we employ a third strategy: an instrumental variables approach to limit identification to variation in instructor type that is uncorrelated with prior, unobserved student interest in the subject. Specifically, we instrument for instructor type, identified by the variables $GradStu_{ijkt}$ and $Adjunct_{ijkt}$ in Eq. (1), using each department's term-by-term variation in the proportion of courses taught by professors of different rank. Departments face natural fluctuations from term to term in the faculty available to teach as professors are hired, retire, take sabbaticals, and replace courses with research grant funds. Departments also experience temporary fluctuations in the demand for particular courses that translates to more course sections. Since graduate students are one

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solution to short-run staffing fluctuations, we hypothesize that variation in the proportion of full-time professors from term to term will predict undergraduates' exposure to graduate student instruction. Likewise, this instrument should predict exposure to part-time instructors, and we therefore instrument for adjuncts as well.4

The first-stage, described by Eq. (2), models the probability of exposure to graduate student instruction as a function of the department-specific variation from term to term in the proportion of courses taught by full-time professors relative to a department steady state.

First, for each department k at campus j, we calculate the number of assistant, associate and full professors teaching during time t, where t is the term of a specific school year. 5 To address differences in scale across departments, we normalize these counts by the typical number of full-time professors teaching in the department during the same term.6 These normalized counts are captured in the variables AsstProfjkt, AssocProfjkt, and FullProfjkt in Eq. (2). Second, we include campus and department fixed effects, σj and τk respectively, so that we are identifying based on deviations from a given department's average reliance on different types of faculty from term to term.

As reported below, deviations in the proportion of faculty teaching in a given term are highly correlated with the probability that an undergraduate took her initial course from a graduate student. However, for our instrumental variables estimates to be unbiased, this distribution of teaching across ranks should not affect undergraduate outcomes directly. Consider, for example, a department in long-run decline where the number of full-time faculty shrinks in successive time periods and replacing them is unlikely to take place. To address short-run course commitments, the department would likely turn to adjunct and graduate student instructors. In this scenario, students might be reluctant to continue their studies in a collapsing department, even if instructor type has no independent relationship with undergraduate students' future academic trajectories. We are not particularly concerned about this threat, however, as prior analysis (Bettinger & Long, 2010) suggests that such declining departments, representing just three percent of all departments across all schools, are rare in our analysis sample.

3.2. Outcomes for graduate student instructors

Our second objective is to explore the relationship between individual graduate students' teaching experiences and their own academic and professional outcomes. One way to interpret this analysis is causal: that the teaching experiences could affect the subsequent outcomes of the graduate students. However, given that graduate students do not randomly choose whether to teach, we acknowledge the likely selection involved. Therefore, we pursue this analysis in part to gain insight into the selection of graduate student instructors from among the large pool of graduate students in a department. The limited evidence on graduate student teaching, notably Borjas (2000), suggests that understanding which graduates are teaching is critical to understanding the effects of their teaching on undergraduate students.

We examine this relationship by estimating the probability that graduate students complete a doctoral degree, and separately, gain employment at another college or university in Ohio within six years of beginning their graduate program as a function of their teaching experience during graduate school. Eq. (3) describes our approach.

The key predictor variable, TermsTaughtijk, is the number of terms graduate student i taught an undergraduate class (within six years of starting graduate school). Our specification also includes fixed effects for department-by-campus τkj. Standard errors are clustered at the department-by-campus level.

We estimate Eq. (3) using our sample of graduate students who began their graduate programs in 1998 or 1999, and subsequently taught at least one undergraduate class.7 Thus TermsTaughtijk cannot be zero, and the correct interpretation of β is how each additional term teaching, conditional on teaching in one term, predicts the outcome of interest. The data available for this study do not include graduate students with zero teaching experience, thus we cannot estimate the margin of teaching versus no teaching experience.

Selection is again a primary concern for any casual interpretation of estimated effects on graduate student outcomes. Notably, when selecting an instructor from among a pool of graduate students,

departments may be more likely to select graduate students who are planning to seek a faculty job after graduation; alternatively, they may try to protect those students from teaching so that they can focus on building a research portfolio. From the perspective of the graduate student, the ability to secure teaching opportunities may be a function of interest, motivation, and other latent characteristics that are correlated with academic and professional success. While fixed effects reduce some sources of bias by identifying on differences between students in the same department, at this time we do not have additional empirical strategies to address residual selection bias. As a result, we caution against interpreting these estimates causally; rather, we believe these results help clarify the implications of our estimates for undergraduate students.

3.3. Data and study sample

To estimate the specifications described above, we use administrative data provided by the Ohio Board of Regents (OBR). The undergraduates in our sample are first-time, full-time, traditional-age (18 to 20 years) freshman who enrolled at one of twelve public, four-year colleges and universities in Ohio during the fall of 1998 or the fall of 1999. The graduate students in our sample were enrolled at one of the same twelve institutions and taught undergraduates from one or both of these two cohorts at least once during the undergraduates' college careers.

For undergraduates the data include demographic details, test scores, major, college courses taken, and the instructor(s) for each course. The OBR data track students across campuses within the Ohio public higher education system, both two- and four-year institutions, which enables us to observe students even when they move from one school to another, or withdraw from any one course. Thus, for example, we can link a student's first biology class at Ohio State with a biology major later declared at the University of Cincinnati. Similarly we can track students who took their first biology course from a graduate student, even if the student withdrew from the course and did not receive a grade. Unfortunately, we do not observe outcomes at private institutions and institutions outside Ohio, and as a result, we cannot distinguish students who transfer to a school outside the Ohio public system from students who drop out of college entirely. Previous work by Bettinger (2004) suggests this is not likely to impact our substantive findings since the rate of transfer to out-of-state or private institutions is quite small among our student sample.

Additionally, for most undergraduates the data also include information taken from forms students complete when sitting for the ACT exam. Particularly important for our identification strategy, these ACT data include the student's intended major stated before they matriculate. Given the value of knowing students' major intentions, we limit our undergraduate analysis sample to individuals who took the ACT. In our data, 89% of four-year college students in Ohio take the ACT.[8]

Table 1 reports summary statistics for these undergraduates and their course taking behavior. Consistent with national trends, the sample is more female and less black than Ohio's college-aged population, as shown in the top panel. They are also spread across Ohio's selective and non-selective public institutions which span the state's urban, suburban, and rural areas. Additionally, the proportion of Ohio high school graduates who immediately enroll in college is near the national average (Mortenson, 2002).

The bottom panel of Table 1 describes students' experiences during their first course in a given subject and subsequent behavior in that subject.[9] Across all courses, undergraduates are taught by graduate students in about one-fifth of their courses in a subject, and undergraduates take, on average, five additional credits in the same subject within a year of taking an introductory course.

The right hand column of Table 1 focuses on our undergraduate analytic sample. In our analysis of undergraduate outcomes we focus on undergraduates' first course in a given subject, and further limit the sample to only courses where at least 10%, but no more than 90%, of sections are taught by graduate student instructors. We also exclude remedial or developmental courses because of their unique design and objectives. This restricted sample of undergraduates is not very different in composition from the full student sample shown on the left of Table 1; however, the restricted sample is drawn slightly more from the selective institutions which are more likely to have graduate programs.

Table 2 compares, by subject, the proportion of undergraduates who took their first course from a graduate student instructor calculated for the full sample and for the sample of courses with variation in instructor type. The restriction affects inclusion of social science and science courses more than some others, such as English and math/statistics, and particularly affects professional departments.

Table 3 characterizes the instructors to which the undergraduates in our student sample were exposed. The first two columns of Table 3 describe the faculty who taught any undergraduate: Column 1 shows the raw means at the course-level, and Column 2 weights by the number of students taught. Approximately 44% of students were taught by faculty with a PhD, 21% by adjuncts, and 14% by graduate students. The right side is limited to faculty of courses where the course was the undergraduate's first introduction to a department. Graduate student instructors were much more likely to be women or minority than full-time instructors.

In addition to the basic instructor characteristics summarized in Table 3, the Board of Regents provided additional data on graduate student instructors. The graduate student data include course taking information (similar to the data for undergraduates), longitudinal data on credits earned and GPA, and detailed degree information. Additional data record the details of employment (i.e., employer, earnings) between the last quarter of 1998 and the second quarter of 2006, but only for employment in Ohio.

Table 4 provides mean characteristics for the sample of graduate student instructors in our analysis of graduate student outcomes; students who began their graduate studies at an Ohio public institution in 1998 and 1999. All students in the sample taught undergraduates at least once (within six years of beginning graduate school); 22% taught just once, while 26% taught in five or more terms. Within six years of starting graduate school, 16% had completed a PhD, and 53% were employed in Ohio with 15% working at an Ohio college or university (excluding their own graduate institution). Another 30% were still enrolled at their university during the sixth year. As Column 2 shows, these characteristics are fairly consistent when focusing exclusively on students from academic departments.

4. Results

4.1. OLSs estimates of the effects of graduate student instructors

We begin with OLS estimates of how early exposure to graduate student teaching affects future undergraduate interest in the subject. In general, the OLS estimates suggest negative effects although, as previously discussed, these may be influenced by non-random sorting of instructors and students even after the inclusion of different fixed effects. Table 5 reports OLS estimates predicting the total number of subsequent credit hours taken in a given subject with varying fixed-effects approaches to address some forms of selection. Columns 1–4 of Table 5 report outcomes following exposure to graduate student teaching in an initial course in a subject during any term. The naïve estimates in Column 1, which exclude any fixed effects would suggest having a graduate student instructor reduces the number of future credits taken in the same subject. When we account for systematic differences from term-to-term and fixed differences across campuses and subject areas, Column 2, the effect is reduced by about 60%. Similarly, when we further control for differences across courses in the same department, Column 3, the effect is again reduced by about half; it approaches zero but is still statistically significantly negative when we cluster at the student level.10 Finally, if selection patterns differ over time, a course-by-time fixed effect will reduce bias. When we add these last fixed effects in Column 4, the magnitude of the negative effect increases.

The differences in estimates across Columns 1 through 4 of Table 5 reinforce the importance of considering how departments, courses, and sections of the same course differ in terms of how students and instructors are assigned to each other. Accounting for non-random variation in which undergraduates enroll in which sections, and who teaches those sections is critical to identifying the true effect.

Coefficients on ACT score and the subject being the undergraduate's major field are also reported in Table 5. Across specifications, higher ACT scores predict more courses taken in any subject, and particularly in the student's major (the interaction of ACT and major). The estimated marginal effect

of "In intended major" is zero when ACT score is a very low seven or eight points (such an ACT score is more than three standard deviations below the mean for our sample).

On the right hand side of Table 5 we report estimates of credits taken following exposure to graduate student teaching during only the undergraduate's first term (as opposed to any term). We hypothesize that selection may be weakest during the first undergraduate term since at this early stage new matriculants know the least about differences in subjects, specific courses, and instructor types. Additionally, they may have the least flexibility in scheduling given the need to complete baseline requirements. For this sub-sample, Columns 5–7 replicate Columns 1–3 (there is no Column 4 analog since time cannot vary within a cohort when the analysis is restricted to students' initial fall term). The estimated effect of exposure to graduate student instruction in the first term is, as before, negative.

4.2. Selection on observables

The fixed effects strategies employed in the specifications in Table 5 address selection across departments, courses, and the timing of enrollment in a course. They do not, however, address selection across sections within a course. In Table 6 we explore the extent of this sorting by predicting the likelihood of having a graduate student instructor using specifications similar to Table 5 except, of course, excluding the graduate student regressor which has become the dependent variable. Students with higher ACT scores are less likely to have a graduate student instructor, though this relationship is practically meaningful only when the subject is the student's intended major. Although the coefficient on "in intended major" is positive and large, undergraduates with ACT scores near or above average do not have a higher probability of seeing a graduate student in their intended major. Additionally, undergraduates attending selective institutions are more likely to have graduate student instructors. These patterns generally hold across fixed effects specifications, and whether considering all courses or focusing just on courses in students' first term.

4.3. Instrumental variables estimates

Given the sorting concerns observed in Table 6, we remain concerned about issues of selection across course sections as well as other unobserved differences, which our previous OLS specifications fail to adequately address. In response to these lingering sources of potential bias we employ an instrumental variables strategy that uses variation over time in the composition of each department's faculty as an instrument for exposure to graduate student teaching. Ultimately this approach results in estimates quite different from ordinary least squares.

Table 7 reports coefficients and F-tests on excluded instruments from first stages predicting undergraduates' exposure to graduate student instruction as a function of variation in faculty composition within departments over time (Eq. (2)). As before, the left side of Table 7 uses the sample of all courses while the right side focuses on courses taken during the first term. The pattern across specifications and samples is fairly consistent: the probability of taking a course from a graduate student instructor is significantly related to departmental deviations from the steady-state proportions of most full-time faculty of different ranks, particularly assistant professors. The results are strongest when focusing on courses during the first term. And, given the coefficient signs, graduate students appear to be a substitute for assistant professor teaching in particular.11 However, the more conservative standard errors clustered at the section level make the pattern of statistical significance somewhat less consistent. In general, F-tests suggest that the combined excluded instruments do explain substantial variation in undergraduate exposure to graduate student teaching. However, when clustering at the section level, the F-statistics are much lower and sometimes below conventional thresholds.

Table 8 reports two-stage least squares estimates of the effect of graduate student teaching on undergraduates' subsequent interest in the subject. Each cell represents the coefficient of interest from a separate regression. All regressions in Table 8 include campus-by-department-by-course and term fixed effects, as well as the standard set of student-level covariates employed across all analyses. The underlying first stages are reported in Columns 3 and 6 from Table 7 for the left and right sides of Table 8 respectively.

In contrast to the OLS results in Table 5, the 2SLS results suggest that overall—pooling all subjects (Row 1)—taking a first class in from a graduate student increases the probability of majoring in that subject. Across their college career, taking an initial course in a subject from a graduate student increased undergraduates' likelihood of choosing that subject as a major by 9.6 percentage points. This is almost a tripling of the baseline probability of 3.5% reported in Column 3 of Table 1. Exposure to graduate student teaching also increased the number of subsequent credits taken in the subject by about 2.3 or about one quarter of a standard deviation. These results are statistically different from zero when we allow for clustering at the student level, but allowing for clustering at the course-by-section level suggests the estimates may be much noisier. By contrast, it does not appear that undergraduates' major choices or subsequent course taking are influenced when their exposure to graduate instructors occurs during their first college term.

The additional rows of Table 8 report effect estimates for three subsamples: academic subjects (e.g., humanities, sciences, mathematics), and professional subjects (e.g., education, business, engineering). The academic and professional samples are mutually exclusive and exhaustive; the STEM sample draws from both.

The contrast between academic and professional subjects is notable. Undergraduates taught by graduate students are very likely to subsequently major in the subject: an estimated effect of 81 percentage points on major choice. The estimates for course taking behavior are complementary: 83 points more likely to take any additional courses and an average increase of 30 additional credits in the subject. These differences are robustly significant to both assumptions about error clustering.

Although these results are consistent with the large effects for professional students exposed to adjunct instructors in prior research (Bettinger & Long, 2010), we caution against making strong inferences regarding what appear to be large differences for professional subjects. There is reason to believe that both the timing of undergraduates' first course in a professional subject, as well as the use of graduate student instructors in these departments, differs in substantively important ways compared to academic departments. Turning to focus just on courses in academic disciplines, undergraduates taught by graduates students are about 2.4 percentage points more likely to major in the subject subsequently although estimates for course taking are fairly imprecise.

The results in Table 8 suggest that there are positive impacts on student engagement in subsequent courses. Other research has suggested that high quality instruction is directly related to subsequent engagement (e.g. Coates, 2005). There still remains the possibility that other graduate student characteristics or practices (e.g. ease of grading) could explain the differences in student outcomes noted in Table 8.12

4.4. Effects of teaching on graduate student outcomes

While the instrumental variables estimates address issues of selection regarding the impact of graduate student instructors on undergraduates, the estimates in Table 8 are partly a function of the relative quality of graduate student instructors and full-time faculty in our Ohio public institution sample. Of particular concern is that, conditional on hiring graduate student instructors, departments likely do not randomly choose individuals to fill those teaching slots. Faculty may prefer that their most promising students take opportunities to teach as preparation for future careers or to preserve the quality of the department's instruction. Alternatively, faculty may prefer that their most promising students focus on research not teaching. To explore the selection of graduate students into teaching roles, we next estimate the relationship between the frequency with which a graduate student taught courses and the graduate student's own probability of future academic success.

In Column 1 of Table 9 we predict the probability of completing a doctoral degree within six years of starting graduate school. Each additional term in which a graduate student teaches increases the probability of degree completion by 2.1 percentage points in the full sample.13 The point estimate is the same, 2.1 percentage points, when we limit the sample to graduate students in academic departments, and appears strongest in the humanities. These coefficients suggest that teaching one additional term in the humanities or math is associated with a 13% increase in the probability of degree completion within six years.

This predicted increase in degree completion rates could be an effect of the "treatment" of teaching undergraduates, but could just as likely be an artifact of how graduate student instructors are selected. The positive coefficients suggest positive selection: departments may prefer to selectively hire their relatively successful doctoral students to fill teaching slots. Institutions and departments may have heterogeneous preferences and our estimation includes campus-by-department fixed effects in part as a response; however, the results are not much changed without these fixed effects.

Degree completion is a broadly held goal for all graduate students. In addition, many graduate students are also working toward securing employment at a college or university after graduation. Again, opportunities to teach could have a causal effect on graduate students' ability to obtain a post-secondary position. Or alternatively, a positive relationship could suggest that departments select graduate student instructors with preference for those who are on a trajectory toward college or university faculty.

In Column 2 of Table 9 we predict the probability of being employed by an Ohio college or university, other than one's own graduate institution, within six years of starting graduate school. Of note, unlike much of the analysis in this paper, "Ohio" here includes both public and private colleges and universities because ODJFS tracks all employment.14 Across all departments, we estimate that the probability of subsequently working in higher education increases by 1.4 percentage points for each additional term a graduate student teaches while a candidate; a 9% increase over the baseline probability of about 0.15 (see Table 4 Column 1). The estimates for subject-specific sub-samples are mostly not statistically significant. As with the degree completion results, if the mechanism here is selection the selection appears positive, and potentially directed toward students on a future faculty trajectory.

We extend the analysis of future employment by comparing employment at a research university to employment at other colleges and universities.15 Graduate student teaching is positively correlated with future employment at both research (Column 3) and non-research institutions (Column 4). In the full sample each additional term teaching raises the probability of employment 0.4 percentage points at a research university and 1.1 percentage points at other colleges and universities. If this difference is driven by selection it suggests that departments are more likely to choose graduate students headed toward jobs in colleges and universities where teaching skills are relatively more valuable. If the difference is causal, then the experience of teaching while a graduate student leads more individuals to jobs in college-level teaching.

The mechanisms behind the results in Table 9 could include some causal role for teaching opportunities. For example, graduate students who teach more frequently could develop skills preferred by non-research-focused institutions, or could miss out on opportunities to develop research skills needed for securing employment at research universities. These effects, if they exist at all, are relative since the results in columns 3 and 4 of Table 9 suggest that teaching predicts a greater chance of employment at both types of institutions.

Which interpretation—selection or causation—is correct? For our purposes, it may not matter. Both interpretations give the result that graduate student teaching generates positive results. If the results represent causal effects, then graduate student teaching is a positive experience and helps graduate students graduate in a timely way and gain employment in higher education, at least in their initial careers. Graduate student teaching leads to positive effects on graduate students and mostly positive or no effects on the undergraduate students they teach. If, on the other hand, the results represent selection of university-bound graduate students, then departments are successfully identifying the graduate students who will have positive effects on students, or at least no differential effects compared to full-time faculty.

Acknowledgments

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Small Stories in Online Classroom Discussion as Resources for Preservice Teachers' Making Sense of Becoming a Bilingual Educator

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Abstract. This paper examines the occurrence and role of personal and professional stories, called small stories or narratives-in-interaction, shared among seven bilingual preservice teachers in nine online classroom discussions in a teacher preparation course. Grounded in qualitative and discourse analytic methods, findings indicated that narratives-in-interaction helped the participants make sense of becoming bilingual educators. Small stories acted to connect academic knowledge to teaching experiences, inviting diverse aspects of the participants' teaching self across time and personal and professional lives. Affordances of the online platform encouraged the use of small stories as a social practice for professional development as bilingual educators.

Keywords: Preservice teacher education; Personal accounts (narratives); Discourse analysis; Classroom discussion; Small stories.

1. Introduction

Teachers create new meanings from storied renderings of specific actions in context and use other teachers' stories as resources to comprehend and teach in locally appropriate ways (Bruner, 2006, Clandinin and Connelly, 2000 and Doyle, 1997). In this view, human understanding emanates from how phenomena are connected and interpreted through experiential narratives. Thus, narratives become authentic gateways to understanding not only the teaching process itself but also teachers' growth in professional knowledge and in realizing their "teaching self" (Elbaz-Luwisch, 2002).

Narrative has emerged both as a pedagogical tool in teacher education and an analytical tool in research on teaching (Golombek and Johnson, 2004, Johnson, 2003, Lim, 2011, Pavlenko, 2007, Tsui, 2007 and Xu and Connelly, 2009). In these studies, conventional narrative inquiry methodologies, including interviews and written autobiographies, were used to elicit big stories, that is, recountings of major events in one's life, in "a coherent temporal progression of events that may be reordered for rhetorical purposes and that is typically located in some past time and place" (Ochs & Capps, 2001, p. 124). This big stories approach has generally focused on content and less on the dialogic nature of narratives constructed during interaction.

In contrast to big stories reported in research contexts, stories told in everyday conversations with family, friends, and colleagues look quite different. Recent attention has been given to these informally shared conversational anecdotes, called small stories (Bamberg, 2004a, Bamberg, 2006 and Vasquez, 2011). The term small stories was coined as "an antidote formulation to a longstanding tradition of big stories" (Georgakopoulou, 2006, p. 123). Unlike big stories, analysis of small stories told in natural conversational settings, hence our use interchangeably of the term narrative-in-interaction, looks at both the content and form of narratives, thereby illuminating their situated nature (Bamberg, 2004b). These narrative interactions are influenced by the current context and interlocutors' conversational purposes and backgrounds, so that multiple time points influence present interactions. Thus, unlike the bias toward past experiences in big stories research, small

stories also include "tellings of ongoing events, future or hypothetical events, shared (known) events" and even "allusions to tellings, deferrals of tellings, and refusals to tell" (Georgakopoulou, 2006, p. 123).

For teachers-in-training, small stories they share with family and friends become populated by new characters that reflect their immersion in a new context and their emerging professional/academic goals. This, according to Oakeshott (1962), is key to professional training because "learning a new technique does not consist in getting rid of pure ignorance, but in reforming knowledge which is already there" (p. 12). Narratives about past, current, and imagined events are powerful vehicles for making sense of teaching and making necessary changes in themselves and their emerging teaching practices.

Given this literature, we wondered how small stories would unfold in a teacher education context and what role they would play in preservice teacher development. We saw the context (synchronous computer-mediated classroom discussion of a theory-into-practice course) and participants (students preparing to become bilingual teachers) to which we had access as particularly felicitous for this exploration. We grounded our research in literature on teacher identity work, teachers' narrative-in-interaction, and computer-mediated discussion.

1.1. Identity work in becoming a teacher

The prolific but complex literature on teacher identity development includes a wide range of perspectives, from Erikson, 1959 and Erikson, 1968) classic views to more recent notions of identity as socially situated and dynamically responsive to the current cultural and discoursal context (e.g., Gee, 2011 and Moje and Luke, 2009). For this study, we adopted the latter perspective, recognizing that identity can be indexed by the words individuals use, and that a semester of observation is likely inadequate to observe radical changes in identity development, but it is appropriate for capturing some of the identity work in which these preservice teachers were engaging. Additionally, Beijaard, Meijer, and Verloop's (2004) review of research revealed that the concept of professional identity in teaching and teacher education has been used with various, but interwoven, definitions, including teachers' concepts or images of self, teachers' roles, and negotiations between social and individual perspectives. Grounded in their research synthesis, Beijaard et al. argued that professional identity formation is a process of building knowledge "characterized by an ongoing integration of what is individually and collectively seen as relevant to teaching" (Beijaard et al., 2004, p. 123). Therefore, aspects of professional identities are not confined to the acquisition of subject matter and pedagogical knowledge, but also include accumulating knowledge of human relations; the goal-directed, emotionally-laden nature of learning; and even conflicting perspectives and identities in developing one's sense of becoming a teacher (Alsup, 2006, Antonek et al., 1997 and Kanno and Stuart, 2011). In this process, teachers' dialogue with colleagues about their experiences is critical to their grasp of diverse perspectives on and resources for teaching (Coldron & Smith, 1999), as is dialogue with expert others and professional texts (Golombek and Johnson, 2004 and Lee and Brett, 2015).

Construction of teacher knowledge and identity is greatly influenced by one's personal, cultural, and linguistic background and schooling experiences (Clandinin and Connelly, 2000, Feryok, 2012, Golombek and Johnson, 2004 and Varghese et al., 2005). Because these experiences and backgrounds are often reflected in narratives, the use of narrative has been advocated as a pedagogical tool in teacher education in order to connect personal and professional identities (Alsup, 2006). Attention to narratives has concomitantly increased in research on teacher education and teaching (Abednia, 2012, Kleinsasser, 2013 and Lim, 2011), analyzing narratives as a way to explore individual and social identities. Constructs including identity as narrative (Moje & Luke, 2009) and self-as-speaker/narrator (Bamberg, De Fina, & Schiffrin, 2008) represent this new view that identity formation is a process of constructing meaning through sharing stories about one's experiences. In this paper, we take the perspective that exploration of one's emerging teaching self can be expressed and then "capture[d]" in narrativized discourse (Moje & Luke, 2009, p. 427; Gee, 2011).

Accumulated from past experiences and representing present realities, identity is also future-oriented, drawing on individuals' capacity to envision who they might become and to which communities they aspire to belong (Norton and Toohey, 2011 and Wenger, 1998). This exploration of

future identities also implicates the formation of future community membership, which is rooted in shared experiences, interactions, and understandings among members. Previous research has claimed that teachers' future-oriented talk is tied to the exploration and presentation of future possible selves (Urzúa & Vásquez, 2008). Teaching staff engage in discourse about future teaching, but preservice teachers do as well. Despite their limited teaching experience, they begin to imagine themselves and play out scenarios as their imagined future teaching selves (Johnson, 1987).

Our view of small stories as helping someone learn what it means to be a teacher is particularly supported by recent theoretical views that teacher identity is not static but results from ongoing processes shaped by social interactions (Akkerman and Meijer, 2011, Gee, 2000 and Varghese et al., 2005). Identities are under constant revision as individuals speak and interact with others. Thus, who we are varies according to whom we are engaging, where, and why. This identities-in-interaction perspective favors a microgenetic approach to investigating identity development through narratives-in-interaction because it "focalizes the momentary history of human sense-making in the form of emergent process" (Bamberg, 2004b, p. 334) and allows one to observe how individuals begin to consider new possible selves as they grapple with emerging understandings (Kuhn, 1995). Our study's aim was not so much to identify evidence of preservice teacher identity development (for such work, see Kanno and Stuart, 2011, Meijer et al., 2009 and Reis, 2011b), but rather to analyze how preservice teachers' "identity work" was reflected in discourse at microgenetic moments while they were learning to become teachers (Gee, 2000 and Gee, 2011). We saw narrative-in-interaction (small stories) as an avenue to explore preservice teachers' situated social identities, reflecting the dialogic nature of the process by which an understanding about the self and teaching develops.

1.2. Teachers' small stories

Our approach comes from a dialogue between two perspectives, identities-in-interaction and identity-as-narrative (Bamberg, 2006, Georgakopoulou, 2006, Moje and Luke, 2009 and Ochs and Capps, 2001). When individuals include small stories in conversations with others, they create interaction spaces in which their identities are "microgenetically performed and consolidated where they can be microgenetically accessed" (Bamberg, 2004b, p. 334). Because becoming a bilingual teacher involves negotiating multiple cultures and languages, preservice teachers' identity work become necessarily complex. We saw value in a sociolinguistic analysis of small stories in pursuing a better understanding of teacher education, especially for preservice teachers of bilingual students.

The broader literature on narrative and small stories has addressed, though minimally as applied to teaching and teacher education, the role of teachers' small stories in contextualizing personal and professional experience. Examples include Richards' (1999) demonstration that sharing small stories in the staffroom helped teachers establish common understandings and values. Vásquez's (2007) analysis of post-observation meetings between novice teachers and mentors revealed that participants jointly used small stories to construct conversations, as when novice teachers provided contextual information about their classes to help mentors understand. Watson (2007) explored how two preservice teachers co-constructed small stories about their practicum experiences in order to attain shared understandings about subject matter and pedagogy. Barkhuizen (2010) analyzed one immigrant preservice teacher's small story about an imagined "better life" for the local immigrant community, concluding that the story offered this teacher-intern a way to imagine herself as a future teacher of immigrants and to rethink her role as an immigrant teacher herself. This last study, in particular, showed how teacher identity was continuously constructed and negotiated through narrative sharings in localized social interactions. These studies focused on the details of talk and the ways that participants narrated their lived or imagined experiences in story form. Notably, the small stories analyzed in these studies came from oral conversations outside the classroom.

1.3. Learning through computer-mediated discussion

Increasingly, individuals find themselves engaging in computer-mediated interactions, and the modern classroom often involves intellectual discussions mediated by an online program. The affordances of such activities have inspired research on knowledge construction, learning communities, and identity exploration in computer-mediated discussion (CMD). First, because text-based online communication by its nature generates sustained thinking and discourse, CMD has

been recognized for its educative potential, including its encouragement of reflection (Garrison et al., 1999 and Reis, 2011a). In some cases, students reported more reflection time and better learning outcomes in online environments than in traditional face-to-face discussion (Morgan, Rawlinson, & Weaver, 2006). CMD can help students consider and reflect on multiple perspectives (Kamhi-Stein, 2000 and Picciano, 2002). Finally, engaging in diverse ways of thinking in CMD, students are simultaneously exploring and developing possible identities (Coiro, Knobel, Lankshear, & Leu, 2008). Thus, CMD becomes a venue to facilitate dynamic constructions and presentations of self, which has implications for teacher education.

When online discussion is incorporated into coursework, the dialogic nature of discussion among preservice teachers may facilitate development of their professional teacherly voices (Sutherland, Howard, & Markauskaite, 2010) and perspectives (Lee & Brett, 2015). Wade and Fauske (2004) reported on diverse discourse strategies and genres preservice teachers used in online discussion as they aligned themselves with classmates and established identities as future teachers. Another line of research has explored interactional features of the collaborative learning process in online classroom discussion (Jordan et al., 2012, Schallert et al., 2009 and Vogler et al., 2013). The question remains whether and how these affordances of CMD manifest specifically with small stories.

1.4. Our study

We explored the ways that students recounted personal and professional stories in classroom discussion in relation to their emerging understanding of what it would mean to become a bilingual educator. Specifically, we examined the online discourse that occurred during synchronous CMD sessions as part of regular face-to-face meetings. We were guided by previous research that examined class members' interactions as they moved toward developing shared knowledge, focusing on naturally occurring language and discourse (Cazden, 2001, Chamot and O'Malley, 1996 and Erickson, 2004; Gee, 2011; Mercer, 1995). Our study differed from these previous studies in our focus on narrative-in-interaction in CMD as an important literacy event in educational contexts.

Two research questions guided us: (a) What types of narratives emerged in preservice teachers' online discussions and how did they function in the dialogic exchanges?; (b) How did narratives contribute to preservice teachers' collaborative meaning making and exploration of what it would mean to become a bilingual teacher?

2. Method

2.1. Participants and setting

Our participants (see Table 1) were seven undergraduate preservice bilingual teachers enrolled in a pre-K/elementary teacher preparation program at a large southwestern university. All seven had heritage ties to Spanish-speaking Latin American countries. Although acceptance into the program was contingent upon certain levels of proficiencies in both languages as determined by the university's language assessments, students considered themselves bilingual to varying degrees. Two (Carla and Rose; all names pseudonyms) were English-dominant, having received English-only instruction throughout their education and having begun formal Spanish instruction in high school to enhance their minimal Spanish. One international student (Vanessa) had recently come to the United States to attend university and was much more fluent in Spanish than English. The remaining four considered themselves fluent enough in both languages to become bilingual teachers, although they reported higher proficiencies in English than Spanish and in oral than written Spanish. Among these four, one (Robert) had been raised speaking both languages at home but was instructed in English only in grades K-12. The other three (Juanita, Nadia, Delicia) were native Spanish speakers but became bilingual through either English as a second language (ESL) or bilingual education during elementary schooling.

Data were collected during the second semester of a four-semester-long teacher preparation program. The first semester involved coursework on language acquisition and teaching methods. During the second semester, students continued their methods coursework but also enrolled in the theory-into-practice course that served as the context of our study. Concurrently, they engaged in their first practicum placement in a lower-grade classroom two days per week. The third semester

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included an upper-elementary practicum and more methods courses. The fourth semester was devoted to full-time student teaching. The timing of the course we studied was particularly relevant to our research focus because of the students' concurrent introduction to their first practicum placement.

The course was focused on applying learning theories to real school settings. The professor, Donna, had designed the 3-h weekly class sessions to include both face-to-face instruction and CMD in the form of text-based synchronous chatting. Her rationale for online discussion, shared with students on the first day of class, was that it allowed class members to benefit from various voices and perspectives. The online discussion, managed through a web-based chat platform, usually occurred during the last 45 min of class, when Donna would direct students to open their laptops and continue discussion online. The teaching assistant (Rebecca), a former middle school teacher, was actively engaged in every online discussion along with the students and professor.

Invited to participate in the study only after their grades were posted, six of the seven students gave us permission to quote their words for research purposes. Recognizing our reflexivity, we acknowledge that "Donna" and "Rebecca" are two of the co-authors on this report. However, because our focus on small stories developed only after the semester was over, we believe our research focus had minimal influence on class activities.

2.2. Data sources

Digital records of nine online discussions served as the primary data source (three of 12 class meetings did not include CMD). A secondary source came from a survey administered after the end of the semester. The survey (see Appendix) asked about students' reflections on online discussion in terms of enjoyment, participation, and narrative exchange, and their backgrounds and views on becoming bilingual teachers (Abednia, 2012).

2.3. Data analysis

2.3.1. Phase 1

We began by making coherence graphs (see Fig. 1 and Fig. 2 for examples) of all nine online discussions to represent visually how comments were interconnected (Schallert et al., 1996). In this process, we treated each comment as the unit of analysis in keeping with Bakhtin's (1981) claim that every utterance is an action with meaning and consequence in relation to other utterances. Coherence graphing helped us read these discussions as maps where meaning-laden actions were responses to previous meaningful actions. When comments seemed related, they were connected with a line, and we called any group of three or more connected comments a topic thread. Drawing these coherence graphs was done either in longhand on lined paper or digitally on spreadsheets (Excel). Coherence graphs helped us identify emerging topics, trace how topics developed through shared comments, and see how narrative comments functioned in the larger discussion.

Next, we determined the discursive function of each comment, engaging in an iterative process, of first analyzing transcripts and coherence graphs, then discussing potential themes, coding individually, comparing initial codings, and ultimately reaching consensus on a coding scheme for discursive moves (see Table 2 for definitions of move types and examples).

Our scheme included two major move categories: narrative and non-narrative. Reflecting previous work (Georgakopoulou, 2006; Vásquez, 2011), narrative codes were divided into three sub-codes: (a) personal narratives (PerN) about past experiences and linguistic/cultural background information, (b) professional narratives (ProfN) about experiences in their practicum, and (c) projected future narratives (PF) in which participants discussed possible teaching practices and situations, imagining themselves as future bilingual teachers. Note that comments coded as PFs often lacked aspects of more typical experiential stories such as a sequenced course of actions, as also reported by Georgakopoulou (2002) and Taylor (2005) who considered such comments "future narrative" as long as they indicated elements of agency in the imagined future subject, even in the absence of standard narrative forms.

For each narrative type, we also identified comments that elicited narratives from other class members (EPerN, EProfN, and EPF). Attention to eliciting moves helped us understand features of talk that directly supported the sharing of narratives. Comments that used rhetorical modes other than narrative, including definitions, exposition, and argumentation, were coded non-narrative (NN).

Because both narrative and non-narrative comments were related to course readings and assignments, we grouped them together as academic talk. All non-academic comments were marked side-talk: greetings, closings, and postings not about course concepts (e.g., comments on technological issues). For comments with overlapping codes, we read each and its ensuing responses and chose a single code based on what was most salient in the post.

Two coders were randomly assigned to each discussion, and new pairs of coders were re-assigned for a second round three months later. We obtained a mean of 80% agreement between the first and second rounds and a mean of 90% agreement between coders in the second coding pass. Disagreements were resolved during whole-team consensus sessions.

2.3.2. Phase 2

The next phase of analysis was informed by the constant-comparative method in grounded theory (Corbin & Strauss, 2008) and discourse analytic techniques (Gee, 2011, Herring, 2004 and Johnstone, 2008). Our iterative process represented "a reciprocal and cyclical process in which we shuttle[d] back and forth between the structure (form, design) of a piece of language and the situated meanings it is attempting to build about the world, identities, and relationships" (Gee, 2011, p. 128). We employed qualitative analysis at the interactional level and quantitative counts of discourse moves in order to capture local discourse segments and their prevalence in a larger context. Assuming that discourse exhibits recurrent patterns, Gee (2011) noted that "counting" in discourse analysis guides us "in terms of hypotheses that we can investigate through close scrutiny of the actual details and content" of language use (p. 154). Therefore, the combination of approaches complement each other in "arriv[ing] at a full understanding" (Herring, 2004, p. 25). See Gee (2011, pp. 148–163) for sample discourse analyses alternating between qualitative analyses and quantification of discourse phenomena of the same talk.

We began this phase by examining frequencies of discourse moves over the nine discussions. We then searched for discourse move patterns within discussions, identifying what tended to precede or follow narrative and non-narrative comments because comments do not exist in isolation but represent the back-and-forth of conversation. We generated initial working hypotheses about the dynamics of narrative exchanges, then checked them against the entire dataset by looking at examples and counterexamples, collapsing, expanding, and refining categories and hypotheses as needed.

As categories and patterns were identified, we derived themes to summarize and describe participants' learning experiences and the functions of narratives in their learning. Also, guided by our interest in identity, we looked for how narrative practices addressed issues of identity work and exploration of future teaching selves. At this stage, we examined and compared the CMD and survey data to check for confirming or disconfirming evidence of working hypotheses, and we further refined our themes through close analysis of the participants' words.

2.3.3. Issues of trustworthiness

We sought data trustworthiness (Corbin & Strauss, 2008) in several ways. Credibility and dependability were established through use of multiple data sources and analytical methods. As the instructor (Donna) and TA (Rebecca) were also members of the research team, their extensive contact with each student provided insider perspectives, and other team members contributed outsider perspectives on the data. This mixture of member-checking with the two class members and peer-debriefing among research team members enhanced the findings' credibility. Confirmability was addressed through team meetings and investigator triangulation involving multiple researchers in coding and interpretation.

3. Findings

Findings are organized around the two phases of analysis, beginning with a descriptive report of frequencies and patterns of conversational moves within and across discussions. Using these findings as background, we then present larger patterns and themes that emerged from analysis of CMD and survey responses.

3.1. Move types and frequencies

Table 3 presents frequencies of all move types across the nine discussions. Non-narrative academic talk was most common, with 56.7% of the comments. The three types of narrative moves, including eliciting moves, made up 32.6%: professional (10.7%), projected future (9.6%), personal (5.2%), and their respective eliciting moves (2.5%, 3.4%, and 1.2%). Side-talk accounted for 10.7% of comments but seemed to compose only a small portion of overall talk as these comments were almost invariably short (e.g., "Hello world," "I'm freezing," "Good talk"). Side-talk was excluded from further analysis.

When all types of narratives and narrative-eliciting moves were combined, the proportions of non-narratives and narratives suggested that each discussion had a different emphasis, with some privileging course readings and others real-life situations and pedagogical applications (Table 3). The variability in these proportions suggests that participants had a sense of when small stories were appropriate, and when the discussion called for a greater focus on non-narrative academic content, adapting their discussion style accordingly. Also, frequencies of each narrative type and corresponding eliciting moves appeared to vary together (Fig. 3). This pattern implied that participants' small stories included both self-generated and other-elicited stories that were shared and elaborated upon through participation in discussion, evidence that class members collaborated through their use of narratives. We develop these points with examples in relation to emerging themes in the next section.

3.2. Emerging themes

3.2.1. Theme 1: preservice teachers' narrative moves were in the service of understanding course concepts by connecting theoretical and experiential knowledge

The close connection between narrative and non-narrative moves was supported by several pieces of evidence. Topics presented in narratives throughout the nine discussions were primarily tied to course readings. For example, the readings assigned for November 21 discussed the transformative power of language (Johnston, 2012) and the value of creating multicultural learning communities (Nieto, 1999). The narratives in online discussion that day included: the importance of understanding students' diverse cultures, ways of increasing parent involvement, the value of trusting in each student's capabilities, teachers' learning throughout their careers, and the importance of helping at-risk students.

Patterns of non-narrative and narrative moves within topic threads also suggested the close connection between move types and the relevance of narrative comments to academic meaning-making. The professor, in the first online discussion, suggested class members start by sharing favorite quotes or confusing aspects of their readings. Students seemed to take up her suggestion as a discursive practice throughout the remainder of the semester. About two-thirds of comments initiating topic threads were non-narrative moves containing direct quotes (Carla: 'We never ask them who they are and where they want to go.') or pointing to sections from readings that they wanted to discuss further (Rose: I like one of the questions at the end of the article we read-- How can teacher educators model caring and controlling?). If an initiating comment with a quote/construct from course readings did not contain any narrative (or narrative-eliciting) move (as Carla's comment above), the thread as a whole tended to generate fewer narratives and fewer comments altogether (Carla received only one response, itself non-narrative).

The remaining one-third of initiating comments contained both non-narrative and narrative (mostly eliciting) moves. For example, on October 3, Vanessa initiated a long thread: 'Every child needs to feel welcome, to feel comfortable.'pg85 I think that it is very important to make sure that the students feel welcome in our classroom and schools so they can have a positive experience and be better learners. Vanessa used the quote as a springboard for a projected future in which she imagined herself as the teacher she wanted to be. This single comment acted to connect the quote not only to Vanessa's future, but with "our" imagined classrooms, thereby inviting her classmates to connect the reading to their future teaching selves. The comment generated a topic thread that included many professional and projected future narratives as well as non-narrative comments (Fig. 1). This example illustrates how sharing stories with concrete examples, both experiential and imagined, generated longer and more productive discussions as students used dialogue with class members to understand course content. Thus, topic threads seemed to develop differently depending on whether the initiating

comment contained non-narrative content alone or combined such content with a narrative or narrative-eliciting move.

Additionally, narrative comments almost invariably appeared throughout non-narrative-generated topic threads. Within threads, narrative comments were followed by both narrative and non-narrative moves. For example, Vanessa's comment discussed above received three responses and three simultaneous sub-topic threads (see Fig. 1 for excerpts). In the first response, Delicia's projected future-eliciting move asked her classmates what they would do if a group of students was making others feel unwelcome in the classroom (note that the comment is paraphrased because we do not have Delicia's permission to use her exact words in our report). This developed into a sub-topic thread on pedagogical strategies that would help them with similar issues in their future teaching. The second response was Juanita's professional narrative in which she described the importance of making students in her placement feel safe, prompting Vanessa to contribute a personal story about how close relationships with teachers had helped her emotionally and academically. The third response, a non-narrative comment from Robert, connected Vanessa's initial comment and other previously shared narratives to the concept of "funds of knowledge." In the ensuing sub-thread, class members connected this theoretical construct to strategic lesson planning and desirable teacher characteristics, using both non-narrative and projected future narrative moves. Thus, students used experiences and examples from their past, present, and imagined future to make sense of academic concepts.

Interestingly, we identified a role for narrative-eliciting moves in facilitating collaborative thinking when making connections between theory and real-life situations. When devoid of eliciting moves, topic-initiating comments expressed self-reflection or personal interpretation, but failed to invite others explicitly to make theory-into-practice connections together. In contrast, topic-initiating comments that coupled non-narrative and narrative-eliciting moves (about 30% of initiating comments, a relatively high percentage considering the 7% overall prevalence of eliciting moves), welcomed collective thinking and reflection.

For example, on October 17, when Rose referenced the day's readings, she included a narrative-eliciting move: Something consistent throughout the article was the 'power' or authority student teachers have within the classroom-do y'all feel like your students listen to you and respect you as a teacher?? This comment generated stories about her peers' placement experiences. Nadia shared: I think they do … At first they didn't but my CT is very good at making my partner and I feel that we ARE teacher and we should be treated like teachers in the classroom. Robert told a similar story in which his cooperating teacher gave teacher interns symbolic power when: She introduced us as the new Teachers in her classroom, she introduced us as Mr. Lopez & Ms. Perez, and she gave us a spot at the teachers desk with her. Unlike Nadia and Robert who felt that they received respect from students thanks to their cooperating teachers' help, Juanita reported a different experience from her placement: Robert you're lucky I barely have a chair. As this conversation demonstrates, narrative-eliciting moves enabled participants to share and learn from diverse experiences and situations conveyed in small stories, and, as a result, understand course readings better.

Participants' survey responses confirmed that real-life experiences and examples helped them understand academic content. For example, Rose replied, I enjoy not only being able to share my personal experiences but also hear about my classmates' personal experiences because it helps me to see how they relate to the topic. Robert also commented, it was nice hearing my classmates' responses and hearing similar situations that they've encountered both in their placements and in their lives growing up. It was kind of validating and reassuring. Robert saw that his classmates had had similar experiences as bilingual individuals and preservice teachers; and this realization seemed to facilitate a learning process through which he could better understand bilingual education. The process of learning vicariously through others' stories enabled participants to imagine themselves experiencing the actions and feelings that others had encountered.

From analysis of connections between non-narrative and narrative comments, we derived two important insights: narrative exchanges (a) facilitated collective thinking and understanding, and (b) helped students accumulate knowledge vicariously. As a result, unlike academic content presented in

isolation, pairing academic content with real-life experiences and examples seemed an important way to foster students' understanding of course readings and to encourage contributions from others.

3.2.2. Theme 2: narrative moves helped preservice teachers connect their academic, personal, and professional selves to explore their futures as bilingual teachers

Narrating stories not only reflected participants' bilingual/bicultural history but also contributed to building their bilingual teaching self. Discussions with high proportions of personal narratives (Table 3) dealt with three kinds of personal experiences: as students, with family, and as bilingual/bicultural individuals. Interestingly, the course readings for these days were about general learning concepts and did not specifically address bilingualism/biculturalism. This finding points to the ways that preservice teachers used their personal narratives to connect experiences of bilingualism/biculturalism with academic material that otherwise might appear "culture free" (Ajayi, 2011). The connection between participants' bilingual/bicultural identities and the profession of bilingual education acted as a conduit for exploring their teaching self.

In an example from October 24, the participants discussed cultural stereotyping and conflicts, and the role of education in relation to such issues. The discussion began by establishing the "9/11" attacks as a collective experience. By sharing thoughts and personal experiences about "9/11," students grappled with how the concept of "social imagination" related to cultural stereotyping. Their personal stories demonstrated how they had understood racial and ethnic topics through their affective understandings of personal experiences. For example, Juanita wrote: Every time I am with my brothers and we see someone from the Middle East, they randomly say 'There's a bomb! Nos vamos a morir!' They say it all loud and people turn around and look at us all weird. They do it in a playful manner but sometimes I tell them to chill out. Later, Juanita shared her favorite quote from the day's readings on the value of confronting conflicts for educational development and reform. This topic thread, taking up the latter half of that day's online discussion, was made up of every type of narrative and non-narrative moves except for personal narrative-eliciting. The thread generated personal stories from two individuals who reported they had not been taught how to confront conflicts when they were students but had learned about these issues elsewhere (e.g., Nadia wrote, Last year I went to a fireside at church where they had a guest speaker who is a member now but her family is muslim and she was there to let us know about her culture. That we have a lot of similar beliefs as they do. It was very interesting). Professional narrative comments included stories about an educational conference on the importance of confronting difficult educational issues and about the kinds of topics that made them uncomfortable when talking with students or colleagues in their current teaching contexts (e.g., Rebecca: I went to a conference in HS where they told us to always 'Discomfort the quiet.' Basically it meant that whatever isn't being said, those uncomfortable things, need to be spoken, and we need to see that discomfort as a growing pain). The class also considered an envisioned teaching situation in which sensitive topics, such as ethnicity or religion, would need to be addressed in their future classes (e.g., Nadia: I think if i were to have a class with someone who lived in New York and we talked about 9/11 I would be afraid to ask questions. I wouldn't want to offend them but I feel it's important to talk about it. 'let it out' as they say).

Continuing in the same thread, some non-narrative responses connected Juanita's initial quote with other parts of the reading (e.g., Carla: I really like that quote too. Though social problems are not always ideal, Johnston does add that they offer these 'concrete spaces for understanding different perspectives' and help students manage their emotions). The thread ended with Juanita's summative comment about the importance of respecting students' diverse cultures: well it is just about introducing all cultures to your class and let the students talk about their experiences. The teacher should not just focus on one type of culture. As this example illustrated, these future teachers were able to connect diverse experiences and subjectivities, that is, their embodied affective understandings of their own experiences (Kramsch, 2009), across academic, personal, and professional discourses of the self by sharing narratives during academic discussion.

Class members seemed to explore past personal and future professional subjectivities somewhat exclusively of one another (Fig. 4). That is, in a given discussion, if personal narratives were high, projected future narratives were low (9/5, 9/12, 10/24, and 10/31), and vice versa (10/3, 10/17, 11/14,

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and 11/21), suggesting that these discourse moves had contrasting functions. When participants shared personal stories, they seemed to project themselves primarily as bilingual individuals and as students. In contrast, when they imagined themselves as bilingual teachers through projected future narratives, they identified as teachers. Interestingly, unlike personal and projected future narratives, the use of professional narratives became stable from the third discussion on, reflecting their current experiences as preservice teachers.

Although topics presented in narratives were primarily tied to course readings, the participants seemed to choose whether to relate course topics to their personal experiences in the past or to their teaching future. For example, when the overarching discussion was assessment (October 31), they aligned themselves more with their student selves because of their vast experience as test-takers, rather than with their future teacher selves as test-givers. This discussion included the most frequent use of personal narratives and one of the lowest uses of projected future narratives. In contrast, when discussing communication with parents (November 14), a situation with which they had little direct experience, participants identified more as future teachers, using projected future narratives to one of the highest percentages and used personal narratives in the lowest percentage of all discussions. Here, they could not help but project themselves as future teachers attempting to manage a contentious parent meeting.

Further analysis showed two interesting aspects of how these preservice teachers used projected future narratives to explore what it would mean to become bilingual teachers. First, imagined teaching stories (projected future narratives) in the final two discussions showed increasing specificity and concreteness. Early in the semester, talk about imagined future selves seemed general, and thus, their projected future narratives remained relatively abstract. For example, I would try to incorporate more activities where the students need to cooperate with each others. I would talk to the group of students. I think that sometimes the solution for those problems is communication and opportunities to know the other person better (Vanessa, October 3). In contrast, by semester's end, students' projected future narratives involved imagined attempts to manage problematic situations, generate specific pedagogical plans, and assess situational factors and outcomes. For example, in the final discussion, participants discussed how they would communicate with students at high-risk of incarceration in order to help future students avoid jail time and increase academic motivation. They shared specific actions they would take in this imagined situation. Nadia commented, I would have college day or even suggest visiting the college in their city. In response to Robert's concern that he would not know how to communicate that jail is not the norm, Juanita replied,

Maybe I would have said somewhere around the lines of, your family has made their decisions and their decisions were not so great which led them to follow up with consequences. However, you should be proud of who you are and make good decisions for you, your family, and future, and college is a great decision. It certainly changed my life and it will yours.

Furthermore, participants demonstrated refinement in their imaginings of the future as seen in their consideration of specific situational factors when engaging with projected future narratives. For example, when her classmates collectively created a scenario in which a parent might come to monitor his/her child's classroom behavior, Nadia pointed out a specific complication that her classmates should consider while brainstorming responses to an imagined future problem: That would be a good idea but then the child will act good in front of the parent (November 14).

Other evidence showing preservice teachers' exploration of their future teacher identities came from their use of future teaching stories when exploring an imagined community of teachers. In about 52% of projected future narratives, participants used first-person plural pronouns, "we," "we as teachers," "us," and "our," to index their shared future identities as bilingual teachers. Their use of modal auxiliary verbs such as "have to," "need to," "can," and "must" similarly served to build a shared community of bilingual teachers: "Good point Juanita that is why before we start to make assumptions it is good for to look for information. We can go to their houses to do home visits. I am pretty sure we can learn a lot from home visits, or we can observe our students in places are the playground or if we take them to a field trip" (Vanessa, October 3).

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Building an imagined community of teachers did not only mean imagining colleagues with similar views, but also anticipating diverse perspectives and approaches to teaching. For example, participants exchanged opinions on whether they would invite students as interpreters to parent-teacher conferences (November 14). Divergent projections of their teaching selves were achieved through the use of singular first-person pronouns and hedges. Such pronoun use occurred in about 22% of projected future narratives: "I would say," "I would use," "I would have," "I would try," and "I would ask." Thus, although students presented possibilities in words that limited their claims to what each would do, these comments were shared with classmates who responded and added their own views. Their language implied a projection of a shared community that allowed for diverse possibilities, fostering reflection on multiple teaching approaches.

In sum, the second theme pointed to the role that narrative played in bridging academic discourse and the teaching profession, as well as connecting personal and professional realms. Shared personal and professional stories helped preservice teachers envision teaching practices in concrete ways, providing a storied process within which they could experiment with different envisionments of "imagined selves" in various possible futures, including future membership in a teacher community.

3.2.3. Theme 3: sharing small stories, facilitated by the affordances of the online venue, helped preservice teachers reflect on what it means to be a future bilingual teacher

Our analysis revealed that the online platform, along with its affordances for fostering collaborative participation among class members, provided an additional venue for making sense of becoming a teacher. In the following, we provide evidence of the facilitating effects of a text-based communication medium on students' sharing of narratives. The aim of this analysis was not to compare online participation with that from face-to-face discussion, but to show how the collaborative participation around narratives was facilitated by CMD affordances.

Responses to narrative and non-narrative comments differed in that narratives tended to trigger multiple responses that produced multiple sub-threads, whereas non-narratives tended instead to elicit sequential comments and a single, linear thread. Here, we define a direct response as a comment that a participant posted in direct relation to a previous comment, whereas all other ensuing comments in the same topic thread are indirect responses, considering that all other than the initiating comment are connected to the initiating comment but through other intervening responses. Nearly 40% of narrative comments yielded more than one direct response, whereas only 29% of non-narrative comments had more than one direct response. Because these calculations included any comment that elicited two or more direct responses (sometimes as many as eight), they give a conservative estimate of the exponential clustering that reflected multiple class members' direct engagement with a narrative comment. Narratives in effect triggered immediate responses from several discussion members with the potential of introducing diverse perspectives. Contrastingly, non-narrative comments stimulated a relatively linear progression of thinking, as students built on one another's academic talk while co-constructing their understandings of course content. Thus, the commingling of non-narrative and narrative comments allowed conversations to grow, both in breadth and extent.

One example from November 21 (Fig. 2) shows the ways that a narrative-eliciting comment generated several direct responses. Nadia (#83) quoted a reading on the high rate of U.S. incarceration and expressed wonder about how the students in her practicum placement would fare in the future. This eliciting move generated eight direct comments from seven other class members. These eight responses were coded as non-narrative (1), personal narrative (1), professional narratives (4), and projected future narratives (2). In one professional narrative, Juanita described how the child she was tutoring said that many of his family members had gone to jail, so he had decided to do that first to get it over with before going to college. Her professional narrative stimulated a long discussion of what these preservice teachers planned to do in their future classrooms in order to help at-risk students. This example demonstrates the tendency for comments to cluster in response to narrative comments and for narrative comments to generate more stories from other participants, in contrast to non-narrative comments that typically received fewer direct responses. This contrast is depicted in Fig. 2: a relatively linear progression of non-narrative comments on the left side versus more clustering around narrative (and narrative-eliciting) comments on the right.

This direct engagement with multiple discussion members around narrative comments was facilitated by the written nature of the online medium itself. Preservice teachers characterized the written communication as a resource in itself. Robert stated: "You were also free to go back and see any responses you may have missed and make more direct connections with the information that was plainly available." The written nature thus afforded the extended time to think and craft one's own comments and review others' comments, and this likely encouraged less outspoken participants to contribute. As Robert stated on his survey, "we were all equal in the chats, that is, no one was seen as a judge or evaluator." In addition, they often commented in their surveys that they felt less pressure to figure out when and if they should make a comment during online discussion than they did in face-to-face discussion. Thus, the online medium allowed for less self-editing or talking over one another and for more comments by multiple participants to be simultaneously shared. Interestingly, these characterizations seemed to apply to narrative exchanges relatively more readily than to non-narrative comments. In other words, the multiple engagement with and around narrative comments found in our data may have been less visible in face-to-face discussion.

In this sense, narrative sharing, facilitated by the affordances of CMD, provided the potential of promoting diverse experiences and stories, thus, diverse perspectives and voices. This finding was supported by Robert's survey response: I remember we were discussing teacher communication and involvement with students, and I and many of my classmates were sharing personal experiences they remembered about positive and negative interactions they'd had with their own teachers, and how it affected their teaching styles in placements. Robert's own experiences, as expressed through narrative comments, took on new meaning once they were shared in CMD, as his classmates' various interpretations and understandings revealed dimensions of experiences to which Robert may not have had access on his own. Furthermore, he described his enjoyment in hearing how different interactions with teachers had affected his classmates, even if those experiences were not part of his own educational past. Survey responses, along with evidence from the CMD data, suggested ways that personal and professional experiences discussed online facilitated the sharing of diverse perspectives in the process of understanding theory and practice relevant to bilingual education.

4. Discussion

Our findings highlighted the storied character of teachers' knowledge building and identity exploration. Freeman (2002) argued that one aim of teacher education should be to help teachers find meaning in their experiences in becoming reflective practitioners, and achieving this aim is likely facilitated by acquiring discourse with which to articulate their experiences. Through narratives-in-interaction shared in online written discussion, our preservice teachers related experiences and described imagined teacher roles as they made sense of bilingual teaching.

Before providing interpretations of our findings, we need to acknowledge our study's limitations. We had only nine class members in the study. It is possible that the intimacy of a small group fostered participants' willingness to share personal stories. It is also possible that the nature of the course, one that focused on theory-into-practice connections, encouraged narrative exchanges more than other teacher education courses. Also, the data were collected from a one-semester course; longer interaction with these preservice teachers could have revealed more about narrative use in relation to identity work and knowledge building.

Recognizing these limitations, we want to revisit our findings by discussing how small stories acted to help our participants (a) build knowledge, (b) develop ways of thinking and knowing as bilingual teachers, and (c) encourage a sense of community among them. Also, (d) narratives-in-interaction allowed the preservice teachers to bridge their different selves, and (e) affordances of the discussion platform fostered the use of stories as a social practice for learning.

4.1. Narrative-in-interaction as knowledge building

Our results revealed several ways that narrative-in-interaction provided a discursive context in which preservice teachers considered theories and their experiences of learning to teach in order to build knowledge of bilingual education. Students used narratives as practical examples of course constructs and as entry points into co-constructing understandings. Personal and professional

narratives did not live outside of course content but were crucially connected to students' meaning-making (Beijaard et al. 2004). Interestingly, if a topic-initiating comment contained both a non-narrative and a narrative (eliciting) move, the topic thread tended to become relatively more substantial and "lived" longer than threads initiated by solely non-narrative comments, supporting the view that narratives are essential in understanding phenomena in one's surroundings (Bruner, 2006, Clandinin and Connelly, 2000 and Doyle, 1997).

Accumulating knowledge relevant to teaching through narrative sharing depended both on providing specificity to context-free theories and on making coherent sense of teaching from the multiplicity of renderings expressed in diverse stories of teaching. This process showed the collective and vicarious nature of learning afforded by narrative exchanges, demonstrating the multifaceted nature of the learning process. Beijaard et al. (2004) defined this process as an ongoing reciprocal interaction of individual and collective knowledge and of theoretical and experiential knowledge. As these researchers argued, previous work has not focused on the ways that preservice teachers build knowledge through an interplay of theoretical and practical/observational knowledge. Our study demonstrated how narrative-in-interaction functioned as a learning system through which preservice teachers made diverse knowledge sources their own, connecting individual to collective and theoretical to experiential knowledge.

4.2. Narrative-in-interaction as a way of thinking and knowing

As many teacher educators and researchers agree (Freeman, 2002 and Golombek and Johnson, 2004), teacher education is not about the telling of objective truths that can be applied uniformly across teaching contexts. Doyle (1997) described teacher learning as "a far cry from the prescriptions and central directives imagined traditionally from research on teaching" (p. 99). Rather, becoming a teacher is about developing an awareness of and sensitivity to the particularity of one's teaching context. Our study provided evidence that, as the semester progressed, the preservice teachers showed increased specificity in their discussion of imagined teaching practices. If we understand this increasing specificity as evidence of development of critical reflection, then we can conclude that narrative exchanges helped our participants develop ways of thinking and knowing pertaining to the teaching profession. Particularities rendered in small stories, more than formal argument appearing in scholarly writing, afforded our preservice teachers with recognition of and openness to possibilities (Abednia, 2012, Lee and Brett, 2015 and Vásquez, 2007). Narratives served as "a way of knowing and thinking that is particularly suited to explicating teachers' practical understandings" (Carter, 1995, p. 326). This finding also implies that looking at the specificity of preservice teachers' projection into their future classrooms is as important as looking at its frequency and timing (Urzúa & Vásquez, 2008).

4.3. Narrative-in-interaction for community building

An individual's sense of self is constructed relationally during interactions with others (Vásquez, 2007 and Wenger, 1998). Sense of belonging connects individuals to the social realm of their profession/work. Also, one's future self is fostered through imagined membership in a community of practice, which is itself rooted in shared experiences, interactions, and understandings (Norton & Toohey, 2011). Through small stories, our preservice teachers shared the legitimate concerns of bilingual teachers in a diverse society, concerns about the bounds of acceptable behavior in relation to students, parents, and colleagues and about the qualifications of desirable bilingual teachers.

However, shared membership did not limit them to a singular teaching self, but rather verified that diverse teaching selves could and did co-exist in the community. Our preservice teachers appropriated the ways of the teaching profession whenever they imagined themselves as individual decision-makers in their particular teaching contexts. The availability of imagination as an interactional resource, in particular, allowed them to offer context-specific formulations so that the process of establishing a shared community of future teachers proceeded smoothly. We conclude that the preservice teachers explored their imagined teaching selves through both the creation of a shared community of practice encouraged by common stories and through reflection on diverse perspectives and possibilities facilitated by diverse stories.

4.4. Narrative-in-interaction as bridging diverse selves

Ample empirical research supports the critical connection of personal and professional identities for teacher identity formation (Ajayi, 2011, Alsup, 2006 and Beijaard et al., 2004). Previous work has portrayed narrative as supporting teachers in reflecting on their backgrounds and experiences, but little has been made of narrative-in-interaction as a locus for the expression of teacher identity. Our study demonstrated that experiential stories shared in online classroom discussion helped these preservice teachers explore their diverse identities across their personal, professional, and academic lives. They were able to connect their bilingual/bicultural identities to the bilingual teaching profession through story-driven dialogue with experts (the professor and TA), expert knowledge (course readings and discussions), and peers with similar professional goals.

Narratives-in-interaction also helped our participants interpret their diverse selves across past, present, and future. If we focus more on the present reconstruction of the past rather than on the past itself, present tellings of a story become future-oriented (Cole and Engeström, 1993 and Wenger, 1998). In this regard, one salient feature of small stories that emerged in our data involved projected future stories about imagined bilingual classrooms. Our participants' perceptions of their future teaching were interwoven with narratives told in the present. From such a perspective, current actions are grounded in their historicity, and the small stories told in discussion illustrate the preservice teachers' storied travels across their different temporal selves. In this regard, our analysis provided evidence to support Georgakopoulou's (2006) idea of "intertextual links." The process of piecing together diverse stories and selves was critical for these preservice teachers to build a "coherent sense of self" (Moje & Luke, p. 427).

4.5. Narrative-in-interaction as a social discourse practice

As learning to teach is a socially mediated activity, our analysis of the sequential and relational structure of narrative-in-interaction highlighted the significance of small stories as a social practice in the context of academic discourse (Cole and Engeström, 1993 and Wertsch, 1991). In co-constructing small stories, these preservice teachers' collective understandings of teaching emerged. This was evidenced by how particular discourse moves developed across the semester and by how narrative moves generated more stories (Norrick, 2000). Our focus on how stories were told in particular interactional actions led us to see small stories as a discourse practice that shaped how the preservice teachers developed their conceptions of teaching.

Mediational tools are crucial in social activities (Thorne, 2003 and Wertsch, 1991). We saw these preservice teachers' knowledge and identity work through the open dialogue afforded by the online written discussion. With its affordances, CMD allowed for nonlinear discussion that also encouraged narrative exchange. Diverse perspectives and experiences expressed in small stories enabled these preservice teachers to share different opinions about teaching and to develop a more complex sense of their teaching selves.

5. Implications

Our findings' significance lies in the narrative-in-interaction approach that proved to be a powerful means of understanding what preservice teachers know and how they learn to teach through social practices. Our findings also contribute to the broader sociolinguistic research on small stories. First, the present study aligns with previous studies that have found projected futures within small stories (Georgakopoulou, 2006; Vásquez, 2011). Second, our participants' small stories were not always "small" compared to those typically collected in sociolinguistic research (Georgakopoulou, 2006). Some narratives in our data, such as the experience of being an interpreter for parents, were similar to big stories in other narrative research in telling about key events in participants' lives. Because they were shared in midst of ongoing interaction, they qualify as small stories even though in content they are "big" stories. Thus, our study suggests the need for discourse analysts to delineate the context-specific genres that share the label of small stories. Within educational research, we believe that our study represents a first attempt to apply this concept to classroom discussion. Thus, further research is needed to explore how findings would apply to educational settings that vary in terms of participants, disciplines, and course types.

As our study demonstrates, the process of becoming a teacher relies heavily on individuals' backgrounds and experiences outside the teacher preparation classroom. Teacher educators can play a key role within this discursive space by valuing small stories during academic discussions and helping preservice teachers find meaning from their experiences in the sheltered space of the classroom. Here, diverse mediational communication tools can provide opportunities for the articulation and celebration of experiences and stories.

Appendix. Survey

Section 1: Thinking about the IN-CLASS ORAL discussions in our class:

1.How would you describe your overall feelings about the group oral time in terms of:

a.The degree of involvement (defined as psychological engrossment or deep attention) you generally felt (a 5-point scale was used with 1 = not involved, 3 = medium, and 5 = fully involved)

b.The degree of enjoyment you experienced (on a 5-point scale with 1 = not enjoyable, 3 = medium, and 5 = very enjoyable)

c.The degree to which you felt the discussions were useful to your learning (on a 5-point scale with 1 = not useful, 3 = medium, and 5 = very useful)

2.Do you remember having a particularly positive and/or negative experience (either or both is interesting to us) in the group in-class oral discussions?

Yes No.

If yes, could you please describe the situation/context specifically?

3.How frequently did you disclose personal experiences in the group in-class oral discussions? Did you enjoy sharing your personal experiences with the group? Why?

4.When any of your classmates expressed opinions similar and/or different from yours in the group in-class oral discussions, what did you do? Why?

5.How often did you use Spanish in the group in-class oral discussions? What prompted you to use Spanish? Do you remember any particular instance of using Spanish? If yes, could you describe the situation/context specifically?

Section 2: For the next questions, consider the WRITTEN ONLINE discussions:

1.How would you describe your current overall feelings about the online discussions in terms of:

a.The degree of involvement (as defined as psychological engrossment or deep attention) you felt (on a 5-point scale with 1 = not involved, 3 = medium, and 5 = fully involved):

b.The degree of enjoyment you experienced (on a 5-point scale with 1 = not enjoyable, 3 = medium, and 5 = very enjoyable)

c.The degree to which you felt the discussions were useful to your learning (on a 5-point scale with 1 = not useful, 3 = medium, and 5 = very useful)

2.Do you remember an instance of a particular positive and/or negative experience during one of our online discussions?

Yes No.

If yes, could you please describe the situation/context specifically?

3.Did you feel that you played a particular role in any of the online discussions? Did your role sit well with you? Were there any individuals in the class who played particular roles that you noticed?

Section 3: Thinking about yourself as a bilingual teacher (you can be brief in answering these questions):

1.Tell us about your ethnic, linguistic, and cultural background. How has your background influenced your decision to become a bilingual teacher? How will it influence your teaching in the future?

2.How do you evaluate your language ability in Spanish and English? In what areas are you stronger and weaker? Do you feel you have enough proficiency in either/both languages to become a bilingual teacher?

3.How did your placement observations and experiences alter or support your ideas about bilingual teaching?

4.Is there any particular experience that influenced your thoughts about becoming a (good) bilingual teacher?

5.How have your peers, both in this class and from other areas of your life, influenced your learning and thoughts about becoming a bilingual teacher? In what contexts do you speak to your peers about becoming a bilingual teacher or about teaching in general?

6.What type of teacher do you think you will be in the future?

7.How would you define the job of teaching bilingual children? What are your goals of teaching bilingual children?

8.How would you define being a bilingual individual in this society?

Acknowledgments

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The Surgery Fellow's Education Workshop: A Pilot Study to Determine the Feasibility of Training Senior Learners to Teach in the Operating Room

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Abstract. *Background* In 2013, we developed an education workshop to enhance the teaching skills of surgical fellows. We sought to investigate the feasibility of the monthly educational workshop format and its effect on participant teaching skills. *Study Design* Surgical and medical education faculty created a broadly applicable curriculum developed from evidence-based teaching principles, delivered across 8 monthly 90-minute weekday sessions. Workshop feasibility and effect were assessed using evaluations, attendance records, and a variety of self-reported surveys. Each session was associated with a specified education action plan to be completed between sessions. *Results* A total of 13 fellows intended to participate. More than 60% attendance was achieved in 7 of 8 sessions. In all, 11 of 13 fellows were engaged (actual attendance or excused absence) across 75% or more of the sessions. Mean participant satisfaction scores ranged from 4.0 to 4.9 on a 5 point Likert scale across 87.5% of sessions. Postworkshop surveys showed increased understanding of the following: (1) knowledge gaps related to education; (2) the role of education for academic surgeons; (3) educational tools to improve teaching performance; and (4) perceived knowledge and attitudes about teaching in the operating room. An action plan was performed in 43% of cases; the most common reason for nonparticipation was lack of time (38%). *Conclusions* Our pilot supports the feasibility of an educational workshop series to enhance fellow's educational skills in the area of intraoperative teaching. Participant engagement and satisfaction were high in this self-selected group of initial trainees. Sessions were effective, resulting in a thoughtful self-assessment of teaching skills.

Keywords: fellow; education workshop; teaching skills.

1. Introduction

Education is a key component of academic medicine. Academic faculty are largely responsible for medical students, residents, and fellows receiving the necessary instruction and guidance to deliver medical care that is safe and high in quality. Duty hour restrictions implemented over the past decade have not only influenced clinical exposure for trainees but also forced faculty to be more effective and efficient in their teaching.[1, 2, 3] and [4] Although outstanding surgical teachers exist in every institution, the great majority approach trainees in the operating room (OR) without a clear educational plan, often relying on skills learned during the course of their own careers. Moreover, surgical training has historically valued procedural "quantity" as a means to master the technical aspects of an operation rather than a specifically designed educational plan.[5] The lack of formalized instruction in surgical teaching has resulted in significant variability in faculty teaching skills.[6] This

variability, coupled with an increased emphasis on OR efficiency, may unintentionally undermine a surgical trainee's education.

Although an abundance of literature exists to improve medical teaching, strategies are often focused on classroom didactics, inpatient medicine or outpatient encounters which often do not easily translate to intraoperative teaching. The physical and cultural differences of the OR require that surgical teaching be performed with an enhanced set of skills.5 and 7 To our knowledge, programs to coach academic surgical faculty in their operative teaching are greatly lacking. Although deliberate approaches to surgical training have been developed,8 senior surgical faculty may be resistant to implementing new methods of teaching as their years of experience have allowed them to formulate educational techniques that have become habitually ingrained.

Surgical fellows, on the other hand, represent a group of learners on the cusp of academic careers who may be open to adopting new educational strategies and approaches. Although most fellowships typically devote significant time to honing clinical and research talents, few protect time for formal instruction in teaching, even though fellows entering academic settings would be expected to participate in the educational mission. Moreover, their future teaching evaluations may be used for performance evaluations, salary incentives, evidence weighed during promotion, and as criteria for institutional awards. For these reasons, fellowship should be a time to craft teaching proficiency, as well as clinical and research acumen.

This pilot study examines the feasibility of a series of focused education workshops for surgical subspecialty fellows. We hypothesize that participation in the workshop is feasible and engaging for surgical fellows in busy training programs. In addition, we anticipate that workshop participation improves knowledge of teaching skills and enhances teaching performance.

2. Method

Workshop Curriculum

We engaged a diverse group of faculty with surgical and medical education backgrounds to participate in the workshop (Online Appendix 1). All faculty were involved in the development of course curriculum, participant self-assessment or testing, and course delivery. The curriculum was grounded in principles of adult learning theory9 and 10 and modeled using several active learning techniques. The content of the course was specifically directed at teaching in the context of surgical procedures (Table 1). As few learners in surgical disciplines have undergone training in education theory or practice, instruction in learning theories and assessment, delivering feedback, direct observation of trainees, teaching models, and debriefing was included. In addition, we incorporated discussions on intraoperative team leadership, the integration of education within the academic career and its effect on promotion, and the creation of teaching plans within the OR. No more than 60 minutes of preparatory work was assigned per session. During each module, time was allotted for the following: (1) reflections from the prior assignment; (2) didactic instruction; (3) small group interactive sessions; and (4) the development of a specified education action plan based on the session content, to be completed within 4 weeks. The purpose of the action plan was to implement the skills and knowledge acquired during each module into a real-world operative setting. The action plan reinforced the core knowledge gained as well as provided opportunity to practice the new skill.

Workshop Participants

As part of this pilot program, workshop participants were identified and recommended through a solicitation of Fellowship Directors in surgical departments and divisions at the University of Michigan. Participants were eligible if they had completed a surgical residency and were now engaged in a surgical fellowship training program. Fellowship programs included those who were both accredited and nonaccredited, but all had a long history of education in our institution. Participation was voluntary.

Assessments

The feasibility of the workshop was evaluated through attendance, attention to learner's teaching skills and education knowledge base, learner satisfaction, and the application of material. Attendance was strongly encouraged but not mandatory. Attendance was logged at every module. Legitimate

absences (e.g., maternity leave, job interview, out of hospital commitments, emergent clinical service, and emergent required presence in the OR) were designated as "excused" whereas other absences were considered "unexcused." This determination was made by the Course Director. Before the initiation of the workshop, perceived participant teaching skills were initially assessed through a baseline 34-item self-assessment survey using a web-based platform. This survey queried learners on their teaching aspirations, challenges, and past experience and also tested fundamental knowledge about specific education strategies that would be covered in subsequent workshop modules. All participants who completed the survey were included in the workshop feasibility analysis, regardless of subsequent attendance. A similar postworkshop survey was performed at the conclusion of the course.

At the completion of each course module, participant satisfaction, educational influence, and perceived change in teaching practice was anonymously evaluated using a 5 point Likert scale that included the following 4 key questions: (1) I have a better understanding of the role of education in the OR; (2) I am able to identify key knowledge gaps related to my teaching skills; (3) This educational activity changed your knowledge or attitudes about teaching in the OR; and (4) I have a better understanding of the tools required to —. (The "blank" made reference to the topic of the specific module.) Lastly, the participants attending each module were asked to complete a brief 6-question web-based survey about the established action goal from each module. The survey queried the participant about action plan completion, reasons for incompletion, and the plan's effect on the fellow's teaching skills. In addition, the survey asked whether the action plan was a valuable exercise. Analyses included descriptive statistics.

3. Results

Overall, 6 faculty members from the University of Michigan Medical School comprised the course faculty (Online Appendix 1). All faculty agreed to focus their content, as much as possible, to the surgical or procedural domain (Table 1). The curriculum was held monthly and delivered over 8 sessions of 90 minutes. A total of 13 surgical fellows were referred for workshop participation. The fellow cohort represented <15% of all surgical fellows training during the 2013 to 2014 academic year at our institution. All 13 fellows completed a pretest survey and were thus included in our analysis. Baseline demographics are described in Table 2. All participants planned a career in academic medicine with expected engagement in all the following missions: clinical service, education, and research. This remained constant as ascertained through group discussion.

Attendance stratified by course module is summarized in Table 1. More than 60% attendance was achieved in 7 of 8 sessions. Throughout the course, an average of 2 and 2.6 excused and unexcused absences per session were observed, respectively. At the participant level, 10 of 13 fellows attended more than 60% of the modules (Table 3). Several fellows demonstrated a desire to attend course modules but could not because of legitimate excuses. When considering actual attendance and desire to attend, nearly 85% of fellows had significant interest in 75% or more of the course modules. Among all, 1 fellow was completely disengaged with 0% attendance throughout the course.

In all, 7 course modules included specified action plans (Table 5). Overall, 42.4% of participants completed the action plan. In those who performed an action plan, 88% reported the plan increased awareness of teaching skills and enhanced overall teaching skills in 80%. Further, 88% of fellows who completed the action plan felt it was a valuable exercise. Based on 21 fellow responses, an action plan was not performed because of lack of time (38%), resources (24%), understanding (19%), or interest (5%); 14% simply forgot to do the exercise.

Postworkshop surveys were reviewed and compared with the preworkshop surveys. Notable observations included the following: (1) an increase in the number of fellows who would consider a career as a clinician educator (31%-62%); (2) an improved knowledge of educational theory, highlighted by a greater understanding of Competency Based Education (54% vs. 82%); (3) a greater awareness of the best practices for teaching (7.7% vs. 81.8%); and (4) an improved understanding about the Briefing, Intraoperative teaching, Debriefing model.8

In particular, we observed improvements in those who suggested optimal areas to efficiently review the operative plan with trainees immediately before the procedure (38.5% vs. 81.8%).

Aspects of OR leadership improved. For example, participants were much more likely to know everyone's name in the OR at the conclusion of the course (69.3% vs. 90.9%), suggesting an increased command in the OR.

The quality of participant responses on the posttest was more thoughtful, focused and used education vernacular demonstrating a greater understanding of educational issues and a more substantial knowledge base. Participants were asked whether they planned on pursuing future educational initiatives. Before the workshop, there was interest; however it was vague and without detail. Examples include "I would like to be part of the residency educational committee," or "I would like to get a Masters in Education." There was also 8 of 13 (61.5%) who had no specific plans for any educational projects. On the postworkshop survey, most of the participants highlighted detailed plans to delve into educational initiatives. Some discussed projects they had begun during the workshop ("created an ultrasound training module for residents"), whereas others discussed clear plans they were actively implementing ("develop computer based modular learning for OR learning"). Participants were also asked to reflect on their own teaching skills in the OR. Before the workshop, participants had a variety of different ways to teach the trainee, most citing what methods that they had been exposed to as a resident. After the workshop, many participants cited use of the Briefing, Intraoperative Teaching, Debriefing model, or use of "teaching scripts to keep me on task and organized." Lastly, participants were asked about constructive feedback they had received from faculty in the past. Many complained about the lack of constructive feedback, often citing they were simply told "good job." After the workshop, many participants were able to more clearly cite examples of constructive feedback, and were able to dissect the feedback into what made it constructive (e.g., "Attending sat me down in a quiet area and, without interruption, gave me specific examples of areas I could improve on, and how to improve on them").

4. Discussion

Surgeons must be intentional about surgical education, particularly in the OR where a number of pressures can create barriers to teaching. Increasing demands on surgical faculty as well as shorter workweeks for residents necessitate efficient training that continues to enhance learning in the OR.3 and 4 Multiple studies provide rationale to reevaluate existing methods of surgical training,11, 12, 13 and 14 however, implementation of new techniques is challenging when surgical faculty have not been equipped with the tools to critically evaluate and adapt these methods. Litvack et al.15 reported their experience with implementing a formal educational training program for neurosurgical residents. They found that a structured teacher training program objectively improved residents' ability to impart knowledge to a learner and, as a result, they recommended adaptation of the curriculum into residency training programs. We commend this group in the development of this course, as residents have a great deal of responsibility in educating junior residents and medical students. Still, the broader feasibility of this is uncertain, as demands on surgical residents are already extraordinary.

In the current study, we determined the feasibility of an education workshop for surgical fellows, rather than residents. The fellow participants were highly engaged in the program, likely because of their academic aspirations. Despite our initial concerns that busy surgical fellows would have limited time or topic attention, fellow participants attended most sessions that occurred at a potentially inopportune time often reserved for clinical activity. Competing interests and a lack of time are clearly barriers to the success of any education initiative. Nonetheless, attendance, which was not mandated, was reasonably favorable given the number of professional and personal commitments fellows regularly experience.

Fellow participants embraced the course concept and worked to establish a framework for themselves for their operative teaching. Overall, interest and satisfaction in the workshop sessions were high. Those who participated grew increasingly more aware of key knowledge gaps in their teaching skills, and sought to improve their integration of education tools into their operative practice

and adjust their previous attitudes about teaching in the OR. This became clear through oral participant reflections on their action plan experiences described at the beginning of each module. Moreover, as captured by the postcourse participant self-assessment survey, fellows demonstrated increased knowledge about education methods, as well as potential applications for these methods within the context of their clinical work. We valued these observations, as self-assessment of one's teaching skills is a useful tool to stimulate enhancement in clinical teaching.16

Our experience with the action plan activity was mixed. We integrated an action plan into course modules to provide a method of practice and implementation of the module goal. Time was a major barrier for those who did not complete their assigned plan. Others noted a lack of understanding or resources as reasons for lack of participation, suggesting that greater instruction and reinforcement was needed for the applied aspects of the program. Still, for those who opted to complete the action plan assignment, there was increased self-awareness of teaching practice and a sense that the activity directly improved their instructional performance. We have since made adjustments to our survey process, permitting "in class" time to complete it, devoted greater time to group discussion of the plan at the beginning of each course module, and incorporated more regular email reminders to compete the action plan. As the program develops, a more rigorous system of action planning grounded in peer observation is anticipated.

Although this work is interesting, we recognize its limitations. The generalizability of our findings is certainly limited by our small number of participants and the academic focus of our fellows. As all participants had an interest in future academic practice, it is likely that our population was enriched with learners with an interest in education. Although we experienced high satisfaction scores in our course modules, response was dependent on attendance and therefore it was not necessarily representative of all participants. Finally, although this pilot study informs the feasibility and satisfaction of the workshop, the observed data does not clearly demonstrate actual improvements in the teaching skills of fellows, rather it provides supportive evidence of self-perceived improvements in participant teaching. Given the variety of surgical services involved and the nonstandard assessment practices within and among each service, we did not find it possible to standardize fellow assessments using resident and student evaluation tools. Instead, during this early pilot, we relied on self-assessments from the participants. Since this pilot we have continued to modify our evaluation process and currently have begun using intraoperative video-based assessment of teaching skills related to specific workshop training. We feel this would be the best method to objectively assess teaching skills and provide a format for participant self-reflection.

5. Conclusions

The current pilot demonstrates the feasibility of the Surgery Fellow's Education Workshop, which uses a "train the trainer" approach to enhance fellow's educational skills in the area of intraoperative teaching. Participant engagement and satisfaction were high and the course sessions were highly rated. After the workshop, fellows had greater insight into gaps in their teaching skills and improved knowledge of education methods and a greater interest in integrating education into their academic career. This work justifies a larger study to determine the effect and value of focused instruction in teaching on the careers of surgical fellows.

Acknowledgment

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Forty Years Later, a Systematic Literature Review on Inclusion in Physical Education (1975–2015): A Teacher Perspective

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Abstract. The first objective of this work is to systematically list the international studies about the inclusion of students with disabilities in physical education (PE) from the teachers' perspective. Sixty studies met our selection criteria and are listed. The second objective is to analyse the content of the literature according to the inductive and thematic approach of Thomas and Harden (2008). Our thematic analysis highlights: a) the factors that influence PE teachers' positive or negative attitudes and predispositions towards the inclusion of students with disabilities and b) the factors that can positively influence the inclusion of students with disabilities in PE classes, according to the teachers' representations. Based on these sets of factors, we propose some adapted PE training content for PE teachers. These training content proposals form the basis of research perspectives.

Keywords: Inclusion; Physical education; Teachers; Attitudes; Representations.

1. Introduction

In numerous countries, educational policies have evolved towards inclusive education and encouraging mainstream schools to include students with disabilities, i.e., allowing those students to truly follow the course of their typically developing classmates.

Indeed, the UNESCO Salamanca Statement (1994) shows that international authorities agree that inclusive education is not simply placing students with disabilities in regular schools; rather, the statement refers to the students' social and active participation in class and to the full development of their potential through access to teaching according to the students' special educational needs (SEN). Therefore, the inclusive education of students with disabilities targets the education of all students in community classes and schools, which are considered the best places for experiencing diversity and learning about one another. Inclusion considers heterogeneity not as a problem but as a chance to transform schools to better respond to their students' diversity (Booth & Ainscow, 2002). The development of this educational philosophy combined with an increasing amount of inclusive legislation has led to an increase in the number of students with disabilities who participate in traditional learning environments.

Among these traditional classes, physical education (PE) seems to be an interesting context for inclusion. Indeed, PE is often, along with music and art education, one of the first courses to "experiment" with inclusion (Alquraini & Gut, 2012). Moreover, the participation of students with disabilities in PE activities increases their sense of belonging to a class or a school community, optimizes their physical functioning and motor skill acquisition and enhances their overall well-being (Murphy & Carbone, 2008). Another advantage is that as a socially structured environment, PE classes provide a unique opportunity for the development of students' social behaviour (Sherrill, 2004).

These elements contribute to the increasing frequency with which PE teachers are entrusted with the mission to take up the challenge of inclusion. This increased involvement explains why two literature reviews regarding inclusion in PE have already been published in the 2000s. Indeed, Block

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and Obrusnikova (2007) reviewed studies pertaining to the inclusion of students with disabilities in PE from 1995 to 2005. Thirty-eight studies were retrieved, and after an analysis, six focus areas were selected. One of these areas focused on PE teacher attitudes (n = 12); that is, their predispositions and intentions towards the inclusion of students with disabilities in their courses. The authors concluded that a lack of adapted physical education (APE) training and a lack of teaching experience with students with disabilities were two factors that negatively influenced the attitudes of PE teachers. For their part, O'Brien, Kudláček, and Howe (2009) reviewed the literature on the inclusion of students with disabilities in PE over a period of eight years (2000–2008). Twenty-seven studies were selected. Thirteen studies focused on teacher perceptions and suggested that PE teachers believed that inclusion could be achieved if:

-training were more appropriate,

-PE teachers received more assistance from an APE specialist,

-the PE curriculum supported inclusion.

These interesting results highlight two complementary topics regarding inclusion in PE: a) the factors that influence PE teachers' attitudes and predispositions towards the inclusion of students with disabilities and b) the factors that can positively influence the inclusion of students with disabilities, according to teachers' representations.

However, these reviews cover a relatively short period (1995–2008). It would be interesting to review a larger period, especially from 1975 (the date of significant relevant laws: Public Law 94–142: The Education For All Handicapped Children Act in the United States and Law 75–534, June 30, 1975, in favour of the disabled people in France). Moreover, since 2008, other studies on this topic have been published that could enrich a new review of the literature. Finally, these two previous reviews of the literature examined all parameters of inclusion and not specifically the attitudes and representations of PE teachers. However, among the factors that contribute to the success of inclusion (class size and composition, teaching context, etc.), the most influential are undoubtedly the teachers' attitudes and representations of inclusion (European Agency for Development in Special Needs Education, 2010). For all these reasons, a number of studies may not have been included in previous reviews. To our knowledge, no such review of PE teachers' attitudes and representations since 1975 has ever been performed.

Thus, our first objective is to systematically list the high-quality international scientific studies on the connection between PE teachers' attitudes and inclusion over a period of 40 years. Our second objective is to thematically analyse the content of this literature to answer three research questions:

1) What are the factors that influence PE teachers' positive or negative attitudes and predispositions towards the inclusion of students with disabilities?

2) What are the factors that can positively influence the inclusion of students with disabilities in PE classes, according to PE teachers' representations?

3) Based on this set of factors, how can PE teachers can be more inclusive and accessible in their teaching?

2. Method

2.1. Search procedures

To reach our first goal, we identified potentially relevant studies published between January 1975 and January 2015 via computer-assisted document research. The following eight databases were consulted: PubMed, Education Resources Information Centre, Academic Search Premier, Science Direct, Web of Science, Education Research Complete, Psychology and Behavioural Sciences, and PsycINFO. The keywords used for the electronic searches were "inclusion" or "mainstreaming" or "integration" & "physical education teachers". The bibliographic references of each of these studies were also manually searched to identify possible additional studies. To be included in our literature review, each article had to fulfil the following seven inclusion criteria:

a) be published between January 1975 and January 2015,

b) be published in English,

c)include at least one primary or secondary school pupil clinically diagnosed with a disability (for example, studies of preschool children or disabled adults were excluded),

d)include at least one PE teacher in the sample (for example studies, exclusively centred on initial teacher-training students or specialized teachers were excluded),

e)be published in periodic publications (for example, books, unpublished documents, doctoral theses, master's theses, conference proceedings or book chapters were excluded),

f)be based on field research (for example, studies that only developed new instruments were excluded),

g)include information in the methodology about the following four elements in enough detail to allow replication:

-sample(s),

-measured variable(s),

-data collection instrument(s) used,

-data analysis method(s) used.

To ensure that reliability of the selection process, two researchers independently evaluated all of the selected studies according to these seven criteria. The absence or presence of each criterion in each study was noted on a dichotomized scale. In instances of disagreement, the studies were jointly reassessed to reach 100% consensus between the assessors.

2.2. Procedures for analysing studies

To achieve our second objective, we conducted a thematic analysis of the results of selected studies according to the approach of Thomas and Harden (2008). The analysis procedure was divided into 3 stages:

-coding text: a line-by-line coding of the main results of each study,

-developing a descriptive theme: thematic grouping by code and categories related to a) the factors that influence the attitudes and predispositions of PE teachers towards inclusion and b) the factors that can positively influence inclusion, according to the PE teacher representations. After defining each code and category, the two reviewers revisited the raw data of each study to validate this inductive and thematic analysis.

-generating analytical themes: Structuring all factors related to the attitudes and representations of PE teachers in a way that helps them be more inclusive and accessible in their teachings.

To ensure a maximum of rigour, we used the blind parallel coding procedure described by Lincoln and Guba (1985). To this end, each author performed each of the three steps blindly and in parallel. At the end of each step, both authors discussed their analyses.

2.3. Study selection

Fig. 1 shows results of the study selection procedure. Of the 510 studies identified from the databases, 60 met our selection criteria (selection rate = 11.8%). The main criteria leading to the rejection of studies were scientific rigour (for example, the sample and/or data collection and analysis techniques were missing from the methodology) and the absence of the PE teachers' attitudes and representations from the measured variables. Regarding the journals, 36 studies came from journals with an average impact factor (Journal Citation Reports 2014 of Thomson Reuters) of 1.03; the average impact factor for all 60 studies was 0.62.

3. General results

3.1. PE teachers' descriptions

Table A1 (appendix) presents the demographic data of the PE teachers in terms of attitudes and predispositions, and Table A2 (appendix) presents the demographic data for the representations of PE teachers. The total number of PE teachers was 6495. Of these 6495 teachers, 1865 (28.7%) had experience with students with disabilities (based on 32 studies), and 2208 (34%) had APE training (based on 31 studies). Based on 48 studies, there were 2551 male teachers (49.6%) and 2594 female teachers (50.4%). The average age of the teachers was 36.4 years (based on 26 studies). The average duration of PE teaching experience was 11.8 years (based on 31 studies). Regarding teaching level, 22.2% of the teachers taught at the elementary level, 37.8% of the teachers taught at the secondary

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level, and 40% of the teachers taught at multiple levels (based on 45 studies). The studies were based on teachers from all 5 continents but with very different repartitions. Indeed, most of the studies examined teachers from the United States (n = 34), followed by the United Kingdom (n = 8). Ireland, Greece, Finland, Turkey and Japan were represented by 2 studies each. Germany, Sweden, Latvia, Israel, China and Australia were represented by 1 study each. Two studies focused on several countries at the same time: Germany and the United States for one, and Puerto Rico, the United States, Japan and Ghana for the other.

3.2. Thematic procedure

Table 1 presents the tree diagram of our thematic analysis. The line-by-line coding of the results of each study identified 24 codes. These 24 codes were grouped into 6 categories which divided into two themes: factors that influence PE teachers' attitudes and factors that the PE teachers reported could influence their representations.

The theme of the PE teachers' attitudes and predispositions regarding inclusion (n = 28 studies) adopts Allport's definition (1935), i.e., that an attitude is not a behaviour as such but a predisposition to act, i.e., "a mental and neural state of readiness, organized through experience, exerting a directive and dynamic influence upon the individual's response to all objects and situations with which it is related" (Allport, 1935, p. 810). In other words, these studies try upstream to list the factors that influence the teachers' attitudes (positive or negative) towards inclusion and downstream to measure the impact that the PE teachers' positive or negative attitudes has on their teaching practices.

The theme of the PE teachers' representations (n = 32 studies) is defined as "the product of processes of mental activity through which an individual or group reconstitutes the reality with which it is confronted and to which it attributes a specific meaning" (Abric, 1994, p. 13). In other words, these studies try to understand the factors that can positively influence inclusion, according to the teachers' perceptions of their inclusion experiences.

3.3. Methodological approaches used

3.3.1. Studies on attitudes

The factors that influence the PE teachers' positive or negative attitudes and predispositions towards inclusion of students with disabilities are based on quantitative studies that collected data via questionnaires. The most frequently used ones are the Physical Educators' Attitudes toward the Handicapped (PEATH, PEATH II) and the "Physical Educators' Attitudes toward Teaching Individuals with Disabilities" (PEATID III) from the academic works of Rizzo (1983). These questionnaires consist of a series of twelve statements to which the teachers respond according to their intentions to include pupils with a particular type of disability (associated or not with a severity level) in their PE courses. The responses are made on a five-level scale (from strongly in disagreement to totally in agreement) underneath each statement. These measures are based on the theory of reasoned action (Fishbein & Ajzen, 1975) and the theory of planned behaviour (Ajzen, 1985).

Other questionnaires have also been developed to study the attitudes of teachers, such as the Teacher Integration Attitudes Questionnaire (TIAQ) of Sideridis and Chandler (1995), which asks teachers to express their attitudes in response to 12 statements that fall into 4 areas of inclusion (skills, benefits, acceptance and support). The responses are given on a 4-point Likert-type scale (from strongly agree to strongly disagree). Contrary to the PEATH, the TIAQ is not based on a particular theory. All of these questionnaire-based studies included rather significant samples (M = 176 ± 181) that allowed statistical analyses with a not-insignificant strength and supported the reliability of the results.

3.3.2. Studies on representations

Two types of methodologies are used to define and understand the factors that, according to the teachers' representations, can positively influence the inclusion. First, studies that took the form of a survey (n = 8) and had a relatively significant sample size (165 teachers ± 98) were analysed via descriptive statistics, thus allowing a general inventory of the teachers' representations regarding inclusion. For example, Klavina, Block, and Larins (2007) surveyed 250 PE teachers and found that they were concerned about their level of training in APE, practical considerations (for example, the

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absence of an individual inclusion plan or the lack of accessibility and adapted sports equipment) and the absence of a teacher assistant to develop an APE approach.

Then, to investigate these representations in depth, qualitative approaches were developed (n = 24). Most of the time, data collection was performed through interviews (semi-structured interviews, focus groups); however, these were sometimes associated with observations of sessions or analyses of documents such as lesson plans, which were then qualitatively analysed (using content analysis, constant comparative method, thematic analysis, and mixed methods). The teacher samples are smaller (12 teachers ± 13) in the studies on representations compared with the studies on attitudes because of the considerable amount of time needed to collect and analyse the data. The use of the qualitative approach is understandable because of the need to perform a deep and thorough analysis of representations that cannot be easily assessed or defined with a classic questionnaire approach. Indeed, unlike attitudes, which can be defined either as positive or negative, teachers' representations are less clear and more variable and can often be considered contradictory. Several studies agree that teachers generally have common a representation of inclusion as an ideal, but they ask themselves many questions about its practical implications, and they quickly feel helpless and concerned when facing the reality and complexity of inclusion (Ammah and Hodge, 2005, Hersman and Hodge, 2010, Hodge et al., 2004 and Hodge et al., 2009).

4. Specifics results of the thematic analysis

4.1. Attitudes and predispositions
4.1.1. Teacher-specific factors that influence their attitudes

Neither the teachers' level of experience in teaching general PE (Jerlinder et al., 2010, Obrusnikova, 2008 and Tripp and Rizzo, 2006) nor their degree earned in teaching general PE (Rizzo and Vispoel, 1991, Rizzo and Wright, 1988 and Rizzo, 1985) showed a significant effect on the attitudes of the teachers towards the inclusion of students with disabilities.

In the same sense, most of the studies showed no link between the PE teachers' age and their attitude toward including a student with disabilities (Jerlinder et al., 2010, Rizzo and Vispoel, 1991, Rizzo and Wright, 1988 and Tripp and Rizzo, 2006). Only Rizzo (1985), who questioned 194 PE teachers using the PEATH, indicated that younger teachers showed a more favourable attitude towards the inclusion of students with disabilities compared with their older colleagues in the United States. Rizzo (1985) added that recent policies (the Education for All Handicapped Children Act of 1975) may have allowed these young teachers to become more aware of these questions during their initial training, which led them to have more positive attitudes than their older colleagues.

Likewise, most of the studies showed no link between the teacher's gender and their attitude toward including students with disabilities in general (Doulkeridou et al., 2011, Duchane and French, 1998, Jerlinder et al., 2010, Patrick, 1987, Rizzo and Vispoel, 1991, Rizzo and Wright, 1988, Rizzo, 1985 and Tripp, 1988). However, the studies concerning specific types of disabilities qualified these results (Aloia et al., 1980, Meegan and MacPhail, 2006 and Schmidt-Gotz et al., 1994). For example, Schmidt-Gotz et al. (1994) used the PEATH to question 722 PE teachers and 369 students (Physical Education and Sport University). They showed that the attitudes of female teachers were more favourable than those of their male colleagues only in regard to the students with physical or learning disabilities.

Contrary to the previously discussed elements, the factor that most strongly predicted the teachers' attitude seemed to be their perceived competence in teaching students with disabilities. All of the studies that examined this factor specific to teachers showed that it had a significant influence on their favourable attitudes towards inclusion (Block and Rizzo, 1995 and Obrusnikova, 2008; Papadoupoulou et al., 2004; Rizzo and Vispoel, 1991, Rizzo and Wright, 1988, Schmidt-Gotz et al., 1994 and Tripp and Rizzo, 2006). In fact, the PE teachers who perceived themselves as more competent in inclusion (that is, they considered themselves to have a certain level of knowledge and control regarding inclusion) had more positive attitudes because they perceived inclusion as a rewarding and interesting professional challenge. On the contrary, a lack of perceived competence was considered a major obstacle to inclusion (Heikinaro-Johansson & Sherrill, 1994).

Strangely enough, the studies concerning the relationship between the teachers' experience with students with disabilities and their predispositions towards inclusion were reserved. Five studies showed a positive effect of experience teaching students with disabilities on teachers' attitudes (Marston and Leslie, 1983, Meegan and MacPhail, 2006, Obrusnikova, 2008, Rizzo and Vispoel, 1991 and Özer et al., 2013), while four others showed no effect (Block and Rizzo, 1995, Rizzo, 1985, Schmidt-Gotz et al., 1994 and Tripp and Rizzo, 2006). However, according to Rizzo and Wright (1988), certain studies did not obtain a direct correlation between the experience of teaching students with disabilities and positive attitudes because positive attitude were sometimes developed indirectly. However, experience with teaching students with disabilities was directly linked to perceived teaching competence in inclusion, which represented the most significant predictor of a positive attitude.

Following the same logic, the studies that examined the relationship training in adapted physical education (APE) and the teachers' attitudes towards inclusion were contradictory. Six studies showed a positive effect of training in APE on the teachers' attitude towards the inclusion of students with disabilities (Block and Rizzo, 1995, Doulkeridou et al., 2011 and Obrusnikova, 2008; Papadoupoulou et al., 2004; Patrick, 1987 and Tripp and Rizzo, 2006), while three others showed no effect (Bird and Gansneder, 1979, Meegan and MacPhail, 2006 and Rizzo and Vispoel, 1991). According to Rizzo and Wright (1988), it is important to emphasize that training in APE was strongly correlated with perceived teaching competence in inclusion. Moreover, the quality of the APE training seemed to strongly influence attitudes. Jarvis and French (1990), who replicated a study by Jansma and Shultz (1982), showed the ineffectiveness of short in-service trainings (2 days) for influencing attitudes. Additionally, concerning initial APE training for future teachers, Maeda, Murata, and Hodge (1998) showed that late training (during graduate studies) more positively and significantly influenced teachers' attitudes than early training (during undergraduate studies) did.

To summarize these results, the teacher-specific factor that most influenced their positive attitude towards the inclusion of students with disabilities was perceived teaching competence. Having said that, factors based on APE training or experience with teaching students with disabilities could influence the teachers' attitudes either positively and directly or indirectly, by contributing to the teacher's feelings of competence. However, it seems that other factors could influence PE teacher's attitudes. It is very likely that teachers' attitudes toward inclusion depend at least on the type and the severity of the student's handicap (Qi & Ha, 2012a).

4.1.2. Factors specific to the students with disabilities that influence teachers' attitudes

One factors associated with the students with disabilities was the disability label itself. Indeed, Tripp and Rizzo (2006) used a revised version of the Physical Educators' Intention Towards Teaching Individuals with Disabilities questionnaire (PEATID III) with two groups of 34 teachers: those who were given a description of a pupil with cerebral palsy symptoms who was labelled as a "pupil with cerebral palsy" and those were given only the description of the pupil without the label. The study showed that the teachers whose descriptions included the label were significantly less enthusiastic about including the student compared with their colleagues who received student information without the label.

Another factor specific to the student with disabilities was his/her age or class level. Indeed, students with disabilities were more favourably perceived in lower-level classes than in higher grades (Minner and Knutson, 1982 and Rizzo, 1984). For example, using the PEATH with 194 PE teachers, Rizzo (1984) showed that the higher the class level was (from primary school [K-3] to an intermediate class [K4-6] then to high school [K7-8]), the less favourable the teachers' attitudes gradually became.

An hypothesis could be that as the students' levels increased, the teachers paid greater attention to the growing dissatisfaction of the typically developing students, particularly secondary school students, when PE sessions were adapted (Block, 2007).

The third student-specific factor was the type of disability. For example, although PE teachers were more positive than music teachers about including students with behavioural or emotional disorders (Sideridis & Chandler, 1996), studies agreed that PE teachers showed negative attitudes toward the

inclusion of these children (Obrusnikova, 2008, Rizzo and Vispoel, 1991 and Tripp, 1988). For Obrusnikova (2008), it was not surprising that teachers were less inclined to teach pupils with behavioural and emotional disorders (such as aggressive or impulsive behaviour, depression, hyperactivity, or social maladjustment) because these pupils required greater organization, management of the class, and involvement in relationships between pupils; consequently these students were considered too complex of a challenge and were negatively impacted teachers' attitudes.

In contrast, PE teachers' attitudes toward pupils with learning disabilities were often favourable (Meegan and MacPhail, 2006, Obrusnikova, 2008, Rizzo and Vispoel, 1991 and Rizzo and Wright, 1987). Indeed, for Rizzo and Wright (1987), teaching PE to students with learning disabilities (such as dyslexia, dysphasia or dysorthographia) seemed to be less challenging than teaching to students with physical disabilities, sensory disabilities or mental retardation.

In summary, studies have showed that teachers seemed to present a negative attitude towards students with emotional disorders and a rather favourable attitude toward students with learning disabilities. However, teachers adopted a mixed attitude towards students with physical, sensory or mental disabilities (Obrusnikova, 2008, Rizzo and Vispoel, 1991 and Tripp, 1988). This mixed attitude towards these types of disability arose partially because the type of disability was an important factor that, in association with the severity of disability, could evoke different attitudes.

Indeed, the final student-specific factor that influenced teachers' attitudes was the severity of the disability (Block and Rizzo, 1995, Duchane and French, 1998 and Meegan and MacPhail, 2006). To illustrate this point, Block and Rizzo (1995) examined (using the PEATID III) the relationship between the attitudes of 91 PE teachers towards pupils with a severe or profound mental disability. For the authors, the adjective "severe" described people who had relatively good levels of consciousness and a capacity to respond adequately to environmental constraints with significant support. The term "profound" described people with little consciousness or capacity to adapt to the environment, even with considerable support. The results revealed that teachers were undecided about teaching students with severe mental disabilities, and they disagreed about teaching pupils with profound mental disabilities in their regular classes. Similar results were also reported by Meegan and MacPhail (2006) and by Duchane and French (1998).

To synthesize these findings, we could say that the attitudes of PE teachers depended at least partly on whether the disability was labelled, the student's age (class level), and the type and severity of the disability. It goes without saying that the combination of these factors could have an even greater influence on the attitudes of teachers, and thus, a posteriori, on the efficiency of their teaching practices.

4.1.3. Influence of teachers' attitudes on their teaching practices

Three studies more specifically examined the influence of PE teachers' attitudes (positive or negative) on their objectives and teaching practices. The first study (Duchane & French, 1998) examined the relationship between the attitudes of 182 teachers and the participation objectives of the students with disabilities compared with those of the typically developing students (via a questionnaire about grading). The results showed that regardless of the nature (positive or negative) of the attitude measured via the PEATID III, teachers reported using different grading criteria for the pupils with disabilities versus those without disabilities. In fact, pupils with disabilities were first judged in terms of their effort or participation, while typically developing pupils were judged in terms of their fitness and performance on skills tests. In other words, this difference in assessment could be considered a reduction of the requirements and objectives for students with disabilities.

However, another qualitative study showed different results. Combs, Elliott, and Whipple (2010) used the PEATID III to identify two PE teachers with positive attitudes and two others with negative ones towards the inclusion of students with mental disabilities. Semi-directive qualitative interviews showed that both teachers who presented a positive attitude constantly insisted on the motor performance and success of the students with disabilities. They identified in their practices several ways to present class situations, various types of intervention, and multiple objectives, and they developed lesson plans that integrated several strategies to adapt the environment to the students with

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disabilities. In contrast, the two PE teachers who presented negative attitudes defined inclusion in terms of the participation of the students with disabilities in traditional sport and not adapted physical activities.

These results were confirmed by the study by Elliott (2008), which dealt with the relationship between the attitude of the teachers (regarding including pupils with low or moderate mental disabilities) and the efficiency of their interventions in terms of the following:

-the participation of pupils with disabilities in the session (number of attempts) compared with that of typically developing pupils,

-the level of success achieved by pupils with disabilities compared with their typically developing peers. To examine this factor and determine the nature of the teachers' attitudes, 20 PE teachers completed the PEATID III and then were observed during PE sessions. The observers systematically collected data on the number of attempts completed by students with disabilities compared with typically developing students and associated them with the percentages of success and failure. The results showed a relationship between the teachers' attitude toward inclusion and the efficiency of the teaching. Indeed, the teachers with a positive attitude towards inclusion presented:

-higher expectations in terms of motor performances for all the pupils (with and without disabilities),

-a higher number of attempts, which was associated with a more significant rate of success for all the pupils (with and without disabilities).

To synthesize these findings, only three studies examined the impact of the nature of PE teachers' attitudes on their practices. It seemed that the teachers who favoured inclusion adapted their teaching to the specific needs of the students with disabilities without reducing the level of motor requirements. This implementation of inclusive practices seemed to be effective for students with and without disabilities. However, additional research on this topic is clearly needed.

4.2. Teachers' representations

4.2.1. Educationally inclusive policies and PE curriculum

Several studies showed that teachers were extrinsically motivated to conform to inclusive educational policies and to the directives of the school administrators (Qi and Ha, 2012b and Sato and Hodge, 2009). However, numerous studies in United Kingdom or in Japan noted problems with the inadequacy of the inclusive principles described in general texts when applied to the curriculum content or expectations of certifications in PE (Haycock and Smith, 2010a, Haycock and Smith, 2010b, Haycock and Smith, 2011, Sato and Hodge, 2009, Smith and Green, 2004 and Smith, 2004). Indeed, these studies agreed that the curriculum contents focused too broadly on competitive and collective activities (soccer, basketball, netball), thus creating a paradoxical situation that the teachers denounced. For example, Smith and Green (2004) interviewed 7 PE teachers via semi-directive interviews followed by a thematic analysis. The results showed that the teachers intended to provide the students with disabilities the same opportunities to participate in activities along with their typically developing peers; however, this did not occur in practice. Instead, students with disabilities were excluded from the class's sports activities because the official curriculum was very focused on competitive and collective activities, which the teachers said were not suitable for inclusion. Moreover, the teachers noted that students with disabilities could more easily be included with their typically developing classmates in individual activities that were not focused on comparing interpersonal performances. This situation was confirmed by Morley, Bailey, Tan, and Cooke (2005), who organized a focus group of 12 PE teachers, followed by a thematic analysis. The results showed that the increase in the number of students with disabilities in mainstream schools did not radically modify the contents of physical activity programming, which continued to be widely dominated by competitive team sports and a strong emphasis on performance, excellence and technical skills. The authors showed that this programming seemed to have reduced, rather than improved, the opportunities for students with disabilities to participate in the same activities as their typically developing peers. On the whole, pupils with disabilities took part in a limited number of physical and sports activities compared with their classmates. In some cases, students with disabilities practised PE without other pupils, during hours that were specially designed for them with the aim of meeting their

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special needs and motor capacities. Programming centred on collective and competitive activities hindered the participation of students with disabilities, especially students with autism spectrum disorders. Indeed, Obrusnikova and Dillon (2011) showed that the 43 PE teachers (examined using an elicitation questionnaire) reported that instructional tasks were more often challenging during social and competitive activities because first, impaired social relationships and social behaviour constitutes a main characteristics of individuals with autism spectrum disorders and second, because these students often failed to develop a sense of competition.

In addition to programmes based on sports activities, several studies showed that certifications were also in inadequate with regard to the principles of inclusion (Haycock & Smith, 2010b), in the United Kingdom; Sato & Hodge, 2009, in Japan. For example, Haycock and Smith (2010b) studied 12 teachers using the same data collection and analysis technique that was applied by Morley et al. (2005). They showed that despite the significant experience of the interviewed teachers, the criteria they used were inadequate and inappropriate for identifying the acquisitions of pupils with disabilities. In reality, according to the teachers, the requirements, which were essentially based on performance, were only reachable by a limited number of pupils (including students without disabilities).

Given these difficulties of teaching PE using traditional physical and sports activities, Grenier, Collins, Wright, and Kearns (2014) suggested integrating units on teaching sports to people with disabilities units into PE programmes. To this effect, the authors conducted a qualitative study via multiple sources (focus group, semi-structured interviews, field notes and documents) and conducted a thematic analysis to compare the representations of the pupils and the teachers in 3 primary school classes (n = 41) who practiced a disabled sports unit (wheelchair basketball, goalball, sit-volleyball, and sledge hockey) for 5 weeks compared with 3 primary school classes who practiced games and traditional sports (n = 46) over the same period. The results showed that scheduling a disabled sports unit was an effective strategy for favourably shaping the representations of both typically developing students and teachers. More flexible programmes that are open to adapted and disabled physical activities seemed to be an effective strategy for helping the teachers build favourable representations and offer pupils with and without disabilities a way to practise PE together.

4.2.2. Collaboration and communication with colleagues

Numerous works have studied the influence of the communication and the collaboration among the partners in inclusion and the PE teachers on representations (Aydin, 2014, Fejgin et al., 2005, Heikinaro-Johansson et al., 1995, LaMaster et al., 1998, Lienert et al., 2001, Murata and Jansma, 1997, Pedersen et al., 2014 and Sato et al., 2007). However, most of these studies highlighted numerous concerns regarding the effectiveness and quality of these collaborations. For example, Aydin (2014) surveyed 55 PE teachers and found that their primary concern was the lack of information they had about the special educational needs of students with disabilities before the inclusion began because of a lack of communication. More particularly, the PE teachers seemed worried by their collaborations with paraprofessionals (APE specialists or teacher assistants). For example, Lienert et al. (2001) questioned 30 PE teachers to determine their concerns, and they clearly showed the difficulty of collaborating with the specific members of the support staff. For example, most of the teachers estimated having collaborated with an APE specialist once or twice at the most during the school year and over a short teaching period. This limited cooperation led to professional concerns about the negative consequences for teachers' representations of inclusion. In another study, LaMaster et al. (1998) questioned and observed 6 PE teachers. In this case, the role of the APE specialist was essentially consultative. A thematic analysis revealed the PE teachers' frustration about the lack of availability of the APE specialist because of the significant number of individual cases that they had to address. As a result, the consultations were too short and too far apart to have a positive impact on the PS teachers' representations. However, the frequency and quality of the communications was an essential element in favour of the effectiveness of the inclusion. Heikinaro-Johansson et al. (1995) tested two models of communication between the PE teacher and the APE consultant with two teachers for 2 months. The following models were examined:

a)a model that qualified as intensive (face-to-face meetings every week, observations of the PE sessions every week and regular phone conversations), and

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b)a model that qualified as limited (a meeting at the beginning and at the end of the teaching sequence).

The evaluation of these two models of communication (in the form of a case study) clearly showed the positive impact of the intensive model. The PE teacher who benefitted from this intensive model presented positive representations of inclusion, and he was more effective in his teaching (for example, in terms of instruction time, feedback, encouragement). The efficiency of the inclusive practices that arose from the intensive model of communication strengthened the positive representations of the teacher and the pursuit of inclusion.

Along with the frequency of the exchanges between the teacher and the APE specialist, the quality of the collaboration with teacher assistants was also important. Pedersen et al. (2014) questioned 14 teachers about the strategies they used to develop working relationships with the teacher assistants helping the students with disabilities in their everyday life at school. Although the teachers generally had a favourable attitude towards the teacher assistants, the collaboration was often limited by the teacher assistant's lack of knowledge about general PE and about APE in particular. This lack of teacher assistant training in APE was confirmed by Vickerman and Blundell (2012) who showed via a questionnaire that 63.3% of teaching assistants received general information about inclusion, whereas only 5.5% received specific information about APE.

Therefore, for Grenier (2011), one of the solutions is co-teaching. This situational collaboration was the result of his study of two PE teachers and an APE specialist over a period of 16 weeks. During this period, interviews, observation notes and teachers' documents were analysed. Grenier (2011) showed the efficiency of the cooperative model of co-teaching between a PE teacher and an APE specialist on the ground. This cooperation allowed the student to make an efficient transition from special or segregated education to an inclusive setting via a thorough dialogue regarding the preparation of the sessions, a wide range of teaching adaptations during the sessions, and numerous reflections on their teacher's own inclusive practices. The objectives of both teachers in co-teaching were to achieve a certain quality of social relationships among the pupils and to allow motor learning to occur at the best possible level. This type of co-teaching encouraged more favourable representations of inclusion for both the teachers and the pupils with and without disabilities.

4.2.3. Training in APE

Another very important concern that the teachers had regarding inclusion rested on the quality of their professional preparation for inclusion in PE through either initial training or continuing education (Chandler and Greene, 1995, Crawford, 2011, Fitzgerald et al., 2004, Hardin, 2005, Lieberman et al., 2002 and Vickerman and Coates, 2009).

Regarding the initial training, Vickerman and Coates (2009) examined the representations of 19 recently qualified PE teachers and 202 student PE teachers via a survey. They noticed that the teacher judged their representations of their training experiences in a rather negative way. Indeed, 84% of the recently qualified PE teachers and 43% of the student teachers considered that most of their initial training did not allow them to develop a truly inclusive environment for students with disabilities in their classes. These concerns were confirmed by the study by Hardin (2005). He studied five recently qualified teachers using semi-structured interviews that were analysed thematically. The original finding of this study was that teachers consistently considered practical training the most efficient way to acquire inclusive strategies. Another significant aspect inferred from these interviews was that advice and examples about inclusion from experienced teachers would allow new teachers to quickly and efficiently incorporate efficient inclusive adaptations.

Regarding continual training, Fitzgerald et al. (2004) questioned 105 teachers and then selected 8 PE teachers who took continuing education training courses in this particular field to participate in face-to-face interviews. Although the continuing education training significantly helped the teachers improve in terms of inclusion, numerous teachers remained sceptical about the relevance and utility of this training. In reality, despite these continuing education courses, the teachers felt insufficiently informed or experienced to include students with disabilities in their classes. Lieberman et al. (2002) also questioned 148 teacher volunteers who participated in a training on the inclusion of pupils with visual disabilities. The authors noticed that the teachers' most frequently identified obstacle to

inclusion was their lack of professional preparation (66%). In addition to addressing the quantitative lack of training, the authors suggested that the training should focus more on the didactic strategies and pedagogical adaptations necessary to address inclusion problems in a real classroom and reduce the amount of instructional time spent on theoretical aspects of the disability (for example, the physiology of the eye, the causes and consequences of visual diseases). Along similar lines, in Ko and Boswell's (2013) qualitative study of 7 teachers, they suggested that the experience acquired during inclusive practices could be reinvested in a continuous process of collaboration with other teachers during regular professional trainings. An example of inclusive experience was described by Grenier (2006), who conducted a case study over a six-month period with a PE teacher whose class (n = 16) included a pupil with severe cerebral palsy and a pupil with visual deficiency. The data resulted from interviews, observations, and lesson plans. The thematic analysis showed that the teacher, who was trained in inclusive strategies and adaptations, focused primarily on the development of social skills among the students. To this end, the teacher first and foremost used cooperative learning in the reduced-sized class to amplify the social interactions between pupils. She also often taught small groups (even pairs, using the format of peer-tutoring between the student with disabilities and a classmate volunteer) to achieve a common motor objective that could only be reached if all group members participated. The objectives shifted toward motor learning and socialization and avoided a climate of competition that could aggravate interpersonal performances. The class climate that the teacher established was clearly directed towards progress and control to amplify amount of time that the students spent cooperating on the same common lessons, which were adapted to everyone's needs.

In summary of the thematic analyses, it seems that the representations that are favourable to inclusion are shaped by the following:

- the quality and the consistency of the professional training,
- the frequency and quality of the exchanges between teachers and colleagues,
- the adequacy of training programmes, and inclusive texts in particular, to provide a curriculum that is open to adapted physical activities and sports participation for people with disabilities.

5. Discussion and practical implications

At this stage, our thematic analysis highlights the following factors:

- that influence the PE teachers' positive or negative attitudes towards the inclusion of students with disabilities (first research question),
- that can positively influence the inclusion of students with disabilities in PE classes, according to teachers' representations (second research question).

The aim now is to highlight the limitations of this work and to structure all of the factors related to PE teachers' attitudes and representations around a central element to help them become more inclusive and accessible in their teaching.

5.1. Limitations and central element determination

The first limitation is based on the focus of this work on a single discipline: PE. As a result, the impact on inclusive education is limited. Indeed, this review showed the need for better exchanges between the inclusion partners (parents, administration, medical staff, etc.) and all teachers (general education teachers of different subjects, specialized teachers and teacher assistants) to collectively develop an individualized plan according to the SEN of the student with disabilities as a starting point for inclusion.

Another limitation concerns the small number of studies on the impact of inclusive practices (peer tutoring, cooperative learning, disabled sports programming, teaching adaptations, sport modifications, etc.) on the attitudes and representations of PE teachers. It is likely that the lack of APE training among PE teachers greatly limits the opportunity for research on the impact of inclusive practices (still undeveloped) on the attitudes and representations of PE teachers.

Therefore, it seems that the central element around which the inclusive practices could be developed and that could positively influence the attitudes and representations of teachers is APE training. APE training is a common factor of the two themes. Thematic analyses have previously shown that PE teachers need regular APE training focused on inclusive didactic strategies and

pedagogical adaptations and the support of teachers with inclusion experience (co-teaching) throughout their careers (starting at the university level). To answer our third research question, we propose 3 types of training content for PE teachers to help them be more inclusive and accessible in their teaching: multidisciplinary training, didactical disciplinary training and pedagogical disciplinary training.

5.2. Multidisciplinary training

An essential part of the thematic analysis is based on collaboration and communication with colleagues and partners of inclusion (section 4.2.2) to collectively identify the SEN of the student with disabilities (Aydin, 2014), to create his individual inclusion plan (Klavina et al., 2007) and to help PE teacher to be effective in his teaching (Heikinaro-Johansson et al., 1995). These results could be structured inside a multidisciplinary training.

Given the singularity of each individual plan of inclusion, the multidisciplinary training could be performed locally in the regular school with the different partners in the educational community (Qi & Ha, 2012b). This training could be conducted in two stages.

The first step involves collecting information about all of the characteristics of the student with disabilities. To do so, it seems crucial to include an administrator (as listed by Sato & Hodge, 2009) who would:

-bring together all of the partners that could help the teachers and the members of the educational community to precisely determine the student's SEN and help the educators understand the consequences of the disability on education (as suggested by Lieberman et al., 2002). The active participation of the student's family and the specialist or medical staff seems decisive.

-bring all of the partners together as a team to define the organization of the individual inclusion plan (adaptation of the schedule, accessibility of the classrooms, support of a teacher assistant, teacher training, etc.). From this perspective, the exchanges between the PE teacher, the parents and the medical staff could be important to ensure that the student can safely perform the class activities.

The second step is to define the pedagogical aspect of the individual plan of inclusion. To do so, it is necessary that all of the teachers (the general teachers of different subjects, specialized teachers and teacher assistants) work together (as supported by the study of Grenier, 2011) to:

-define specific learning objectives (cognitive, motor, social, emotional, etc.) according to the SEN.

-develop a common educational strategy adapted to the class to achieve these specific learning objectives.

-increase exchanges regarding effective teaching practices. Regular exchanges between the teachers are important ensure that the individual plan of inclusion is reviewed on a regular basis. The participation of the PE teacher on the educational team seem to be important for establishing a complete plan, that is, one that addresses motor skills, physical capacities, cooperation with others, and other skills.

Ultimately, this multidisciplinary training is based on the recognition of team work as an essential part of the mission of teachers.

5.3. Didactic disciplinary training

The results of the thematic analysis highlight different effective strategies for successfully including students with disabilities in their PE courses which could be grouped within a didactic disciplinary training, such as:

-the modification of one or more parameters of traditional sports activities (the size of the field, the number of players, the rules of the game, etc.) as reported in the study of Combs, and (2010). For example, in soccer matches, the teacher could reduce the number of players to decrease the cognitive and emotional burden for students with mental retardation. However, Block (2007) cautioned that if the modifications change the nature or the challenge of the game too much, it could cause dissatisfaction among the typically developing students, particularly those with a competitive spirit.

-the programming of disabled sports units to implement reverse inclusion (as showed Grenier et al., 2014). Reverse inclusion allows typically developing students to participate in a sport usually reserved for people with disabilities (Hutzler, Chacham-Guber, & Reiter, 2013). For example, the

teacher may teach wheelchair basketball instead of basketball to successfully include a student with paraplegia.

-the use of an inclusion teaching style (Mosston & Ashworth, 2002) that aims to provide students with the opportunity to engage in an activity at an appropriate skill level (as reported in the study of Elliott, 2008). For example, during an indoor climbing activity, the teacher determines several levels of difficulty among the climbing routes (relative to the distance between holds, the size of the holds or the inclination of the wall). Each student, including a visually impaired student, tests the different routes to determine his/her initial level and works to gradually reach the next level. Moreover, in this example, the belayer (a student without a disability) verbally communicates with the visually impaired student to guide his/her ascent.

5.4. Pedagogical disciplinary training

In the thematic analysis, Ko and Boswell (2013) show that different effective instructional adaptations could be grouped within a pedagogical disciplinary training to help PE teachers to increase the motor skill acquisitions of students with disabilities and to strengthen social relationships among students in the PE course.

The content of this pedagogical training could refer to the use of the following:

-a mastery climate that facilitates students' concentration on their own learning process (Valentini & Rudisill, 2004) rather than on the performance (as suggested by Morley et al., 2005 or Smith & Green, 2004). For example, during performance activities (athletics, swimming races, etc.), the teacher could assess the progress of each student (in terms of motor skill acquisitions or the evolution of his/her performance) rather than comparing performances among students. This could be particularly appropriate for students with locomotor disabilities, such as cerebral palsy.

-Cooperative learning, which is the instructional use of small groups of students (in our case, with and without disabilities) who must work together to achieve a common goal (as developed in the study of Grenier, 2006). This common goal can only be accomplished if each student in the inclusive group works together (Grineski, 1996 and Johnson and Johnson, 1999). This pedagogical strategy is useful for collective activities that amplify social relationships among students. For example, in an orienteering team activity with a student with Down syndrome, the students could discuss the distribution of beacons according to their cognitive complexity in a way that allows them to be more efficient during the team race.

-Peer tutoring (as listed by Grenier, 2006) is an instructional strategy that provides a trained peer tutor to support a student with disabilities in PE courses. For example, in fitness choreography with a hyperactive student, the teacher could train a volunteer classmate to provide unidirectional tutoring. In this case, to increase the hyperactive student's concentration step by step, the peer tutor uses repetitive and rhythmic demonstrations. In fact, peer tutoring can promote equal participation among students with and without disabilities (Murata & Jansma, 1997) by increasing the activity engagement times for all students (Klavina, 2008) and by amplifying the instructional and physical interaction between students with and without disabilities (Klavina & Block, 2008).

6. Implications for further research

Ultimately, this systematic literature review on the inclusion of students with disabilities in PE from a teacher perspective highlighted the following:

-the factors that influence PE teachers' positive or negative attitudes and predispositions toward the inclusion of students with disabilities,

-the factors that can positively influence the inclusion of students with disabilities in PE classes, according to teachers' representations.

From this set of factors, we identified three types of training content to help PE teachers become more inclusive and accessible in their teaching. This training content forms the basis of the following research perspectives.

Regarding multidisciplinary training, it would be interesting to conduct a study to compare the representations and attitudes of PE teachers and those of their colleagues that teach other subjects. A quantitative study in the form of survey could be considered.

Regarding disciplinary didactic training, it would be important to investigate PE teachers' points of view regarding the changes and differentiations in their teaching content and didactic choices (disabled sports programming, modifications of traditional sports, individual goals, etc.) that they find necessary to ensure the participation of children with disabilities in their course. A qualitative approach involving interviews after the teachers are given descriptions of different students with disabilities (for example, their age and the type and severity of their disability) could help the teachers share their points of view and justify their educational choices.

Finally, regarding pedagogical disciplinary training, it would be interesting to observe the different types of instruction (classroom climate, style of intervention, the use of cooperative learning, the use of peer tutoring, etc.) that PE teachers have available to implement. Multiple case studies with observations and postsession interviews could add rich information for analysing teaching practices.

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