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Mapping teacher education domain: A document co-citation analysis from 1992 to 2012

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HIGHLIGHTS

- The study was carried out via document co-citation analysis, a bibliometric method.
- The study provides insight into the intellectual formation of the teacher education domain.
- The teacher education domain is comprised of a number of specialties.
- None of the specialties is advanced enough to be regarded as the principal trend in the domain.

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ABSTRACT

The aim of the present study is to identify the structure of the research base for teacher education as a scientific discipline and changes in the structure of this domain between 1992 and 2012. The study was carried out using document co-citation analysis, a bibliometric method. Document co-citation analysis shows that the domain of teacher education is characterized by a number of specialties; however, none of them are sufficiently developed to be regarded as the principal trend in the domain.

1. Introduction

Teacher quality and educating high-quality teachers have emerged as fundamental problems to be solved by nations since the correlation between education and economy is becoming more and more apparent, and the principal factor in student achievement is teacher quality (Cochran-Smith, 2008). The primary way of enhancing teacher quality is to base teacher education on the ground of robust research (Cooney, 1994). This requires more discussion of the basis for research on teacher education. As Cochran-Smith and Fries (2005, p. 69) put it:

> In many of the most important contemporary debates about teacher quality and teacher preparation, the central focus-—at least on the surface—is research itself, particularly on the fundamental question of whether there is a research basis for teacher education and, if so, what that research base suggests.

Recent years have witnessed a closer relationship between educational policies and the relevant research bases. According to Cochran-Smith (2008, p. 11), the underlying idea behind reforms in the U.S. is that, "the implementation of research-based policies regarding teacher education will solve the teacher supply problem and enhance teacher quality, thus leading to increased pupil achievement." Similarly, European scholars have agreed in recent years that a basis for research on teacher education should be formed. Although strategies vary from one country to another, certain political patterns seem to be emerging as a research base (Arreman & Weiner, 2007). Arreman (2005) summarizes the strategies related to the construction of a basis for research in the European nations thus:

> In Finland, Sweden, and Portugal, the aim has been to make teacher education a research-based field (Erixon, Frånberg, Kallós, 2001). Alternatively, in the UK, it has been to raise the

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professionalism of teacher educators by government-led measures derived from 'evidence-based' (Weiner, 2002, p. 279) or 'brute data' (Edwards, 2001, p. 20) research. In other European countries, for example, Austria and Spain, research in teacher education has been mainly oriented towards integrating theory and practice, in order to promote democratic values of equity and multiculturalism (Gassner & Schratz, 2001; Zufiaurre, 2001) (p.215).

1.1. A research basis for teacher education

The significance of a basis for research on teacher education is often emphasized as a critical requirement for the education of high-quality teachers. Until recently, however, the research base for teacher education was blamed for being narrow (Houston, 1990) and unguided (Zimpher & Ashburn, 1992). This section reviews the teacher education research that has been carried out in different countries and tries to provide a general view of teacher education research. Bergem, Björkqvist, Hansén, Carlgren, and Hauge (1997) examined the scope of and changes in teacher education research from the 1950s to the 1990s in Scandinavia. In their review of the research carried out in Norway, Sweden and Finland, the researchers asserted that there was a great variety of research in the field of teacher education, and that the patterns of change of research in related fields were quite similar both within and beyond the other Nordic countries during the research period (p. 450). The researchers proved that research had focused most on teacher behavior in the 1950s and later shifted to issues such as teacher cognition and student–teacher interaction. Their research also demonstrated that the use of simple quantitative tools as a research method decreased over time, while the use of the qualitative research methods such as classroom field studies, case studies, participant observation, group interviews and action research increased.

Cameron and Baker (2004) examined the teacher education research conducted between 1993 and 2004 in New Zealand using the annotated bibliography and literature review method. The researchers found that the research they examined could be classified under six main themes according to its primary focus. These themes were: student teachers (selection of programs for initial teacher education, student teacher demographics, student teacher backgrounds and beliefs), teacher educators, the impact of particular courses and interventions, associate teachers and practicum, program evaluations (evaluations by researchers from institutions, external evaluations) and beginning teachers. McGee (1999) criticized teacher education research in New Zealand as fragmented, small scale research carried out by individuals, and the researchers found that this was accurate.

Murray, Mitchell, and Nuttall (2008) examined the experimental research on initial teacher education and beginning teachers in Australia that was published in peer-reviewed journals from 1995 to 2004. The researchers grouped the research according to topics. Most of the research carried out in that period was about reflective thinking in teacher education, followed by practicum supervision and mentoring, the use of online learning, pre-service teachers' information and communications technology self-efficacy, primary pre-service teachers' attitudes and beliefs regarding science, pre-service teachers' general conceptions of teaching and learning, primary pre-service teachers' attitudes and beliefs related to mathematics; primary pre-service teachers' mathematics subject content knowledge, graduates' perceptions of their pre-service education, primary pre-service teachers' confidence in their ability to teach science and pre-service teachers' wellbeing. The researchers stated that this topic distribution supports Tisher's (1990) claim that the field of teacher education research has a quite fragmented structure. The researchers proved that the epistemological basis for the teacher education research is weak, and consists of mostly small scale, isolated research. According to Murray et al. (2008), this is a natural result of the fact that teacher education is a new field which is trying to prove itself. The researchers assert that the funds provided for teacher education research are limited and do not allow for large scale research.

Criticisms of teacher education in different nations frequently claim that, since the field is brand new, it is hard to carry out long term, longitudinal research. It lacks funding. The research structure of the field is fragmented. Work on many significant questions has yet to be carried out, and the work have not been that has been done is insufficient (Bergem et al., 1997; Borko, Liston, & Whitcomb, 2007; Cameron & Baker, 2004; Murray et al., 2008). These limitations of teacher education research, reduce its effect on the process of generating teacher education policies (Murray et al., 2008; Pandey, 2004; Zongyi & Gopinathan, 2001). Research that can show the research structure of teacher education research, and its gaps and tendencies may contribute to the consolidation of its research basis and increase its effect on policy makers by guiding new research (Zongyi & Gopinathan, 2001).

1.2. Mapping scientific fields

Generally, geographic or spatial metaphors like "field of study" and "area of specialization" are used to talk about science. It is supposed that the visualization of abstract and complicated facts by using spatial terms makes it easier for us to comprehend conceptual relationships and developments (Small, 1999). The idea that mapping scientific fields might contribute to the specification of the research structure of scientific fields and that these results might be used by policy makers caused bibliometric mapping methods to be discussed widely (Rip, 1988). Garfield, Malin, and Small (1978) have defined this idea as follows, "Mapping science is an attempt to arrive at a spatial representation of fields and disciplines—and, at a lower level, individual papers and scientists-in which the relative locations of entities is depicted" (p. 192).

The idea that the specialties are the key element of the social and cognitive structures in scientific fields provided a framework to mapping science (Small, 1978). Chubin (1976) describes the position of the specialties in disciplines as follows, "Disciplines form the teaching domain of science, while smaller intellectual units (nestled within and between disciplines) comprise the research domain. Within the sociology of science, these units have been termed 'scientific specialties' (p. 448). Crane (1972) provided the idea of mapping the structures and the relationships of specialties.

The mapping of the scientific specialties or subdomains may contribute to the analysis of the domain sociologically and historically, to the increase of our comprehension about the process of information transfer among scientific domains and to the improvement of relationships between cognitive structures (Small & Crane, 1979). According to Borgman and Furner (2002), the relationships among the sub domains that constitute a scientific domain and the mapping of the improvements in that domain may allow its structure to be comprehended as a historical process and allow predictions to be made about its methods.

Thus, insight into the intellectual structure of teacher education, as well as its evolution and research trends over time, will enable researchers, practitioners and policymakers to b better understand the existing situation and guide their future research. Small (1978) suggested a general method for the examination of the structures and changes in the relationships among the specialties. The basic rule of this method is that changes in social/cognitive situations will be reflected in the citation patterns of the researchers working in the

field. Kuhn puts it, " … if I am right that each scientific revolution alters the historical perspective of the community that experiences it, then that change of perspective should affect the structure of post-revolutionary textbooks and research publications. One such effect—a shift in the distribution of the technical literature cited in the footnotes to research reports—ought to be studied as a possible index to the occurrence of revolutions" (Kuhn, 1962, p. 172).

1.3. Research aim

The purpose of the present study is to identify the structure of the research base for teacher education as a scientific discipline and the changes in that structure between 1992 and 2012. Insight into the intellectual formation of the domain, as well as into its evolution and research trends over time, will hopefully enable researchers, practitioners and policymakers to better understand the existing situation and guide their future research.

2. Methodology

The study was carried out using document co-citation analysis, a bibliometric method. Bibliometric methods are principally based on the assumption that a study's citations indicate the effect of cited sources on the study. In other words, citations are seen as a measurement of a study's dependency on the previous body of research. In a co-citation analysis, the number of times two documents are included in the references of different documents is considered as a measure of the similarity of these two documents' research or theoretical perspectives. Documents that are commonly cited together are grouped together, and they are placed on the map either closely or at a distance depending on the number of co-citations. (for a detailed discussion of method see Small & Griffith, 1974). The method reveals the structure of a domain, and it attempts to reflect not the perception of a particular researcher, but the shared perceptions of all the researchers who work in that domain. Therefore, it can be regarded as more objective than other methods, including literature reviews (Culnan, 1987).

Co-citation analysis is commonly used in different disciplines to interpret their subdomains, the relationships between these subdomains, and thus progress and changes in the discipline, and the validity of the method is acknowledged in various disciplines (Nerur, Rasheed, & Natarajan, 2008), including, but not limited to, higher education (Tight, 2008), human resource management (Fernandez-Alles & Ramos-Rodríguez, 2009), organizational behavior (Culnan, O'Reilly, & Chatman, 1990), anesthesia (Jankovic, Kaufmann, & Kindler, 2008), scientometrics (Chen, McCain, White, & Lin, 2002), international management (Acedo & Casillas, 2005), ubiquitous computing (Zhao & Wang, 2011) and knowledge management (Lee & Chen, 2012). The capabilities of co-citation analysis, as well as its acceptance in various disciplines, suggest that the method can be a suitable instrument for revealing the structure of teacher education research and the changes in this domain. In a co-citation analysis, the unit of analysis is either authors or documents. The present study was based on the latter, for author co-citation patterns may not clearly reveal the structure of the domain since that the same author is likely to conduct studies in more than one subdomain. Unlike authors, documents are less likely to be included in more than one subdomain.

These are steps the research followed (for a visual demonstration see Fig. 1):

1. Specifying the journals in the research domain.
2. Downloading the references of the journals in their publications for the years, 1992–2012.
3. Sorting the data and preparing them for the statistical processes.
4. Designating the number of references in each publication and the number of co-citations in each publication using the data obtained in the previous step.
5. Generating a co-citation matrix using the co-citation numbers obtained in the previous step.
6. Generating a Pearson correlation matrix based on the co-citation matrix.
7. Specifying the factors (specialties) derived from factor analysis of the co-citation matrix.
8. Naming the subdomains that result from the factor analysis.
9. Drawing a PFNET diagram to specify the relationship among the subdomains visually.
10. Discussing the results.

2.1. Data collection

A document co-citation analysis starts with the identification of the study's source documents. These source documents are determined by lists of journals from the professional associations and, lists based on learned opinion. In order to obtain more objective results, the source documents for the present study were not identified by individuals or institutions, but chosen from journals that have been in nonstop circulation for a long time and are indexed by Social Science Citation Index (SSCI).

Thus, the *Journal of Teacher Education*, *Teaching and Teacher Education*, and the *Journal of Education for Teaching* were chosen for the present study since they met the criteria for inclusion in the study, namely, a focus on teacher education and being indexed by SSCI uninterruptedly for a long time (21 years). The 21-year period between 1992 and 2012 was divided into seven year time periods to analyze the teacher education research longitudinally. For the first time period (1992–1998), a total of 985 articles were examined, and citations of 23,251 documents by 8554 authors were included in the study. For the second time period (1999–2005), a total of 758 articles were examined, and citations of 24,802 documents by 9509 authors were included in the study. For the last time period (2006–2012), a total of 1368 articles were examined, and citations of 59,189 documents by 21,724 authors were included in the study. A total of 107,242 documents were cited in 3111 documents during the entire period (1992–2012). The great majority of the documents were produced by researchers from the U.S. or other English-speaking countries. Table 1 presents the number of documents by country.

The Web of Science (WoS) database was used to access these documents. Then the references in the documents were identified using Bibexcel (Persson, Danell, & Schneider, 2009), which was also used for prepare the data for analysis. Differences such as capital letters used in the references were removed, and a full stop has inserted between name abbreviations using Bibexcel. Here are two example citations: (1) Abell S. K., 2004, USING VIDEO TEACHER; (2) ABELL SK, 2004, USING VIDEO TEACHER. Both were found in the same publication, yet they were written in different styles. To eliminate such discrepancies, all the characters were changed to lower by Bibexcel, and only the first letter of the first names of the authors was retained in the data. In this case, both records were changed to: abell s. 2004. using video teacher.

Since the first name of an author might have been used in a citation or different editions of the same publication (especially books) might have been referred to, the data were examined by the researcher, who standardized different reference records for the same publication. For example, the two records given below are references to the same book, yet the name of the writer was written

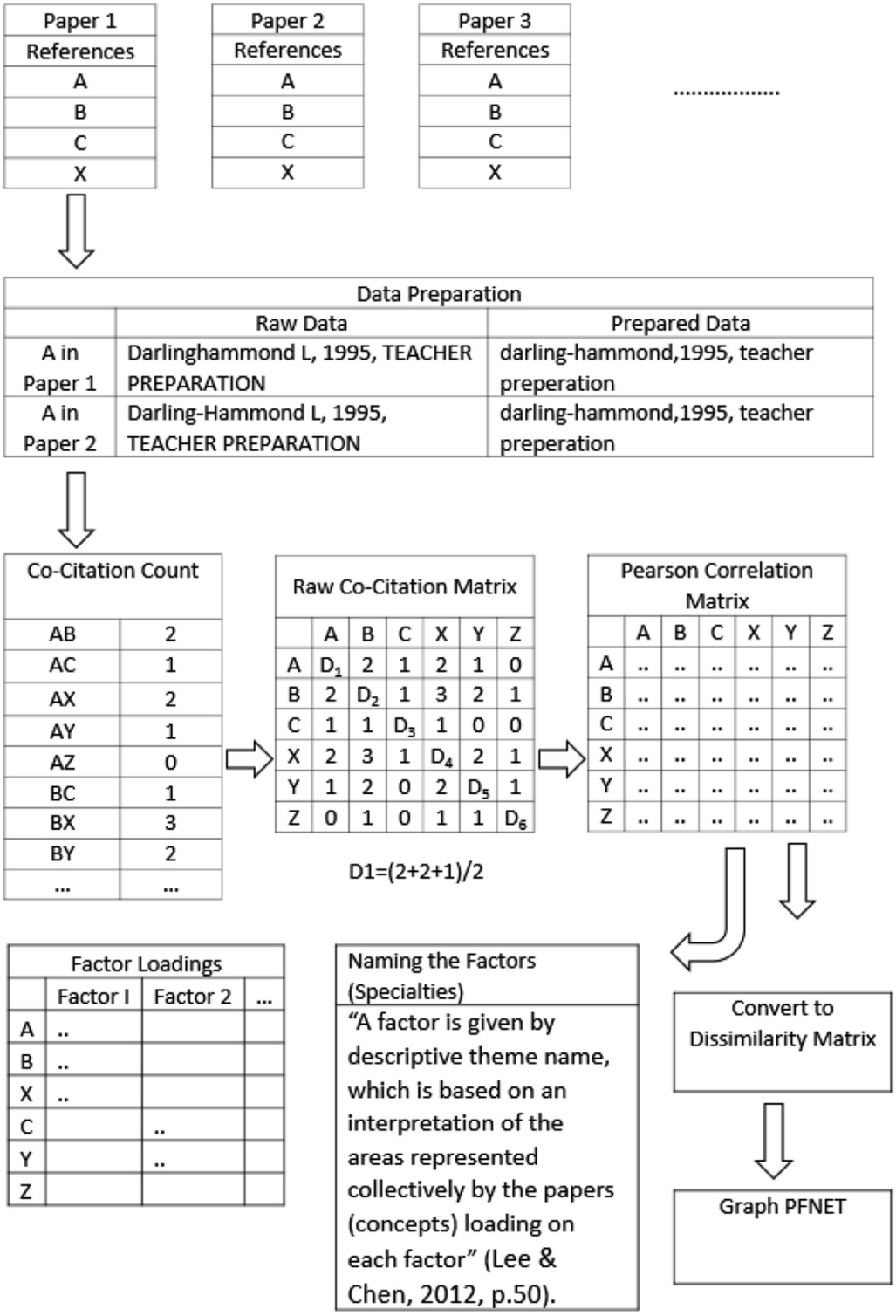

Fig. 1. Document co-citation analysis process.

differently, which may cause programs to perceive this research as different works. Such differences among the records were removed by the researcher by examining the records one by one.

1) Darlinghammond L, 1995, TEACHER PREPARATION 2) Darling-Hammond L, 1995, TEACHER PREPARATION

The number of references made to each publication and co-citations were specified using the references that have been obtained after preparing the data. Since a co-citation analysis involves an immense amount of data, it is quite common to determine a cut-off value to decide how much will be included in the study. No particular cut-off value was specified for the present study. Rather,

Table 1
The distribution of the number of documents by country.

Countries	1992–1998	1999–2005	2006–2012	1992–2012 (Total)
	Record count (%)	Record count (%)	Record count (%)	Record count (%)
U.S.	538 (54.56)	477 (62.93)	621 (45.4)	1636 (52.57)
England	182 (18.46)	25 (3.3)	140 (10.23)	347 (11.15)
Canada	74 (7.51)	41 (5.41)	77 (5.63)	192 (6.17)
Australia	42 (4.26)	44 (5.81)	77 (5.63)	163 (5.24)
Netherlands	17 (1.72)	41 (5.41)	80 (5.85)	138 (4.43)
Israel	22 (2.23)	41 (5.41)	41 (3)	104 (3.34)
P. R. C.	0 (0)	11 (1.45)	50 (3.66)	61 (1.96)
New Zealand	3 (0.3)	13 (1.72)	40 (2.92)	56 (1.8)
Scotland	14 (1.42)	5 (0.66)	27 (1.97)	46 (1.48)
Finland	14 (1.42)	5 (0.66)	26 (1.9)	35 (1.13)
Belgium	4 (0.41)	7 (0.92)	22 (1.61)	33 (1.06)
Spain	2 (0.2)	4 (0.53)	27 (1.97)	33 (1.06)
Norway	2 (0.2)	5 (0.66)	21 (1.54)	28 (0.9)
Germany	2 (0.2)	4 (0.53)	21 (1.54)	27 (0.87)
Turkey	0 (0)	3 (0.4)	23 (1.68)	26 (0.84)

inclusion was limited to the 100 most commonly cited documents for each time period.

For each document pair, by using the number of co-citations obtained, a raw co-citation matrix was formed for each time period, which was 100 × 100 units square on the basis of the 100 most commonly cited documents. In the literature on co-citation analysis, it is still being debated what the numbers on the diagonal should be in the raw co-citation matrix. Attempts to overcome the problem have considered the diagonal as missing data (McCain, 1990), maximized diagonal values with reference to the number of co-citations between the author and other authors (White, 2003a) and added the three highest numbers of co-citations together and divided that amount by two (Culnan, 1986). In the present study, the data on the diagonal were obtained by adding the three highest values in the row/column of the document and dividing that amount by two. The final raw co-citation matrix was used as input data for the factor analysis, which was carried out using SPSS 17.0.

2.2. Factor analysis

Authors in a specialized subdomain generate and improve their ideas on the basis of those of other authors in that subdomain. In other words, they cite studies in the same subdomain that share their perspectives or conceptual frameworks (McCain, 1990). Morris and Van der Veer Martens (2008, p. 214) have defined specialty as "a self-organized network of researchers who tend to study the same research topics, attend the same conferences, read and cite each other's research papers and publish in the same research journals". Such studies fall under the same factor in a factor analysis that uses a raw document co-citation matrix as input. In other words, a factor analysis allows specialties (subdomains)to be identified through the co-citation matrix. These specialties are comprised of documents that are based on similar theories and research perspectives (Nerur et al., 2008).

The present study used principal component analysis (PCA), which is quite common in co-citation studies. The analysis attempts to account for the relationship between variables by generating a smaller number of factors. In a co-citation analysis, principal component analysis is often accompanied by a varimax rotation, which generates a simple structure by enabling independent factors to be loaded under a single factor. Software implementing a factor analysis attempts to generate as many factors as they can; however, it is necessary to specify a stopping rule since the factors generated will account for less and less variance after a certain point. The present study used one as the critical eigenvalue, and the analysis was ended at that point.

2.3. PFNET

The Pathfinder Network Analysis (Schvaneveldt, Durso, & Dearholt, 1989) was developed to analyze proximity data in psychology. This analysis allows complicated network displays obtained from proximity data to be refined to the extent that they will only include the most important links, thus yielding displays that are easy to interpret, simple and meaningful. The process of refining is carried out using triangle inequality, and redundant (counterintuitive) links are excluded from the network. In other words, if there happens to be more than one link between two nodes (i.e., documents), the path with the greater impact is retained, and the others are discarded. Network displays generated using PFNET are displayed using force-directed graph drawing algorithms, in which linked nodes are displayed closely to each other, but unlinked ones apart from one other (Chen, 1999).

Compared to other visualization methods used in co-citation analyses (multidimensional scaling, complete-linkage clustering, Kohonen self-organizing maps, factor loading plots, and so forth), the PFNET is not only less demanding, it is also more successful at emphasizing the distinctive characteristics of the semantic structure of the network (White, 2003b). What makes it superior to other methods is that it enables local structures to be revealed more clearly (Chen, 1999), and it displays authors linking different specialties (Nerur et al., 2008).

Raw co-citation data are based on similarity. PFNET algorithms, on the other hand, are based on dissimilarity. For the present study, the correlation matrix obtained from the factor analysis was translated into a dissimilarity matrix to conduct the PFNET analysis. The PFNET analysis was carried out using PAJEK (Batagelj & Mrvar, 1998). In the PFNET display, each circle symbolizes a study. The numbers next to the circles represents each document from the raw co-citation data (see Appendix for full titles of the documents). The size of the circles is determined by the citation counts for the document over the specified period. The underlying idea was to show the impact of each document more clearly. To better explain the structure of the domain and the location of each document in the specialties, factor numbers were added in brackets for each document (See Table 2 for corresponding factor names).

3. Results

A collective assessment of the results of the factor analysis and the PFNET analysis presented a grand vision for the structure of teacher education and changes in this domain. Each time period was subjected to a separate factor analysis. Considering the limitations of space, only the top 15 factors that were the most successful in accounting for the variance were incorporated into the discussion. First, the publications grouped under the factor and the abstracts and key words of these publications were analyzed to identify the factors. Then, each "factor is given by descriptive theme name, which is based on an interpretation of the areas represented collectively by the papers (concepts) loading on each factor" (Lee & Chen, 2012, p. 50). Table 2 presents the factors. The percentage at which a factor can account for the variance can be considered as an indicator of the contribution made by that factor to the conceptual structure of the domain (McCain, 1990). The factors most successful in accounting for the total variance are acknowledged as subdomains, or specialties of the domain. The PFNET graph shows the structure of the factors, their links with one another, and the documents that constitute the core of each factor, so that the structure of the domain can be better visualized.

Table 2
Factors and factor loadings.

	1992–1998		1999–2005		2006–2012	
	Factor	Variance explained (%)	Factor	Variance explained (%)	Factor	Variance explained (%)
1	Reflective Thinking In Teacher Education	9.64	Beliefs about Teaching	6.62	Self-efficacy	7.85
2	The U.S. Educational System	7.34	Self-Efficacy Beliefs	6.31	Learning in Communities	7.42
3	Beliefs about Teaching	7.13	Qualitative Research Methods	5.83	Culturally Relevant Teaching	6.87
4	Qualitative Research Methods	6.1	The U.S. Educational System	5.31	Qualitative Research Methods	6.83
5	Teacher Narratives	5.45	Culturally Relevant Teaching	5.23	Teaching Mathematics	6.27
6	Teacher Beliefs and Cognitive Change	4.38	Teaching Mathematics	4.28	Teacher Preparation	6.21
7	Feminine Approach	4.3	Reforms in Teacher Education	4.27	Reflective Thinking In Teacher Education	6.13
8	Knowledge Base of Teaching	3.91	Reflective Thinking In Teacher Education	4.26	Beginning teachers	4.99
9	Beginning Teachers	3.46	Beginning Teachers	4.09	Teacher Turnover	4.59
10	Organizational Dimension	3.34	Knowledge base of teaching	4.01	Teacher Narratives	4.05
11	Research on Teaching	3.22	Teacher Narratives	3.84	Beliefs about Teaching	3.69
12	Teaching Mathematics	2.97	Learning in Communities	3.8	Teacher Identity	3.19
13	Practical Knowledge	2.7	Practical Knowledge	3.8	Concern-Based Model of Teacher Development	2.84
14	Defining Teacher Education	2.6	The Moral Dimension and Caring	3.49	Teacher's Professional Development	2.59
15	Narrative and Learning	2.6	Defining teacher education	3.35	Teacher Beliefs and Cognitive Change	2.27
	Total	69		68.5		75.78

The document most frequently cited in the first and second time periods was Lortie (1975), while in the third time period, it was Lave (1991). A look at the ten most frequently cited documents for each time period suggested that the three time periods had seven documents in common. The second and third time periods shared two of the remaining three documents (out of ten) in common, and one document was included in the top lists of the first and second time periods. This suggests that these documents had great significance and were landmarks in teacher education research between 1992 and 2012. A look at the 100 most commonly cited documents indicated that the three time periods had only 24 documents in common. An assessment of the documents' citation counts suggested that the top 100 documents in the first time period (1992–1998) got 2341 citations in total (23.4 citations on average per document). The figures for the second and third time periods were 2103 (21 on average per document) and 3548 (35.5 on average per document), respectively.

3.1. 1992–1998

The factor analysis of the 100 most frequently cited documents for the first time period yielded 23 factors with eigenvalues higher than 1. These 23 factors accounted for 69.18% of the total variance. The largest factor, *reflective thinking in teacher education*, accounted for only 9.64% of the total variance on its own. The subdomain of reflective thinking in teacher education involved documents such as Schön (1983, 1987), Dewey (1933), Calderhead (1989), Van Manen (1977), Zeichner and Liston (1987), and Gore and Zeichner (1991) (see Appendix for the full list). The factor focused on discussions about the place of reflective thinking in teacher education and teachers' professional development, as well as how reflective thinking could be improved. The second largest factor, *the U.S. educational system*, accounted for 7.34% of the variance. The factor was marked by discussions about problems in the U.S. educational system, and subjects concerning learning and teaching were handled in the context of the U.S. educational system. This focus on the U.S. educational system can easily be explained by the fact that nearly half of the source documents during the time period were produced by American researchers. The third factor, *beliefs about teaching*, accounted for 7.13% of the variance. Its main theme was prospective teachers' and newly-recruited teachers' ideas about teaching and being a teacher, and how these ideas were reflected in their professional experiences and practices. The fourth factor was *qualitative research methods*, which accounted for 6.10% of the total variance. The documents loaded under this factor discussed the principles of qualitative research methods in educational research. The next factor was *teacher narratives*, which accounted for 5.45% of the total variance. These documents studied teaching practices and practical knowledge and the use of narratives. Due to the limitations of space, only the top five factors are discussed at length for each time period. Please see Table 2 for the other factors.

The PFNET graph generated for the first time period (Fig. 2) suggested that *beliefs about teaching* were telescoped with another factor, namely *teachers' beliefs and cognitive change*, forming the core of teacher education research, which was divided into three main axes. The document that linked the three axes in the PFNET graph was Calderhead and Robson (1991), which was included in not only *beliefs about teaching,* but also *teachers' beliefs and cognitive change*. The backbone of the main axis was composed, from the center to the periphery, of the factors *knowledge base of teaching*, *reflective thinking in teacher education,* and *the U.S. educational system*. The factor *teaching mathematics*, which was relatively isolated, was connected to *knowledge base of teaching* through Brown, Collins, and Duguid (1989), which appeared in not only *practical knowledge,* but also in *teaching mathematics*. Two smaller factors, *defining teacher education domain* and *practical knowledge*, were linked with *reflective thinking in teacher education*. *The U.S. educational system* was located relatively far from the other factors, which suggests that it can be considered the "leaf" factor of this axis. *Reflective thinking in teacher education* and *the U.S. educational system*, two factors of this axis, included quite similar documents. The second axis for the time period was comprised of two factors,

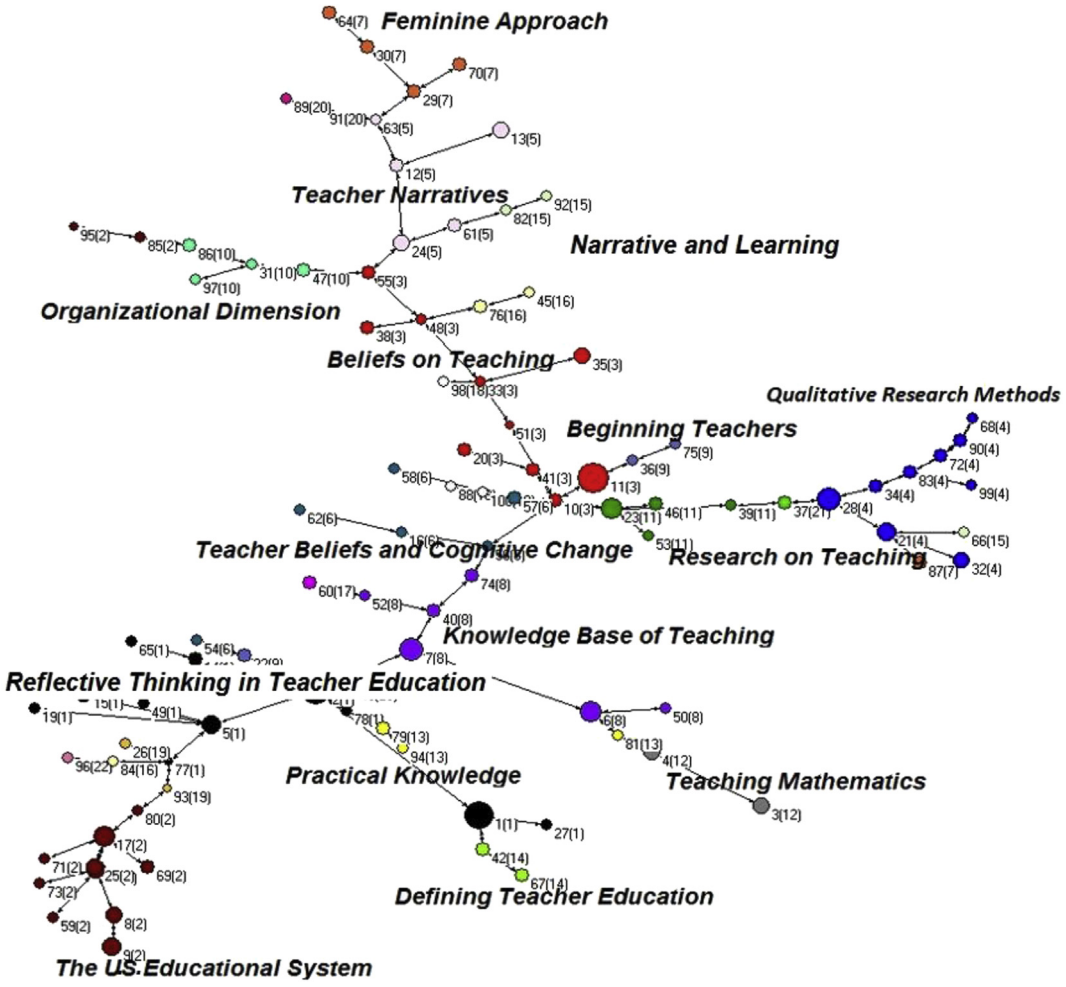

Fig. 2. PFNET mapping of documents from 1992 to 1998. Each node in the graph represents a document. The number by the node is a unique document number, and the number in the parenthesis is the factor number this document belongs.

namely *research on teaching* and *qualitative research methods*. As for the third axis, it had a branching structure. For this axis, Bullough, Knowles, and Crow (1992) linked the factors *organizational dimension* and *teacher narratives*. The factor *teacher narratives*, in turn, linked with two other factors, namely *feminine approach* and *the place of narrative in learning*.

3.2. 1999–2005

The factor analysis yielded 22 factors for this time period. The factors accounted for 68.39% of the total variance. Out of the top five factors accounting for the variance in the preceding time period, only *qualitative research methods* appeared among the top five factors for this time period. Of the top 15 factors, ten factors from the preceding time period appeared in this time period, too. The largest factor, *beliefs about teaching*, accounted for 6.62% of the total variance. Most of the documents loaded under this factor dealt with how the *a priori* beliefs of prospective teachers could affect their teaching and learning, and how prospective teachers' cognitive structures could be changed by teaching education (e.g., Calderhead & Robson, 1991; Hollingsworth, 1989; Richardson, 1996). Unlike the preceding time period, when there were two factors for beliefs about teaching and being a teacher (*beliefs about teaching* and *teacher beliefs and cognitive change*), the factor analysis for this time period merged these two into a single factor.

The second largest factor was *self-efficacy beliefs*, which was comprised of six documents with quite high factor loadings (ranging from 0.92 to 0.97): Ashton & Webb, 1986; Bandura, 1977, 1986, 1997; Gibson & Dembo, 1984; Tschannen-Moran, Hoy, & Hoy, 1998. This factor was not included among the top 15 factors in the preceding time period. However, it was the largest factor for the next time period (2006–2012), accounting for 7.85% of the total variance. In other words, the factor maintained its prominent position in the literature between 2006 and 2012. The third largest factor was *qualitative research methods*, which was included among the top five factors for all the three time periods. The fourth largest factor was *the U.S. educational system*, which accounted for 5.31% of the total variance. This factor ranked second in the preceding time period, accounting for 7.34% of the total variance. This time period was mainly characterized by the same documents as the first time period (e.g., Boyer, 1990; Darling-Hammond, 1997; Darling-Hammond & Lanier, 1994; Goodlad, 1984, 1990; Goodlad, Soder, & Sirotnik, 1990). The documents falling under this theme mainly focused on how to educate better teachers and how to enhance school achievement in the context of the U.S. educational system. The theme was not included among the top 15 themes in the next time period (2006–2012).

The fifth largest factor was *culturally relevant teaching*, which was not an important factor in the preceding time period. Accounting for 5.23% of the total variance, this factor included studies

of how class, cultural and ethnic differences emerged in the classroom and how teachers' and students' perceptions of the classroom and learning vary by class, culture and ethnicity. Other factors that emerged in this time period were *teaching mathematics*, *reforms in teacher education*, *reflective thinking in teacher education*, *beginning teachers*, *the knowledge base of teaching*, *teacher narratives*, *learning in communities*, *practical knowledge*, and *the moral dimension and caring*.

The PFNET graph for the time period (see Fig. 3) has *beliefs about teaching*, *reforms in teacher education*, and *the U.S. educational system* in the center. The most frequently cited document was Lortie (1975), which was located in the center of the PFNET graph. According to the results of the factor analysis, Lortie (1975) had a factor loading of more than 0.30 in five of the top 15 factors for the time period. In other words, the results of the factor analysis seemed to confirm the PFNET graph. As was the case for the preceding time period, the PFNET graph consists of three main branching axes. In the first axis, Kagan (1992) linked two factors, namely *beginning teachers* and *beliefs on teachers*. The factor *self-efficacy beliefs* was important, but isolated from the other factors. However, it was linked to *beginning teachers*. The other branch of the first axis had *beginning teachers* and *practical knowledge*, as well as *the knowledge base of teaching* and *reflective thinking in teacher education*, two factors linked by Elbaz (1983). In the second axis, *reforms in education* connected *teaching mathematics* and *the moral dimension and caring*. It was also linked to *qualitative research methods* and *teacher narratives*. The other main axis involved *the U.S. educational system* and *defining teacher education*, and *culturally relevant teaching* and *learning in communities*, two factors connected by Zeichner (1996). The link between Zeichner (1996) and *learning in communities* was Vygotsky (1962, 1978).

Compared to the preceding time period, there were certain changes in the PFNET graph. For instance, *self-efficacy beliefs*, *culturally relevant teaching*, and *learning communities* were added to the graph as peripheral factors. Furthermore, *reforms in education*, a factor which was absent from the graph for the preceding time period, is located in the center of the graph. Another difference is that the factor *feminine approach* was transformed into *moral dimension and caring*, and *research in teaching* and *the organizational dimension* did not survive into this time period. In addition, *the U.S. educational system*, which was a peripheral specialty in the preceding time period, was relatively more central in this time period, whereas *reflective thinking in teacher education* moved from the center to the periphery.

3.3. 2006–2012

The factor analysis yielded 21 factors that accounted for 86.09% of the total variance for this time period. The top 15 factors were studied and identified by the researcher and another experienced

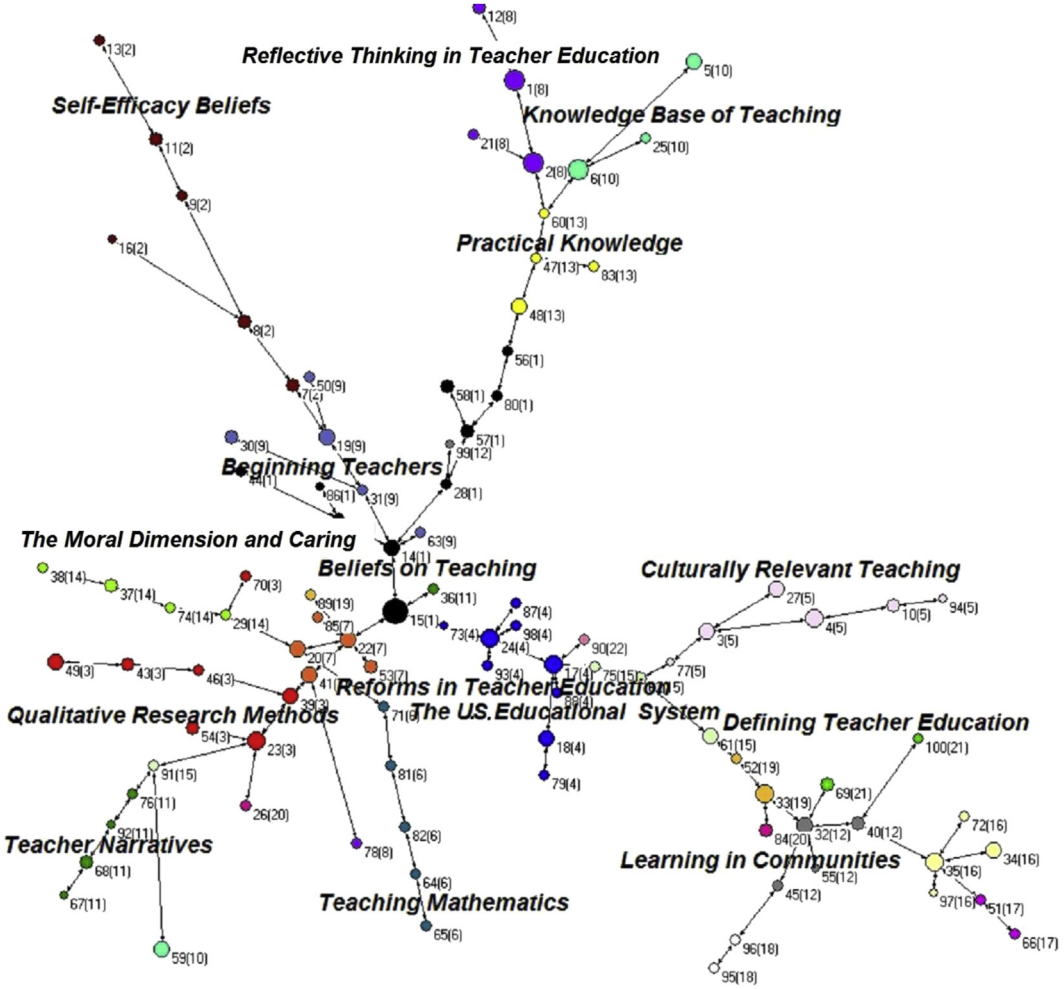

Fig. 3. PFNET mapping of documents from 1999 to 2005. Each node in the graph represents a document. The number by the node is a unique document number, and the number in the parenthesis is the factor number this document belongs.

researcher. Of the top 15 in the preceding time period (1999–2005) nine survived into this time period, and six new factors emerged. A look at the top five factors indicated that three of them—*self-efficacy beliefs*, *culturally relevant teaching*, and *qualitative research methods*—were also included among the top five factors in the preceding time period. The other two factors were *teaching mathematics*, which ranked sixth in the preceding time period, and *learning in communities*, which ranked twelfth in the preceding time period. The largest factor, *self-efficacy beliefs*, accounted for 7.85% of the total variance. This factor was also one of the largest factors in the preceding time period, accounting for 6.31% of the total variance. The six documents constituting the factor in the preceding time period maintained their prominent position in this time period, and they were supplemented by Tschannen-Moran et al. (1998), and Hoy and Spero (2005).

Learning in communities, which ranked twelfth in the preceding time period by accounting for 3.8% of the total variance, ranked second in this time period by accounting for 7.42% of the total variance. While the most commonly cited documents were Lave (1991), Wenger (1998), Borko and Putnam (1996), Wertsch (1991), Cochran-Smith and Lytle (1999) in the preceding time period, this factor was represented by Grossman, Wineburgh and Woolworth (2001), Little (1990, 2002), McLaughlin and Talbert (2001), Wilson and Berne (1999), Ball and Cohen (1999) and other documents (Cochran-Smith & Lytle, 1999; Lave, 1991; Wenger, 1998) in this time period. The main theme of this factor was the emergence and development of social learning communities established by teachers, as well as teachers' learning experiences in these communities.

Ranking fifth in the preceding time period, *culturally relevant teaching* came in third in this time period. Accounting for 6.84% of the total variance, the factor was comprised of seven documents with similar high factor loadings (varying between 0.77 and 0.94). Two documents, Kozol (1991) and Zeichner (1999), which were grouped under the factor in the preceding time period, disappeared, and Ladson-Billings (2001), Sleeter (2001) and Villegas and Lucas (2002) were the documents that belonged to the factor in this time period. The fourth largest factor was *qualitative research methods*, which was also included among the top 5 factors in the other time periods. This factor accounted for 6.83% of the total variance. Another factor, t*eaching mathematics* accounted for 6.27% of the total variance. The 11 documents grouped under this factor had factor loadings ranging from 0.42 to 0.86 (see Appendix for these documents). The factor had relatively more documents; however, it was heterogeneous in terms of factor loadings. This can be attributed to the fact that the common ground of the documents was mathematics education, although they fundamentally concerned teachers' knowledge base and teacher education. Some of the documents that were grouped under *the U.S. educational system* in the two preceding time periods clustered with Feiman-Nemser

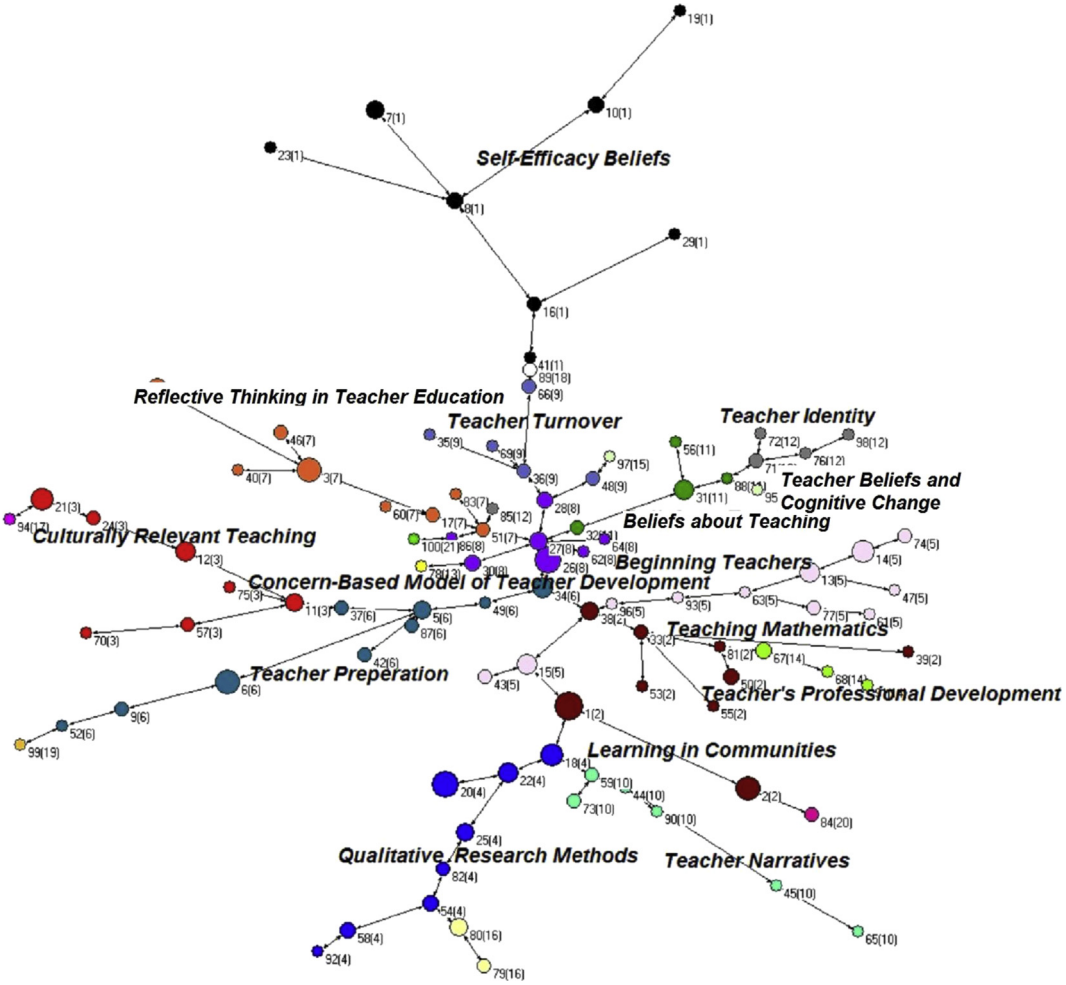

Fig. 4. PFNET mapping of documents from 2006 to 2012. Each node in the graph represents a document. The number near the nodes is the document number and the number in the parenthesis is the factor number that this document belongs. Also the names of the first 15 factors are added.

(2001), Zeichner and Shepard (2005) and Bransford, Darling-Hammond, and LePage (2005) under the factor *teacher preparation*.

The PFNET graph for this time period (Fig. 4) is like a clover with three leaves, as was the case for the other two time periods. In the center of the graph were *teacher preparation*, *beginning teachers* and *learning in communities*. On the first of the three axes were *teacher preparation* and *culturally relevant teaching*. On the second axis, three paths branched off from *beginning teachers*: *teacher turnover* and *self-efficacy beliefs* on the first path, *reflective thinking in teacher education* on the second, and *teacher beliefs*, *teacher beliefs and cognitive change* and *teacher identity* on the third. The center of the third axis was comprised of *mathematics* and *learning in communities*, which were telescoped into one another. The center of the axis is divided into three branches. The three branches consisted of *teachers' professional development*, *teacher narratives*, and *qualitative research methods*. A comparison between the PFNET graph for this time period and those for the preceding time periods suggested that *learning in communities*, which was a distant leaf in the second time period (1999–2005), was centrally located in the graph for this p time period. On the other hand, *reforms in education*, which was centrally located in the second time period, was included neither among the top 15 factors for this time period, nor on the PFNET graph. In addition, *feminine approach*, which was on the axis of *qualitative research methods* in the first time period and subsumed under *the moral dimension and caring* in the second time period, was not included on the graph in this time period.

4. Discussion

This study applies the co-citation analysis method, which is one of the bibliometric analysis methods to demonstrate the structure of teacher education domain. It would be appropriate to begin this section with a brief discussion on the criticism for this method and the theoretical basis of it to make a better interpretation of the findings acquired through this method. The underpinning idea of the citation analysis criticism is that an author might cite a document for various reasons; therefore, co-citation of two documents might not be an indication of two documents' similarity. This notion generates the result that it is wrong to use the citation analysis as an operational measure (Lievrouw, 1989). White (1990) gives a comprehensive response to this criticism by the co-citation analysis technique. White claims that the argument about the similarity between the two documents results not only from their being co-cited for a few times but from the fact that the number of these co-citations has exceeded a specific threshold value in time. White also states that the social relationship between the co-cited authors that is built through the co-citation studies is supported by experimental studies.

Despite these criticisms, the usage of citation data to describe different aspects of scientific studies and domains has not decreased but increased (Cozzens, 1981). On the other hand, citation analysis still does not have a developed theoretical basis although it is widely used (Moed, 2005). The lack of a robust theoretical background is seen as the most significant factor of the discussions about the validity of bibliometric studies (Riviera, 2014). An analysis of the theoretical basis of citation analysis might be helpful for a better understanding of co-citation studies and the criticism related to them. There is a variety of theoretical studies oriented to explain citation behaviors and the most discussed theoretical perspectives are the normative theory, constructivist theory and concept symbols theory that is highly influenced by the two former theories.

Robert K. Merton is accepted as the founder of modern sociology of science; the normative theory (Merton, 1973) is built on his ideas and according to this theory, the author who make citations accept the influence of the documents that they cite. Therefore, the citations stand for the cognitive and intellectual influences on the study. The constructivist view on citing behavior approach, which is based on the constructivist view of sociology, puts forward that the cognitive content of publishing has little influence on the way it is perceived and the citing behavior of writers are framed by complex motives socially structured in different forms (Gilbert, 1977). According to Gilbert, one of the pioneers of the constructivist approach, citing "is an aid to persuasion". Small (2004) asserts that it is possible to find a common ground for normative and constructive approaches. He states this idea as:

> If the norm of citation involves a symbolic payment of intellectual debt, it is, at the same time, an ascription of meaning to the cited text and a construction of its meaning. Documents function as concept symbols for citing authors (SMALL, 1978) at the same time symbolic credit or discredit is being bestowed. By extension, when documents are co-cited, citing authors are awarding co-recognition as well as creating an association of meanings. Here the symbolism of reward and the symbolism of meaning are operating in tandem (Small, 2004, p.76).

Small's approach is called "symbolic perspective"; according to this approach, the author makes a relation between a part of the document and a previous document, gives a specific meaning to the document and this meaning might not be the one that is intended by the writer of the document. After all, it is possible that the meaning of the document changes in time regarding that the meaning of the document is determined by those who read it (Cozzens, 1981). In Small's approach, citation is the transformation of published documents into symbols. Small argues that the clusters created by the co-citation of documents are symbol groups based on the denotation perspectives of writer who cite; they also can be seen as social identities (Small, 1978).

Most co-citation studies demonstrate a mapping of the acquired clusters or subdomains to make a visual presentation of the domain. According to Garfield et al. (1978), the idea of mapping the scientific fields by using frequently-cited studies is based on the notion that these researches indicate critical scientific ideas in its broadest sense. The document networks created through document co-citation analysis reflect both the cognitive and the social structures of the specialties. Garfield et al. (1978, p. 193) summarize the ontological background of the idea of mapping scientific fields as:

> The ontological status of maps of science or other cognitive maps will perhaps remain speculative until more has been learned about the structure of the brain itself. Whatever their physical reality, maps of science are certainly useful as heuristic tools.

The underlying idea behind a co-citation analysis is that factors accounting for a significant percentage of the total variance can be considered specialties or principal subdomains. In this respect, it can be argued that the teacher education domain is comprised of a number of specialties; however, none of them are sufficiently developed to be regarded as the principal trend in the domain. A comparison of similar studies of, for instance, human resource management (Fernandez-Alles & Ramos-Rodríguez, 2009) and tourism (Chou & Tseng, 2010) suggests that the teacher education domain is relatively disorganized. Kuhn (1962) describes the social sciences as "pre-paradigmatic." A discipline in the pre-paradigmatic stage is often fragmented and not dominated by any model or perspective. The results of the present study suggest that

Kuhn's idea about the social sciences in general applies to the teacher education domain. The results of the factor analysis confirm that the literature on teacher education is fragmented and lacks a shared language and structure (Bergem et al., 1997; Murray et al., 2008). This finding is not surprising, for it was only after the 1980s that teacher education came to be regarded as a profession and a discipline (Shulman, 1987).

Even so, the findings of the present study partially refute the idea that the teacher education domain is unguided (Zimpher & Ashburn, 1992). Considering the data on the citations, seven of the ten most frequently cited documents were the same in all three time periods, which suggests that the domain has a specific ground. Similarly, a look at the differentiation among the time periods on the basis of the results of the factor analysis indicate that 11 of the 15 named factors were the same in all three time periods. Nevertheless, there were significant changes, not only in the percentage at which they accounted for the factors, but also in the order of the factors. This suggests that the cornerstones of the teacher education domain have started to emerge, but there are certain differences in the priority of these cornerstones over time.

An analysis of the results in the context of the transformation of the domain shows that *learning communities*, *culturally relevant teaching* and *self-efficacy beliefs* were popular factors in the final time period. One of the crucial implications of globalization and movement between countries for education is corresponding changes in the demographics of students at schools. The increasing permeability of borders has led to classrooms that are composed of students with various native languages from different ethnic backgrounds and cultures. However, this is not the case for teachers, who tend to come from majority ethnic groups. This brings about a cultural division between students and teachers in many countries (e.g., Australia, Canada, the United States, the United Kingdom, and so forth) (Gopinathan et al., 2009). This divide has important implications for teacher education. According to Frankel (2008, p. 53), "The most pressing issue in teacher education around the world certainly must be developing teachers who can effectively teach children who are culturally different from teachers themselves".

In recent years, there has been a paradigm shift in the professional development of teachers. Accordingly, the purpose of this process of transformation and reform is not only to help teachers acquire particular knowledge and skills, but also to provide them with opportunities to reflect on their own practices and redefine their roles in the classroom through collaborative inquiry in professional development (Putnam & Borko, 2000). The model here is professional learning communities (PLCs), which are said to enable teachers to improve on their own teaching and that of their colleagues through critical and thoughtful discussions about richly defined practices. Vescio, Ross, and Adams (2008) assert that professional learning communities can help teachers to make decisions, identify objectives, and determine the needs of their students by taking the context into account. The prevalent idea in the literature on teacher education in recent years is that PLCs should be formed and maintained so that educational reforms can be successful (Gopinathan et al., 2009).

Another issue commonly discussed between 1999 and 2012 is beliefs. The assumption that beliefs are one of the most important factors in one's decisions (Bandura, 1986; Dewey, 1933) forms the basis for the idea that it is necessary to study beliefs about teaching, not only to understand teachers' attitudes and behaviors, but also to change and enhance them (Ashton & Webb, 1986; Brookhart & Freeman, 1992). Authors have noted that beliefs play a central role in research on teacher education (Pajares, 1992; Pintrich, 1990). Despite these expectations, research on teachers' beliefs about teaching and being a teacher have not increased so much for a long time (Nespor, 1987) (see Pajares, 1992 for a detailed discussion). Research on the beliefs of teachers and prospective teachers about teaching and being a teacher held a prominent place between 1992 and 2012, and proved to be one of the basic trends in the domain. In the third time period (2006–2012), *teacher identity*, *teacher beliefs and cognitive change* and *teacher beliefs* formed an axis on the PFNET graph. This finding suggests that these three specialties, which are closely intertwined, have started to become a significant trend in research on teacher education.

In addition to beliefs about teaching and being a teacher, teachers' self-efficacy, which means teachers' beliefs about their ability to ensure individual or collective learning, is acknowledged to be one of the most significant motivation beliefs that affect teachers' professional behaviors and learning (Bandura, 1997). Research on teacher self-efficacy began in the mid-1970s with surveys by the RAND organization designed to measure teachers' beliefs in their ability to influence student achievement levels. Studies of teacher self-efficacy were reported to reach maturity by Tschannen-Moran et al. (1998), in the late 1990s, and by Henson (2002) in the early 2000s. The present study revealed a perspective on the place and development of teacher self-efficacy research in the teacher education domain which is similar to those of Tschannen-Moran et al. (1998) and Henson (2002). Despite not being included among the top 15 factors in the first time period (1992–1998), *self-efficacy* emerged as one of the main factors in the next time period. The PFNET graphs for the second and third time periods (1999–2005 and 2006–2012) show that the factor *self-efficacy* had close links, but was relatively isolated from the other factors. This suggests that there is little exchange of information and ideas between *self-efficacy*, which has proved to be a leading specialty in recent years, and the other specialties of the teacher education domain. In other words, *self-efficacy* is an advanced but peripheral specialty (Lee & Chen, 2012).

Although narrative inquiry has a long history in social sciences and education, it was only after the 1990s that it started to be used commonly in education (Kelchtermans, 2010). The basis for this is the assumption that human beings are "storytelling organisms". This assumption has caused narrative inquiry to emerge as a clear way of understanding how human beings experience the world. Education and research on education are the construction and reconstruction of stories, and teachers and researchers are both storytellers and characters in the story. As a consequence of this assumption, storytelling and (auto) biographical reflective thinking in teacher education have recently started to be used commonly in the teacher education domain to learn about practice. In fact, narratives and biographical stories have emerged, not only as a way of understanding the processes of teaching and learning, which are complicated and interactive in practice, but also as a method used by researchers in teacher education to learn from these experiences (Connelly & Clandinin, 1990, p. 2; Kelchtermans, 2010).

With regard to research tendencies, the significance of qualitative research as a method is continuously increasing. This fact overlaps with the discovery of Bergem et al. (1997) about the increasing significance of qualitative research methods in teacher education research in the Scandinavian countries. Like Murray et al. (2008), who analyzed the distribution of teacher education research topics in Australia, this research makes it obvious that research on reflective thinking in teacher education and beliefs has a large role to play in teacher education research. However, this research, found that the significance of reflective thinking in teacher education research decreased between 2006 and 2012. In addition, the fact that the self-efficacy beliefs specialty has a significant presence in the PFNET diagrams, yet remains far from the center of the field, might be interpreted as an indication of a need for research that can link self-efficacy beliefs with other sub fields.

From 1992 to 1998, the learning in communities specialty was not among the first 15 factors, but gained a significant place in the subsequent time periods. This shows that research in this field will be needed in the next period. The discoveries of this research show a significant parallelism to research carried out in other countries (Bergem et al., 1997; Cameron & Baker, 2004; Murray et al., 2008). This may be interpreted to mean that a common ground has been generated internationally in the field of teacher education.

5. Conclusion

Even though some literature review studies have attempted to identify the structure of the teacher education domain, there have been no quantitative studies to map it. The present study analyzed the structure of the domain in three time periods and attempted to describe the changes using bibliometric methods. The teacher education domain is rather disorganized. Although the domain has a number of specialties with varying importance from one time period to another, qualitative research methods, such as narrative inquiry, have been in common use since 1992. Furthermore, beliefs about teaching, being a teacher, and teacher efficacy have been discussed in the literature throughout this period, and they have played a key role in the literature in recent years. Another finding is that learning in communities has gained prominence along with the trend in the learning domain.

Mapping teacher education domain could make significant contributions to teacher educators, policy-makers in teacher education, and prospective teachers who are struggling to familiarize themselves with the profession. The present study attempted to map this domain using particular methods and a specific set of data, presenting a two-dimensional map of research on teacher education. Further studies using different methods and data could present a three-dimensional map of the domain, thus enabling those concerned to understand the basis for research on teacher education even more easily and clearly.

This study was bound by certain limitations, which should not be neglected in the interpretation of its results. First, the source documents were comprised of those published in three prestigious journals, which have been in circulation for a long time and are indexed by the SSCI, between 1992 and 2012. Most of the source documents were produced by American researchers. The vast majority of the source documents were written by researchers in English-speaking countries such as England and Australia. This may have caused different voices to be heard less. A great percentage of the co-citation research carried out in different fields has been done by using data obtained from the Web of Science. This situation means that the research is focused on publications that are published in certain journals. In Google Scholar, for instance, the utilization of tools that enable scanning on a wider scale may allow different voices to be heard as if they are equal. Next, there were tens of thousands, or even hundreds of thousands of documents cited in each time period. Therefore, the analysis was based on the most commonly cited documents as in other similar studies. Although it has been emphasized in the literature that this is not to bring about great changes, it can still be regarded as a limitation for the present study. Another limitation, which is inherent in most co-citation studies, is that the number of times and the reason a citation occurs in a study are not reflected in the analysis. In other words, there is technically no difference between a study cited a number of times to form a theoretical framework, and one that has only been cited to be criticized. However, the high number of citations included in the study can partly compensate for such problems (Fernandez-Alles & Ramos-Rodríguez, 2009).

Appendix

Document	1992–1998			1999–2005			2006–2012		
	Number	Factor	F. Load	Number	Factor	F. Load	Number	Factor	F. Load
Calderhead, J. (1989). *Teaching and Teacher Education*, *5*(1), 43–51.	14	1	0.86			0.60			
Van Manen, M. (1977). Curriculum Inquiry, 6(3).	19	1	0.86						
Zeichner, K. M., & Liston, D. P. (1987). *Harvard Educational Review*, *57*(1), 23–49.	5	1	0.85	21	8	0.82			
Dewey, J. (1933) How We Think. New York: Heath & Co.	15	1	0.80	12	8	0.84	17	7	0.61
Gore, J. M., & Zeichner, K. M. (1991). *Teaching and Teacher Education*, *7*(2), 119–136.	49	1	0.78	86	1	0.55			
Schön, D. A. (1987). *Educating the reflective practitioner*.	2	1	0.77	2	8	0.79	4	7	0.66
Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*.	1	1	0.76	1	8	0.73	3	7	0.63
Zeichner, K. M. (1983). *Journal of Teacher Education*, *34*(3), 3–9.	77	1	0.63						
Carr, W., & Kemmis, S. (1986). Becoming critical: Knowledge, education and action research.	27	1	0.57	72	16	0.80			
Grimmett, P. P., & Erickson, G. L. (Eds.). (1988). *Reflection in Teacher Education.*	65	1	0.54						
Fuller, F. (1969). *American Educational Research Journal*, *6*, 2.	44	1	0.44	30	9	0.62	78	13	0.76
Kagan, D. M. (1990). *Review of Educational Research*, *60*(3), 419–469.	78	1	0.40						
Carnegie Corp. of New York. (1986). A Nation Prepared: Teachers for the 21st Century.	8	2	0.92						
Holmes Group (1986). *Tomorrow's teachers: a report of the Holmes Group*.	9	2	0.91						

(*continued on next page*)

(*continued*)

Document	1992–1998			1999–2005			2006–2012		
	Number	Factor	F. Load	Number	Factor	F. Load	Number	Factor	F. Load
Holmes Group. (1990). Tomorrow's schools. *East Lansing, MI*.	18	2	0.90						
Goodlad, J. I. (1990). *Teachers for our nation's schools*.	17	2	0.90	17	4	0.83	52	6	0.92
Goodlad, J. I. (1994). *Educational renewal: Better teachers, better schools*.	73	2	0.81	18	4	0.79			
Tschannen-Moran, M., & Hoy, A. W. (2001). *Teaching and Teacher Education*, *17*(7).	59	2	0.62				10	1	0.91
Goodlad, J. I. (1984). A place called school: Prospects for the future.	25	2	0.62	73	4	0.52			
Goodlad, J. I., Soder, R., & Sirotnik, K. A. (1990). The moral dimensions of teaching.	71	2	0.55						
Cochran-Smith, M. (1991). *Harvard Educational Review*, *61*(3), 279–311.	80	2	0.54	34	16	0.61			
Hargreaves, A. (1994). *Changing teachers, changing times: Teachers' work and culture in the*.	95	2	0.54	20	7	0.73	97	15	0.73
Lanier, J. E., & Little, J. W. (1986). In MC Wittrock (Ed.). Handbook of research in teaching	69	2	0.49						
Fullan, M. (1993). *Change forces: Probing the depths of educational reform*.	85	2	0.46	53	7	0.75			
Knowles, J. G. (1992). In I. Goodson (ed.) Studying Teachers' Lives.	33	3	0.88						
Bullough, R. V. (1991). *Journal of Teacher Education*, *42*(1), 43–51.	48	3	0.85						
Kagan, D. M. (1992). *Review of Educational Research*, *62*(2), 129–169.	35	3	0.82	14	1	0.63	30	8	0.56
Holt-Reynolds, D. (1992). *American Educational Research Journal*, *29*(2), 325–349.	51	3	0.79	44	1	0.83			
Calderhead, J., & Robson, M. (1991). *Teaching and Teacher Education*, *7*(1), 1–8.	10	3	0.73	42	1	0.75			
Carter, K. (1990). *Handbook of research on teacher education*, 291–310.	41	3	0.59						
Bullough Jr., R. V., Knowles, J. G., & Crow, N. A. (1992). *London, New York*.	55	3	0.56						
Lortie, D. (1975). Schoolteacher: A sociological analysis. *Chicago: University of*.	11	3	0.50	15	1	0.42	26	8	0.44
Lacey, C. (1977). The socialization of teachers.	38	3	0.49						
Zeichner, K., & Gore, J. (1990). In Handbook of research on teacher education (pp. 329–348).	20	3	0.46				64	8	0.71
Goetz, J. P., & LeCompte, M. D. (1984). *Ethnography and qualitative design*.	34	4	0.86						
Spradley, J. P. (1979). *The ethnographic interview*.	83	4	0.76	91	15	0.71			
Glaser, B., & Strauss, A. (1967). The discovery of grounded theory.	28	4	0.71	23	3	0.55	22	4	0.74
Miles, M. B., & Huberman, A. M. (1984). Qualitative data analysis.	21	4	0.69				20	4	0.81
Spradley, J. (1980). Participant observer. *Thomson Learning*.	99	4	0.67						
Erickson, F. (1986). *Handbook of research on teaching*, 119–161.	90	4	0.66	84	20	0.63			
Strauss, A. L. (1987). *Qualitative analysis for social scientists*.	72	4	0.61						
Lincoln, Y. S. (1985). *Naturalistic inquiry*.	32	4	0.60	41	7	0.48	58	4	0.77
Cochran-Smith, M. (1991). *Journal of Teacher Education*, *42*(2), 104–118.	68	4	0.52						
Clandinin, D. J. (1986). Classroom practice: Teacher images in action.	12	5	0.88	47	13	0.79			
Connelly, F. M., & Clandinin, D. J. (1988). *Teachers as curriculum planners: Narratives of experience*.	24	5	0.83	76	11	0.60			
Elbaz, F. (1983). *Teacher thinking: A study of practical knowledge*.	13	5	0.80	60	13	0.63	90	10	0.93
Lyons, N. (1990). *Harvard Educational Review*, *60*(2), 159–181.	63	5	0.70						
Connelly, F. M., & Clandinin, D. J. (1990). *Educational Researcher*, *19*(5), 2–14.	61	5	0.51	68	11	0.84	45	10	0.48
Weinstein, C. S. (1989). *Journal of Teacher Education*, *40*(2), 53–60.	16	6	0.77						
Weinstein, C. S. (1988). *Teaching and Teacher Education*, *4*(1), 31–40.	62	6	0.72						

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Document	1992–1998			1999–2005			2006–2012		
	Number	Factor	F. Load	Number	Factor	F. Load	Number	Factor	F. Load
Posner, G. J., & Gertzog, W. A. (1982). *Science Education*, *66*(2), 195–209.	58	6	0.71						
Hollingsworth, S. (1989). *American Educational Research Journal*, *26*(2), 160–189.	56	6	0.65	28	1	0.87			
Zeichner, K. M., & Tabachnick, B. R. (1981). *Journal of Teacher Education*, *32*(3), 7–11.	54	6	0.50	36	11	0.46	62	8	0.62
Pajares, M. F. (1992). *Review of Educational Research*, *62*(3), 307–332.	57	6	0.43	57	1	0.85	31	11	0.39
Gilligan, C. (1982). *In a different voice*. Harvard University Press.	30	7	0.87						
Noddings, N. (1984). Caring: A feminist approach to ethics.	64	7	0.82	37	14	0.79			
Belenky, M. F., Clinchy, B., Goldberger, N. R., & Tarule, J. M. (1986). Women's ways of knowing.	29	7	0.78						
Dewey, J. (1938). Education and experience.	70	7	0.56	61	15	0.54	59	10	0.87
Merriam, S. B. (1988). *Case study research in education: A qualitative approach*.	87	7	0.35						
Berliner, D. C. (1986). *Educational Researcher*, 5–13.	40	8	0.70						
Shulman, L. S. (1986). *Educational Researcher*, *15*(2), 4–14.	6	8	0.67	5	10	0.73	13	5	0.71
Borko, H., & Livingston, C. (1989). *American Educational Research Journal*, *26*(4), 473–498.	52	8	0.67						
Leinhardt, G., & Greeno, J. G. (1986). *Journal of Educational Psychology*, *78*(2), 75.	74	8	0.65						
Shulman, L. S. (1987). *Harvard Educational Review*, *57*(1), 1–23.	7	8	0.54	6	10	0.75	14	5	0.81
Grossman, P. L. (1990). *The making of a teacher: Teacher knowledge and teacher education*.	50	8	0.51	25	10	0.79	47	5	0.86
Bullough, R. V. (1989). *First-year teacher: A case study*. Teachers College Press.	75	9	0.80						
Feiman-Nemser, S. (1983). nL. Shulman & G. Sykes (Eds.), Handbook of teaching and policy.	36	9	0.61						
Veenman, S. (1984). *Review of Educational Research*, *54*(2), 143–178.	22	9	0.57	19	9	0.75	28	8	0.64
Rosenholtz, S. (1989). Teachers' Workplace: The Social Organization of Schools.	31	10	0.85						
Ashton, P. T., & Webb, R. B. (1986).	97	10	0.84	7	2	0.94	23	1	0.95
Fullan, M. (1991). The new meaning of educational change Cassell.	86	10	0.79	22	7	0.81			
Nias, J. (1989). Primary teachers talking: A study of teaching as work.	47	10	0.55	29	14	0.62			
Shulman, L. S. (1986). *Handbook of research on teaching*, *3*, 3–36.	53	11	0.81						
Wittrock, M. C. (1986). Handbook of research on teaching.	23	11	0.71						
Shavelson, R. J., & Stern, P. (1981). *Review of Educational Research*, *51*(4), 455–498.	39	11	0.63						
Feiman-Nemser, S., & Floden, R. E. (1986). In M. C. Wittroch (Ed.), Handbook of research on teaching.	46	11	0.49						
National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards for*.	3	12	0.94	64	6	0.91			
National Council of Teachers of Mathematics. (1991). *Professional standards for teaching mathematics*.	4	12	0.94						
Richardson, V. (1990). *Educational Researcher*, *19*(7), 10–18.	79	13	0.80						
Fenstermacher, G. D. (1986). *Handbook of research on teaching*, *3*, 37–49.	94	13	0.61						
Brown, J. S., Collins, A., & Duguid, P. (1989). *Educational Researcher*, *18*(1), 32–42.	81	13	0.53	69	21	0.57	43	5	0.42
Gilroy, D. P. (1992). *British Journal of Teacher Education*, *18*(1), 5–22.	67	14	0.81						
STONES, E. (1992). Quality Teaching: a sample of cases.	42	14	0.78						
Carter, K. (1993). *Educational Researcher*, 5–18.	92	15	0.88						
Bruner, J., & Minds, A. (1986). Possible Worlds.	82	15	0.61						
Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*.	66	15	0.45	32	12	0.81	1	2	0.78

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Document	1992–1998			1999–2005			2006–2012		
	Number	Factor	F. Load	Number	Factor	F. Load	Number	Factor	F. Load
Wideen, M., Mayer-Smith, J., & Moon, B. (1998). *Review of Educational Research*, *68*(2), 130–178.				58	1	0.61	27	8	0.75
Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). *Review of Educational Research*, *68*(2), 202–248.				9	2	0.95	8	1	0.87
Yin, R. K. (1989). Case Study Research: Design And Methods.				39	3	0.84			
Richardson, V. (1996). *Handbook of research on teacher education*, *2*, 102–119.				80	1	0.73	32	11	0.91
Calderhead, J. (1996). I DC Berliner & RC Calfee (red): Handbook of educational psychology.				56	1	0.65			
Gibson, S., & Dembo, M. H. (1984). *Journal of Educational Psychology*, *76*(4), 569.				8	2	0.97	16	1	0.92
Bandura, A. (1997). *Self-efficacy: The exercise of control*.				11	2	0.96	7	1	0.87
Bandura, A. (1986). *Social foundations of thought and action* (pp. 5–107).				13	2	0.93	41	1	0.97
Bandura, A. (1977). *Psychological Review*, *84*(2), 191.				16	2	0.92	19	1	0.95
Stake, R. E. (1995). *The art of case study research*. Sage.				46	3	0.85	92	4	0.57
Merriam, S. B. (1998). Qualitative research and case study applications in education.				43	3	0.84	54	4	0.83
Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*.				49	3	0.82			
Bogdan, R. C., & Biklen, S. K. (1982). *Qualitative research for education*.				54	3	0.55			
Hargreaves, A. (1998). *International Journal of Leadership in Education Theory and Practice*, *1*(4).				70	3	0.51			
National Commission on Teaching & America's Future (US). (1996). *What matters most*.				24	4	0.78			
Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*.				79	4	0.71			
Darling-Hammond, L. (Ed.). (1994). *Professional development schools: Schools for developing*.				88	4	0.61			
Darling-Hammond, L. (1997). *The right to learn: A blueprint for creating schools that work*.				87	4	0.60			
National Commission on Excellence in Education. (1983). A Nation at Risk.				93	4	0.59			
Wilson, S. M., Floden, R. E., & Ferrini-Mundy, J. (2001). *Teacher Preparation Research*.				98	4	0.49	9	6	0.63
Delpit, L. (1995). Other people's children: Cultural conflict in the curriculum.				3	5	0.94	24	3	0.93
Ladson-Billings, G. (1994). The dreamkeepers.				4	5	0.93	12	3	0.81
Gay, G. (2000). Culturally responsive teaching: Theory, practice and research.				10	5	0.90	11	3	0.78
Freire, P. (1970). Pedagogy of the Oppressed.	98	18	0.49	27	5	0.71	21	3	0.88
Kozol, J. (1991). Savage inequities.				77	5	0.61			
Zeichner, K. (1999). *Educational Researcher*, *28*(9), 4–15.				94	5	0.45			
National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*.				65	6	0.87	93	5	0.65
Putnam, R. T., & Borko, H. (2000). *Educational Researcher*, *29*(1), 4–15.				82	6	0.69	15	5	0.66
Wilson, S. M., & Berne, J. (1999). Teacher Learning and the Acquisition of Professional Knowledge.				81	6	0.66	81	2	0.67
Little, J. (1990). The persistence of privacy: Autonomy and initiative in teachers' professional relations.				71	6	0.64	55	2	0.96
Little, J. W. (1993). *Educational evaluation and policy analysis*, *15*(2), 129–151.				85	7	0.62			
Michael, A. (1984). Qualitative Data Analysis.				78	8	0.41			
Gold, Y. (1996). Beginning teacher support: Attrition, mentoring, and induction.				50	9	0.77			
Fuller, F. F., & Bown, O. H. (1975). Teacher education: The 74th yearbook.				31	9	0.67			
Britzman, D. P. (1991). Practice makes practice: A critical study of learning to teach.	76	16	0.68	63	9	0.52			

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Document	1992–1998			1999–2005			2006–2012		
	Number	Factor	F. Load	Number	Factor	F. Load	Number	Factor	F. Load
Corbin, J., & Strauss, A. (1990). Basics of qualitative research: Grounded theory procedures.	37	21	0.66	59	10	0.49	25	4	0.76
Clandinin, D. J., Connelly, F. M., & Craig, C. (1995). *Teachers' professional knowledge landscapes*.				92	11	0.75			
Clandinin, D. J., & Connelly, F. M. (1996). *Educational Researcher*, 24–30.				67	11	0.74			
Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*.				55	12	0.80	2	2	0.90
Borko, H., & Putnam, R. (1996). In Handbook of educational psychology (pp. 673–708).				99	12	0.62	74	5	0.45
Wertsch, J. V. (1991). Voices of the mind: A sociological approach to mediated action.				45	12	0.57			
Cochran-Smith, M., & Lytle, S. L. (1999). *Review of Research in Education*, 249–305.				40	12	0.47	38	2	0.55
Fenstermacher, G. D. (1994). *Review of Research in Education*, *20*, 3–3.				48	13	0.75			
Eraut, M. (1994). Developing Professional Knowledge and Practice.				83	13	0.70			
Goodlad, J. I., Soder, R., & Sirotnik, K. A. (1990). The moral dimensions of teaching.				74	14	0.84			
Noddings, N. (1992). *The challenge to care in schools* (Vol. 1, p. 15).				38	14	0.78			
Zeichner, K. M., Melnick, S. L., & Gomez, M. L. (1996). *Currents of reform in preservice teacher education*.				62	15	0.83			
Grant, C. A., & Secada, W. G. (1990). Preparing teachers for diversity.				75	15	0.71			
Hoy, A. W., & Spero, R. B. (2005). *Teaching and Teacher Education*, *21*(4), 343–356.							29	1	0.96
Ball, D. L., & Cohen, D. K. (1999). Teaching as the learning profession: Handbook of policy and practice.							50	2	0.89
Grossman, P., Wineburg, S., & Woolworth, S. (2001). *The Teachers College Record*, *103*(6).							33	2	0.85
Talbert, J., & McLaughin, M. (2001). Professional communities and the work of high school teaching.							53	2	0.72
Warren Little, J. (2002). *Teaching and Teacher Education*, *18*(8), 917–946.							55	2	0.67
Ladson-Billings, G. (2001). *Crossing over to Canaan: The journey of new teachers in diverse classrooms*.							70	3	0.94
Villegas, A. M., & Lucas, T. (2002). *Journal of Teacher Education*, *53*(1), 20–32.							75	3	0.90
Sleeter, C. E. (2001). *Journal of Teacher Education*, *52*(2), 94–106.							57	3	0.77
Patton, M. Q. (1990). *Qualitative evaluation and research methods*.				26	20	0.68	82	4	0.67
Vygotsky, L. S. (1978). Mind and society: The development of higher mental processes.	43	23	0.36	33	19	0.49	18	4	0.63
Stigler, J. W., & Hiebert, J. (1999). The Teaching Gap.							96	5	0.69
Ma, L. (1999). *Knowing and teaching elementary mathematics.*							63	5	0.64
Hiebert, J., Gallimore, R., & Stigler, J. W. (2002). *Educational Researcher*, *31*(5), 3–15.							77	5	0.57
Wang, J., & Odell, S. J. (2002). *Review of Educational Research*, *72*(3), 481–546.							61	5	0.54
Darling-Hammond, L., & Sykes, G. (2000). Education Policy Analysis Archives. *Teacher quality*.							87	6	0.91
Bransford, J., Darling-Hammond, L., & LePage, K. (2005). Preparing teachers for a changing world.							49	6	0.91
Feiman-Nemser, S. (2001). *The Teachers College Record*, *103*(6), 1013–1055.							34	6	0.79
Zeichner, K. M., & Shepard, L. A. (2005). Studying teacher education.							6	6	0.67
Cochran-Smith, M., & Zeichner, K. M. (2005). Studying teacher education.							37	6	0.57
Darling-Hammond, L., & Bransford, J. (2005). Preparing teachers for a changing world.							5	6	0.50

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Document	1992–1998			1999–2005			2006–2012		
	Number	Factor	F. Load	Number	Factor	F. Load	Number	Factor	F. Load
Darling-Hammond, L. (2006). *Powerful teacher education: Lessons from exemplary programs.*							42	6	0.45
Korthagen, F. A., Kessels, J., Koster, B., Lagerwerf, B., & Wubbels, T. (2001).							51	7	0.86
Korthagen, F. A., & Kessels, J. P. (1999). *Educational Researcher*, *28*(4), 4–17.							83	7	0.80
Cochran-Smith, M., & Lytle, S. (1993). Inside/outside teacher research and knowledge.				35	16	0.65	46	7	0.78
Hatton, N., & Smith, D. (1995). *Teaching and Teacher Education*, *11*(1), 33–49.							40	7	0.77
Zeichner, K. M., & Liston, D. P. (1996). Reflective teaching. An introduction.							60	7	0.76
Loughran, J. (2006). *Developing a pedagogy of teacher education: Understanding teaching.*							86	8	0.39
Ingersoll, R. M. (2001). *American Educational Research Journal*, *38*(3), 499–534.							66	9	0.94
Johnson, S. M., & Birkeland, S. E. (2003). *American Educational Research Journal*, *40*(3).							69	9	0.85
Smith, T. M., & Ingersoll, R. M. (2004). *American Educational Research Journal*, *41*(3), 681–714.							36	9	0.84
Johnson, S. M., Birkeland, S. E., Donaldson, M. L., Kardos, S. M., Kauffman, D., Liu, E., & Peske, H. G. (2004).							35	9	0.82
Kelchtermans, G., & Ballet, K. (2002). *Teaching and Teacher Education*, *18*(1).							48	9	0.53
Dewey, J. (1916). Education and democracy.							73	10	0.92
Clandinin, D. J., & Connelly, F. M. (2000). Narrative inquiry.							44	10	0.69
Connelly, F. M., & Clandinin, D. J. (1999). *Shaping a professional identity.*							65	10	0.51
Clark, C., & Peterson, P. (1986). Teachers' thought processes.							88	11	0.86
Kagan, D. M. (1992). *Educational psychologist*, *27*(1), 65–90.							56	11	0.82
Lasky, S. (2005). *Teaching and Teacher Education*, *21*(8), 899–916.							76	12	0.83
Hargreaves, A. (1998). *Teaching and Teacher Education*, *14*(8), 835–854.							98	12	0.78
Beijaard, D., Meijer, P. C., & Verloop, N. (2004). *Teaching and Teacher Education*, *20*(2), 107–128.							71	12	0.65
Korthagen, F. A. (2004). *Teaching and Teacher Education*, *20*(1), 77–97.							85	12	0.53
Flores, M. A., & Day, C. (2006). *Teaching and Teacher Education*, *22*(2), 219–232.							72	12	0.42
Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001).							68	14	0.86
Bransford, J. D., & Schwartz, D. L. (1999). *Review of research in education*, 61–100.							91	14	0.71
Borko, H. (2004). *Educational Researcher*, *33*(8), 3–15.							67	14	0.68
Richardson, V. (2001). Handbook of research on teaching.							95	15	0.73
Liston, D. P., & Zeichner, K. M. (1991). *Teacher education and the social conditions of schooling.*	84	16	0.60						
Britzman, D. P. (1986). *Harvard Educational Review*, *56*(4), 442–457.	45	16	0.55						
Feiman-Nemser, S., & Buchmann, M. (1987). *Teaching and Teacher Education*, *3*(4), 255–273.	60	17	0.73						
Nieto, S. (1992). Affirming diversity: A sociopolitical analysis of multicultural education in the United States.	100	18	0.82						
Delpit, L. D. (1988). *Harvard Educational Review*, *58*(3), 280–299.	88	18	0.59						
Jackson, P. W. (1968). *Life in classrooms.*	26	19	0.72						
Feiman-Nemser, S., & Buchmann, M. (1985). *The Teachers College Record*, *87*(1), 53–65.	93	19	0.50						
Tom, A. R. (1984). *Teaching as a moral craft.*	91	20	0.74						
Cochran-Smith, M., & Lytle, S. L. (1990). *Educational Researcher*, *19*(2), 2–11.	89	20	0.69						
Apple, M. (1986). Teachers and texts.	96	22	0.69						

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Document	1992–1998			1999–2005			2006–2012		
	Number	Factor	F. Load	Number	Factor	F. Load	Number	Factor	F. Load
Elliot, J. (1991). *Action research for educational change*.				97	16	0.54			
Cochran-Smith, M., & Lytle, S. L. (1999). *Educational Researcher*, *28*(7), 15–25.				51	17	0.81			
Hamilton, M. L. (Ed.). (1998). *Reconceptualizing teaching practice: Self-study in teacher education*.				66	17	0.80			
Gee, J. (1996). Social linguistics and literacies: Race, writing, and difference.				96	18	0.82			
Bakhtin, M. M. (1981). *The dialogic imagination: Four essays*.				95	18	0.80			
Vygotsky, L. S. (1962). Thought and Language.				52	19	0.77			
Cohen, D. K., & Ball, D. L. (1990). *Educational Evaluation and Policy Analysis*, *12*(3), 233–239.				89	19	0.52			
Shulman, J. H. (Ed.). (1992). *Case methods in teacher education*.				100	21	0.44			
Tom, A. R. (1997). *Redesigning teacher education*.				90	22	0.66			
Patton, M. Q. (2002). *Qualitative research and evaluation methods*, *3*, 230–246.							79	16	0.83
Strauss, A., & Corbin, J. (1998). Basics of qualitative research.							80	16	0.57
Bruner, J. S. (1996). *The culture of education*.							94	17	0.57
Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*.							89	18	0.79
Darling-Hammond, L., Chung, R., & Frelow, F. (2002). *Journal of Teacher Education*, *53*(4), 286–302.							99	19	0.46
Bogdan, R., & Biklen, S. (1992). Qualitative research for education.							84	20	0.68
Furlong, J. (2000). Teacher education in transition: Re-forming professionalism?							100	21	0.60

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Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191.

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Batagelj, V., & Mrvar, A. (1998). Pajek - program for large network analysis. *Connections, 21*(2), 47–57.

Bergem, T., Björkqvist, O., Hansén, S. E., Carlgren, I., & Hauge, T. E. (1997). Research on teachers and teacher education in Scandinavia: a retrospective review. *Scandinavian Journal of Educational Research, 41*(3–4), 433–458.

Borgman, C. L., & Furner, J. (2002). Scholarly communication and bibliometrics. *Annual Review of Information Science and Technology, 36*, 3–72.

Borko, H., Liston, D., & Whitcomb, J. A. (2007). Genres of empirical research in teacher education. *Journal of Teacher Education, 58*(1), 3–11.

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Boyer, E. L. (1990). *Scholarship reconsidered: priorities of the professoriate*. Princeton, N.J.: Carnegie Foundation for the Advancement of Teaching.

Bransford, J., Darling-Hammond, L., & LePage, P. (2005). Introduction. In J.Bransford, & L. Darling-Hammond (Eds.), *Preparing teachers for a changing world*. San Francisco: Jossey-Bass.

Brookhart, S. M., & Freeman, D. J. (1992). Characteristics of entering teacher candidates. *Review of Educational Research, 62*, 37–60.

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Chen, C., McCain, K., White, H., & Lin, X. (2002). Mapping scientometrics (1981–2001). *Proceedings of the American Society for Information Science and Technology, 39*(1), 25–34.

Chou, L., & Tseng, H. C. (2010). Exploring the intellectual structure of contemporary tourism studies. *Journal of Quality, 17*(2), 159.

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Cochran-Smith, M., & Fries, K. (2005). Researching teacher education in changing times: politics and paradigms. In M. Cochran-Smith, & K. Zeichner (Eds.), *Studying teacher education: The report of the AERA Panel on Research and Teacher Education* (pp. 69–109). Washington, DC: American Educational Research Association.

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