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The Teacher Development in Physical Education: A Review of the Literature

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Abstract

The purpose of this article was to provide a review of the research on the professional development of physical education (PE) teachers. The structured approach (Erich, Hansford and Tennent, 2004) was used for the search and analysis of literature. First, searching through computerized education databases, a total of 56 research-based articles were included in this review. Second, demographic data were summarized and analyzed according to the geographic distribution, study periods, research method, research design, and participants. Third, a review and analysis of the findings from these studies were presented according to three themes: impact of PE teacher development, types of PE teacher development, and influencing factors. The article concluded with a discussion of key issues in three themes and the recommendation for the future research.

Keywords: Professional development, Physical education, Teachers, Impact

1. Introduction

The professional lives of teachers have significantly changed during the past decade. Education reforms and information technology have brought fresh knowledge which has challenged the nature of schools. One of the key elements in most of these reforms is the professional development of teachers (Kirk, 1998). Many researchers have pointed out that the improvements in the quality of teachers' instruction and pupils' learning are, to some extent reliant upon improvements in the quality of teachers' professional learning (Borko, 2004; Fishman, Marx, Best, and Tal, 2003; Reynolds and Teddlie, 2000). Meanwhile, societies are acknowledging that teachers are not only one of the 'variables' that need to be changed in order to improve their education systems, but are also the most significant change agents in these reforms. This double role of teachers in educational reforms being both subjects and objects of change makes the field of teacher professional development a growing and challenging area, and thus has received significant attention over the past few years (Villegas-Reimers, 2003).

In order to contribute to the knowledge base of educators, policy makers, teacher educators, and administrators who are engaged in the process of teacher education and development, numerous studies have been done on the professional development of teachers. These studies indicated not only the positive relationship between professional development program and teachers knowledge, belief, and teaching behavior but also the effect of teacher development on the learning performance of students (Hart and Lee, 2003; Huffman and Thomas 2003; Supovitz and Turner, 2000).Meanwhile, the professional development of teachers is influenced by some social and cultural issues including district policy, leadership, school culture, and computer technique. Some research evidence was presented to illustrate teacher development in cultural and social settings (Moore, 2000; Cohen and Hill, 2000). More recently, the professional community has gained popularity as a promising strategy to improve the quality of teacher education (Darling-Hommond and Bransford, 2005). A growing number of studies prompting the values of collaborative

professional learning communities emerged to show that collaborative learning contributed to the improvement of teachers learning and instruction (Wray, 2007; Glazer and Hannafin, 2006; Burbank and Kauchak, 2003; Louis and Marks, 1998). A large number of research studies have been reviewed. Villegas- Reimers (2003) presented an informative and detailed review of the recent international literature published on models, factors and case studies of teacher professional development. Guskey (2003) analyzed 13 of the characteristic of "effective professional development" to determine if they were derived through similar procedures, based on similar frames of reference, and included the same elements of characteristics. These reviews provided a general picture of the research on professional development of teachers.

Compared with the research on professional development of teachers in other educational fields, research development on PE teachers has been slower. Before 1990, few studies were conducted that focus on the teacher development in the PE area. However, after 1990, several investigations emerged (e.g., Armour and Yelling, 2004; Bechtel and O'Sullivan, 2006; Dowling, 2006; Cothran, 2001; Curtner-Smith, 1997; Donnelly, Helion and Fry, 1999). These studies have addressed teacher change on beliefs, teaching behavior, and experience, continuous professional development, and professional community, by which abundant evidence was offered to demonstrate the nature, characteristics, and impact of the professional development of PE teachers. Several researchers tried to figure out the current status and developmental trend in PE teacher development reports. Bechtel and O'Sullivan (2006) reviewed some of the theoretical frameworks for research on professional development conducted in education and PE settings and also identified key findings that have affected physical educators as they participated in professional development programs. Armour and Yelling (2004) summarized the continuing professional development theory and research to develop a more effective model for the PE professional development provision. However, these reviews covered only one or two perspectives of PE teacher development rather than the overall PE teacher development research area. Furthermore, there is no paper reviewing the current reports on PE teacher development in a systematic way. Thus, the purpose of this study is to review the theories and research findings of studies on PE teacher development from 1990 to 2008 systematically. It is anticipated that this review will help in understanding the contribution of PE teacher development and offer guidance for future research on professional development programs for PE teachers.

2. Method

2.1 Search Method

A structured approach was used to search literature and synthesize findings in this review. It follows standard principles and procedures as in the "*Formal Mentoring Programs in Education and Other Professions: A Review of the Literature"* by Ehrich, Hansford and Tennent (2004). Computer searches of CSI Illumina (ERIC, Education), EBSCO (Professional Development Collection, Vocational and Career Collection), ISI Web Knowledge (Social Citation Index Expanded; Social Sciences Citation Index; Arts and Humanities Citation Index) and SPORT Discus from 1990 to 2008 were conducted. The search keyword string was 'physical education AND (professional development OR teacher development OR teacher education OR teacher learning OR teacher change)' which appeared in the title, abstract or keyword fields. After all electronic searches were completed, the total number of identified articles from these databases was at 917 .The bibliographic details and abstracts of all the initial 'hits' were exported from each database and imported into EndNote, and duplicate references were removed. After removing duplicates, the count was reduced to 358 articles.

Inclusion criteria were as follows: a) the title and abstract of each entry were read. Articles which are related to professional development of PE teachers were identified, and other unrelated literatures were excluded; b) articles written in English were included, therefore excluding non-English studies; c) Published articles were included, thus unpublished dissertations and conference proceedings were excluded; d) Studies which report the original research findings were included, thus literature review and comments were excluded. e) Studies employing quantitative or qualitative methods were include. After trimming, the final number of articles included in the analysis was down to 56. Online and library searches for the full text of these 56 studies were conducted. Articles not available in the library of the Chinese University of Hong Kong were requested from other libraries in local universities.

2.2 Data Presentation and Analysis

Demographic data of these studies were summarized, which included the geographical location, period of the study, participants, research themes and research methods. The geographical location was summarized into the countries and continents where the study was conducted. The period of study was categorized as 1990-1994, 1995-1999, 2000-2004, 2005-2008. The number of studies and research themes in each session were identified to explore the research focus in different periods. The research participants were split into the three groups including pre-service teachers and in-service teachers and other participants including cooperative teachers and teacher educators. Additionally, research methods were categorized into qualitative methods and quantitative methods. Furthermore, according to the research methods, the summary of different research design was also presented.

Based on the Villegas-Reimers's (2003) international review on professional development, the research findings of these reviewed articles was classified as three parts: a) impact of PE teacher development; b) types of effective PE teacher development; c) influencing factors of PE teacher development. Each part was summarized as studies on pre-service teachers, in-service teachers and or cooperative teachers. Some detailed information including literature sources, participants and findings was presented in each part for the necessity of following the discussion.

Lastly, as an effective synthesis method of qualitative and quantitative evidence, content analysis was employed to identify underlying themes or categories in this review (Dixon-woods, Agarwal, Jones, Young and Sutton, 2005).

3. Results

3.1 Demographic Data

The distribution of geographic location, period of study, research method, research design, and participants were summarized in Table 1. A total of 56 studies were included in this review. These studies came from four continents. Most studies were conducted in North America (64.3%) and Europe (28.6%). On the other hand, few studies were from Australasia (1.8%), and Asia (5.3%). The results showed that most of the studies were conducted in USA (62.5%), followed by the UK (17.9%), Ireland (3.6%), Hong Kong (3.6%), Australia (1.8%), and Canada (1.8%) .

Qualitative method was a major research method which was employed in 48 studies (85.7%), in which, data were collected by interview, observation or from documents in 27 studies (48.2%), followed by mixed method (12 studies, 21.4%), case study (8 studies, 14.3%) and life history (1 study, 1.8%). Quantitative method was applied in 8 studies (14.3%), in which, a cross-sectional design was used by five studies (8.9%), followed by experimental design (3 studies, 5.3%).

The majority of the studies were published in two periods: from 1995 to 1999 (22 studies, 39.3%), and from 2005-2008(19 studies, 33.9 %). While a small group of studies appeared in the other two periods: from 1990-1994 (8 studies, 14.3%), and from 2000-2004 (7 studies, 12.5%). During the period from 1990 to 1994, 40% of the studies focused on the impact of PE teacher development, while one study (10%) identified PE teacher development models. From 1995 to 1999, the number of studies increased to a total of 22 studies. Influencing factor was identified in half of the studies (12 studies), followed by the topic of impact of PE teacher development (eight studies, 33.4%), PE teacher development models (two studies, 8.3%).. Notably, there was a temporary drop on the number of studies during the period from 2000 to 2004, in which the impact of teacher development was shown in five studies (71.4%), and PE teacher development models in two studies (28.6%). It is important to note that there was no study on influencing factors. After 2004, the number of studies increased drastically with a total of 19 studies published in less than four years. PE teacher development models were identified in nine studies (47.4%), followed by impact of teacher development (five studies, 26.3%), and influencing factors (five studies, 26.3%).

Furthermore, 35 studies (62.5%) focused on in-service teachers, 18 studies (32.1%) on pre-service teachers, while three studies (5.4%) on cooperating teachers, or covered two or three different groups of teachers.

3.2 Impact of PE Teacher Development

A total of 22 studies aimed to examine the impact of PE teacher development. The majority of studies (13 studies, 59%) examined the effects on pre-service teachers. Other six studies (27.3%) illustrated the impact on in-service teachers. The remaining three studies (13.7%) included cooperative teachers or covered the pre-service teachers and in-service teachers. Some issues of these studies including research resources, intervention, participants in these reviewed studies were presented in Table 2.

3.2.1 Pre-service teachers

Thirteen studies examined the effects of professional development on pre-service PE teachers. Seven studies (53.8%) focused on the program contributing to teacher classroom practice, in which, different courses have been proposed for different purpose. For example, a critically oriented physical education course improved teachers' understanding of the goals, curricula and pedagogy of subjects (Curtner-Smith, 2007), whereas a school-based practice teaching course refined pre-service teachers' instruction and skill practice (Lounsbery and Sharpe, 1999). Three studies (23.1%) provided evidence for the link between teacher development and PE teachers' reflection. In this group of studies, a variety of strategies were proposed to prepare teachers to become more reflective. These include: a) a field-based elementary physical education methods course (Sebren, 1995), and; b) teaching portfolio (Senne and Rikard, 2002; Senne and Rikard, 2004). The other two studies (15.4%) reported that professional development program enable PE teachers to hold more positive attitude for teaching (Light and Georgakis, 2005; Xiang, Lowy and McBride, 2002). Lastly, the remaining one study (9.7%) conducted by Bolt (1998) reported that a teaching method on case discussion promotes teachers' cognitive growth.

3.2.2 In-service teachers

Six studies examined the effects of professional development on in-service PE teachers. Results of three studies (50%)

reported that in-service teacher training program has a positive impact on teachers' beliefs and attitude for teaching and curriculum change (Deglau and O'Sullivan, 2006; Ha, Lee, Chan and Sum, 2004; Keay 2006b). Other two interventions (33.3%) including a workshop focused on critical thinking teaching methodology and a training program with follow-up consultation were used to influence the teachers' classroom practice (Donnelly, Helion and Fry, 1999; McKenzie, Sallis, Faucete, Roby and Kolody, 1993), wherein one program enabled teachers to modify their instruction to promote critical thinking in PE class, while the other program helped teachers to offer more effective classes. The remaining study (16.7%) conducted by Ince, Goodway, Ward and Lee (2006) focused on the teachers' technological competence. The results indicated that a technology-focused professional development program help teachers in enhancing their technological competence.

3.2.3 Pre-service teachers and in-service teachers

Two studies included two or three groups of participants (Fejgin and Hanegby, 1999; Martin, McCaughtry, Kulinna, Cothran and Faust, 2008). For example, a mentoring-based professional development program which involved fifteen experienced teachers and fifteen inexperienced protégé teachers was observed to improve the two groups' pedometer and computer efficacy (Martin et al, 2008).

3.2.4 Cooperative teachers

One study conducted by Tannehill and Zarajsek (1990) examined the effects of self-directed training program on cooperating teacher behavior. Their research results suggested that trained cooperative teachers gave more substantive feedback and provided student teachers more frequent supervisory intervention than untrained cooperative teachers

3.3 Types of PE Teacher Development

Fourteen studies aimed to identify the nature and characteristics of effective PE teacher development models. Eleven studies described the professional development types of in-service teachers, while three studies focused on pre-service teachers. Based on Villegas-Reimers' (2003) study, the PE teacher development program was categorized into three models: organizational partnership models, small group models and individual models. The former two types of professional development belong to collaborative learning. Table 3 summarized the description of the different professional development models.

3.3.1 Pre-service teachers

Three studies identified the pre-service teacher development models. A district-wide collaboration model was reported to be beneficial for teachers' teaching practice, receptivity and recommitment to the teacher education process (sharpe et al, 1999). Two small group models including peer teaching and post-lesson conference were also illustrated in two studies (Bertone, Chaliès, Clarke and Meard, 2006; Jenkins, Garn and Jenkins, 2005). These two studies indicated that watching peers teaching and post-lesson conference were effective approaches for teachers' learning despite the limitation of time in peer coaching and the communication difficulties between student teachers and cooperative teachers' intentions and actions in the conference.

3.3.2 In-service teachers

Eleven studies described the professional development models of in-service teachers. Two of these studies focused on a university-school partnership (Morin, 2004; O'Sullivan, Tannehill, Knop, Pope and Henninger, 1999). Findings showed that the university-school partnership enhanced the teachers' pedagogical learning. In other eight studies, different small group models were identified as effective approaches in improving teachers' learning. These include PEP talk (Deglau, Ward, O'Sullivan and Bush, 2006), mentoring (Dodds, 2005; McCaughtry, Cothran, Kulinna, Martin and Faust, 2005; Patton, Pangnano, Griffin, Dodds, Sheehy, Qrnold, Henninger, Gallo and James, 2005), and professional community (Armour and Yelling, 2007; Duncombe and Armour, 2004; Keay, 2005, 2006a). Each of these models has different purposes and processes in this review. PEP talk was designed to bring teachers together in an after-school social setting to talk about issues confronting them in their roles as teachers, while knowledge and experience gained by the mentor are passed along to the inexperienced, novice protégé by mentoring.

3.4 Influencing Factors of PE Teacher Development

Twenty studies tried to identify the factors which influence PE teacher development. These studies were categorized with the participants of pre-service teachers (three studies, 15%) and in-service teaches (17 studies, 85%). The influencing factors and literature resources were presented in Table 4.

3.4.1 Pre-service teachers

Three studies identified the factors that influenced pre-service PE teacher development. Culture, assistance of clinical teachers and strategies are associated with pre-service teacher development. The study conducted by Light and Tan (2006) showed that different culture influence teachers' interpretation and understanding of Teaching Games for Understanding (TGFU). The other two studies revealed that the teacher educator played an important role in the professional development of pre-service teachers (Graber, 1995; Rikard and Knight, 1997).

3.4.2 In-service teachers

Researches on the influencing factors of in-service PE teacher development have addressed two different strands of the process. The first strand has been the influence of teachers' personal factors including perception, beliefs and psychological disposition, etc. The second strand for research has focused on contextual factors, including culture, support from principal, collegial and students, and working place conditions, the application of technology.

Ten studies reported the influence of teachers' personal factors. The most frequently mentioned issue, reported in five studies, was teacher beliefs and visions (Bechtel and O'Sullivan ,2007; Cothran ,2001; Ennis ,1994; Henninger ,2007; Ward and Doutis ,1999). Other issues from three studies included teacher psychological dispositions, perception of teacher role, and reflection. The influence of psychological disposition held by a teacher was explored in the study conducted by Rovegno and Bandhauer (1997). In this study, five dispositions emerged which helped the participant during the change process: a) possessing appropriate content knowledge to implement a change adequately, b) accepting that change was difficult and often required asking for clarification, c) implementing change practices aligned with sound philosophy and theory, d) creating a willingness to explore change and new ideas, and e) suspending judgment on new ideas. In the other two studies conducted by Solmon, Worthy and Carter (1993), Tsangaridou and O'Sullivan (1997), the experience from three initial teachers and four experienced teachers respectively showed that teachers' role identity and teachers' reflection have a positive relationship on the PE teacher development. More recently, two other issues, such as, teachers' teaching experience and teachers' emotion dimension, were identified to impact the professional development according to the two studies conducted by Ha, Wong, Sum and Chan (2008) and (McCaughtry, Martin, Kulinna and Cothran (2006) respectively.

Fifteen studies included contextual issues that should be considered for PE teacher development. The support from principals, colleagues and students was derived from four studies (Bechtel and O'Sullivan, 2007; Henninger, 2007; Pissanos and Allison, 1996; Stroot, Collier, O'Sulliva and England, 1994). The other two issues including school culture and students' needs were reported in the two studies. The influence of school culture on a teacher's change process was the focus of the two studies conducted by Rovegno and Bandhauer (1997b) as well as Pope and O'Sullivan (1998), wherein five school norms were identified as having a positive impact on a teacher's change process in this study: a) the school philosophy; b) teacher learning; c)teacher participator power and responsibility; d) continual school improvement; and; e) the tendency "to feel that we can do anything" (p.407). Meanwhile, students' needs and new technology motivated teachers to seek professional development experience (Henninger, 2007; Pierre,1998; Sariscsany and Pettigrew, 1997 ; Pissanos and Allison, 1996;), especially new technology such as video and computer were shown to be more effective for teacher development than traditional instruments. Thus they all are enhancing factors for teacher change. However, the remaining two issues that appeared in one or two studies have a negative effect on PE teacher change process in these reviewed studies. These include status of physical education (2 studies) and district policy (1 study) .The low status of physical education was assumed to be a barrier in teacher development in two studies (Bechtel and O'Sullivan, 2007; Pissanos and Allison 1996). In addition, district policy is an inhibitor of teacher change if the district or schools could not provide enough continuous learning opportunities (Bechtel and O'Sullivan, 2007).

4. Discussion

4.1 Demographic Data

This is a review which involved 56 studies from eleven different countries. The review considered articles published from 1990 to 2008. Most studies in this review were from English speaking countries in North America and Europe while fewer studies came from Asia and Australasia. Literature search showed that studies had been published in Asia or Australasia countries in their own language. Consequently, these were not included in this review because of the language barrier. It was observed that due to higher education level, scientific research activities were more active in developed countries in North America and Europe. Therefore, most of the included studies were contributed by these developed countries and thus results are more representative of the nature of PE teacher development in these countries rather than worldwide. This limitation is as a result of the language barrier and level of scientific research activities.

Qualitative and quantitative methodologies were employed in these studies. Qualitative data were collected mainly by interview, observation and from documents in this review which allowed researchers to obtain in-depth information about thoughts and feelings of teachers. On the other hand, quantitative data mainly come from cross-sectional design which generalized the research findings to the whole group of teachers. The participants covered pre-service teachers, in-service teachers, and cooperative teachers. Therefore, we basically believe that the summarized findings are representative and should have significant value in helping identify the nature of the research on PE teacher development. However, the results showed that most studies (85.7%) used qualitative methodology whereas 14.3% studies employed quantitative method. The lack of quantitative analysis which owns a large group of samples limited the generalization of most findings in this domain. Additionally, 62.5% of these studies focused on in-service teachers whereas 32.1% studies included pre-service teachers, indicating the need for future research to address the professional development of pre-service teachers.

From 1990 to 2008, there are two periods (from 1995 to 1999 and from 2005 to 2008) in which the number of studies increased and one period (from 2000 to 2004) in which the number of studies decreased. It may reflect the rise and decline of research interest on the professional development of PE teachers. Other factors such as the education standards movement, professional organization, and a call for research on teacher learning in different countries also attracted or distracted researchers' attention on professional development (Bechtel and O'Sullivan, 2007).In the first period, there were few studies reporting PE teacher development. Most studies focused on impact of PE teacher development, indicating that researchers have realized the positive impact of PE teacher development. However, three studies which reported the influencing factors of professional development suggested that researchers understand that teachers change from the perspectives of teachers' perception and working place condition. The influence of other factors, for example, district policy and school leadership, has not been realized. Additionally, theories of learning models tended to focus on how individuals functioned during this period. From 1995 to 1999, the number of these studies increased. Twelve studies identified the factors that influence PE teacher development including teachers' experience, district policy, technology, etc. This indicates that researchers have considered the teacher change from broader perspectives. At the same time, the university-school partnership model and district collaboration model were illustrated in two studies. This suggests that the focus of studies on the types of PE teacher development began to shift such that the group has become a unit of analysis. However, from 2000 to 2004, the number of studies decreased. Notably, no researchers conduct study on the influencing factors. This may reflect the research interest in influencing factors declined after the temporary rise from 1995 to 1999. After 2004, the number of studies increased significantly. Researchers paid particular attention on the collaborative learning (47.4%). This suggested that it has become an inevitable part of PE teacher development studies at present.

4.2 Impact of PE Teacher Development

The reviewed studies provided evidence for the impact of professional development on pre-service teachers and in-service teachers. Benefits of professional development for teachers included improvement of skills, attitude and teachers' reflection, in which, the improvement of teachers' attitude as well as teachers' classroom practice was presented in numerous researches on both pre-service teachers and in-service teachers. Therefore, it is apparent that the enhancement of teachers' attitude for teaching and classroom practice is the main target of professional development for these two groups of teachers. However, the findings also revealed that the focus of professional development were different between pre-service teachers and in-service teachers. For pre-service teachers, 53.8% studies focused on teachers' classroom practice, followed by teachers' reflection (23.1%), teachers' beliefs and perception for teaching (15.4%) and teachers' cognitive growth (9.7%). On the other hand, for in-service teachers, 50% of the studies reported the effect of professional development program on teachers' attitude, followed by practice (33.3%), then by computer competency (16.7%). These results suggest that the focus on teacher development program varied for different stages of teachers, which are parallel with the findings of Villegas-Reimers (2003). Through a large-scale review of teacher development, Villegas-Reimers (2003) found that if "professional development opportunities and systems are to be effective, different stages of teacher careers must be taken into consideration since the teachers' needs and dispositions may vary between one stage and the next" (p.129). For example, novice teachers (student teachers and first-year teacher) feel that practical personal experience is more valuable than information transmitted verbally. Teachers in this novice stage are taught the meaning of certain common terms and concepts, the rules of the school culture, and objective facts and features of situations (Dreyfus and Dreyfus, 1986). This viewpoint was also supported in this review as most of studies on pre-service teacher reported the impact of PE teacher development on teachers' classroom practice.

Although our findings suggested that these PE teacher development programs appeared to offer far-reaching benefits for teacher learning, there is a dearth of outcome measure from student learning. In fact, teachers attending professional development program enabled students to engage in physical education more deeply, and students' learning outcome is an important measure index for the effectiveness of professional development program. (Deglau and O'Sullivan, 2006) . A great number of studies in the general education field have reported that there is a strong relationship between teacher development and student learning (Falk, 2001; Grosso de Leon, 2001; Hamilton, McCaffrey, Stecher, Klein, Robyn and Bugliari, 2003; Huffman and Thomas 2003; Ross and Bruce, 2006). These studies showed that students' learning outcome data is necessary for professional development if it is to be validated as an effective instructional strategy. Thus there is a need for research to link effective PE teacher development and student achievement and growth.

4.3 Types of PE Teacher Development

Considering that most literature (13 studies, 92.9%) in this section supported collaborative learning (including organization partnership and small group models) , consensus has been reached that it is thus, an effective method for both pre-service and in-service teachers. These studies indicated that collaborative learning provided both pre-service and in-service teachers support including improved skills, access to new ideas and personal growth. These findings were entirely consistent with the findings reported on general education. In recent research on teacher development in the general education area, traditional professional development has been criticized as being fragmented, unrelated to

classroom practice and lacking in the focus and the follow-up program that teachers require. In contrast, the collaborative model was supported as it emphasizes the importance of nurturing learning communities with new ideas, reflects on the outcomes, and co-construct knowledge about teaching and learning in the context of authentic activity (e.g., Perry, Walton, and Calder, 1999).Although a growing body of studies that focused on collaborative learning emerged, a couple of questions have been left unanswered. Our findings suggested that collaborative learning required, at the very least, time, interest, and commitment of teachers and teacher educators as well as strong support from the school, university or district. However, some practical barriers constrained the widespread deployment of collaborative learning, such as, lack of time and space, the shortage of the support from the school management specifically the head teacher, and teachers' prevention from collaborative practice, which were identified in these studies. Therefore, more studies are needed to examine how to efficiently put collaborative learning into practice. Additionally, for various professional development models, one of the key questions researchers must answer is: what are the criteria for the selection of particular collaborative learning strategies? Some other questions include: a) What is the distinction between collaborative learning as a formal strategy and as an informal activity initiated by teachers? b) What size group is suitable for collaborative learning? c) How are teachers to be grouped in collaborative learning?

4.4 Influencing Factors of PE Teacher Development

There are multiple factors influencing PE teacher development – personal factors and contextual factors. It is clear that teachers, students, principals, schools and districts would be involved in the process if the PE teacher development program was to be effective. Professional development should be considered through multiple lenses and be aligned with elements such as district policy and curriculum requirements.

Although the results from this study revealed that the factors that affect PE teacher development were various and complex, it is important to note that two issues were significantly prominent which are teachers' vision and beliefs and the support from colleagues and principals in the past decades. Teachers' vision and beliefs were the issues most frequently cited in these studies. It is unsurprising since whether these issues would influence PE teacher development positively or negatively is determined by teachers' attitude and perception toward PE teacher development (Henninger, 2007). The support from colleagues and principles was the second most frequently cited issue in these studies. This was also not unexpected because the same conclusion has appeared in another monograph literature review on PE teacher development conducted by Bechtel and O'Sullivan (2006), wherein the conclusion was reached that the collegial support should be an important component of effective professional development since it is instrumental in influencing the teaching environment. The influence of principal's support on professional development has been realized in the education area for the past decades. Rossmiller (1984) suggested that school principals played an important role in encouraging and supporting the professional development of teachers. Thus, teachers' belief and vision as well as the support from principals and colleagues are identified as two significant factors because of their apparent influence on professional development.

In this part, most of the studies concentrated on in-service teachers (85%) indicated that few studies which placed the development of pre-service teacher in a social and cutural context. In fact, pre-service teachers' learning and development are situated in a complex environment, which are influenced by many issues such as teacher educators, colleagues, school cultures, personal beliefes et al. Therefore, there is a need to examine the influnce of personal and contexual factors on pre-service teacher development.

5. Conclusion and Recommendation

This review provided a summary and discussion on the research of professional development of PE teachers. The geographic distribution, research method, research design, study period and participants were summarized and analyzed. The results showed that most studies (92.9%) came from North America and Europe. The majority of researchers used the qualitative method (85.7%) and focused on in-service teachers (62.5%). By summarizing the number and themes of research in every period, the findings revealed the change in these factors suggesting that the research interest and focus transformed from one period to another.

By focusing on the three themes to explain the research results, a couple of important findings emerged from the analysis of the reviewed articles. The different impact of professional development programs on pre-service teachers and in-service teachers provided support for the viewpoint that teachers should receive different professional development programs at different career stages. Among all the studies focused on the types of PE teacher development, collaborative learning was supported by most studies (92.9%). This showed that it has become a major and effective professional development model. In this review, various issues which influenced professional development were identified from the reviewed studies. Two major issues, namely, teachers' vision and beliefs and the support from colleagues and principals, were considered as significantly prominent.

This review revealed that there is a clear knowledge gap in the current research on PE teacher development. Compared with research on the impact of PE teacher development (22) and influencing factors (20), a small group of the reviewed

papers (14) included information on the type of PE teacher development. In terms of the research method, the lack of quantitative studies (14.3%) limited the generation of most findings. Furthermore, the majority of studies (62.5%) focused on in-service teachers while 32.1% studies on pre-service teachers, which indicated that more studies are needed to address the professional development of pre-service teachers.

Based on the research gaps listed in this review, it is recommended that future research should address the following questions:

What makes professional development of PE teachers effective? What is the relationship between the principles of effective professional development and teacher change?

What roles do district policy plays in efforts to improve teaching and learning? How do they affect the professional development of local schools?

What is the impact of PE teacher development on the learning outcome of students?

How should the problems associated with the practice of collaborative learning between organizations or teachers be resolved? For example, how can the collaborative learning efficiently practiced? What are the criteria for the selection of particular collaborative learning strategies?

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Table 1. Descriptive Statistics for Studies used in the literature review

Variable	Summary statistics	
Geographic distribution	Continents	Countries
	North America (36)	USA (35), Canada (1)
	Europe (16)	UK (10), Ireland (2), Turkey (1), Spain (1), France (1), Norway (1)
	Australasia (1)	Australia (1)
	Asia (3)	Hong Kong (2), Singapore (1)
Research method and research design	Research method	Research design
	Qualitative method (48)	Interview, observation, document (27), Mixed study (12), Case study (8), Life history (1)
	Quantitative method (8)	Cross-sectional study (5), Experimental study (3)
Period of studies	Numbers of studies	research themes
	1990-1994 (8)	Impact of PE teacher development (4) Models of PE teacher development (1) Influencing factors (3)
	1995-1999 (22)	Impact of PE teacher development (8) Models of PE teacher development (2) Influencing factors of PE teacher development (12)
	2000-2004 (7)	Impact of PE teacher development (5) Models of PE teacher development (2)
	2005-2008 (19)	Impact of PE teacher development (5) Models of PE teacher development (9) Influencing factors of PE teacher development (5)
Participants	Pre-service teachers (18)	
	In-service teachers (35)	
	Cooperative teachers (1) Participants including two or three different groups of teachers (2)	

Table 2. The intervention, focused subjects, literature resources and effects of professional development

Literature Source	Intervetion	Subjects	Effects
Nielsen and Beauchamp (1991)	The program focused on the development of teachers' analysis and feedback skill	48pre-service teachers	Enhance feedback-provision patterns during professional preparation
Curtner-Smith (1997)	The methods course	2 pre-service teachers	Have positive impact on teachers' perspectives and practice on teaching physical education
Sharpe, Lounsbery and Bahls (1997)	Physical education methods class	4 pre-service teachers	Teachers are more effective in assessing daily occurrences in their gymnasiums and in implementing practice which benefit students.
Sebren (1995)	The methods course	7 pre-service teachers	Improve teachers' reflection and teaching knowledge
Bolt (1998)	Games class in which case discussion was used	12 pre-service teachers	Promote teachers' cognitive growth
Lounsbery and Sharpe (1999)	Physical education methods plus field-based practice teaching course	4 pre-service teachers	Increase the incidence of refinement and explicit instruction, instructional interaction, skill practice
Hardy (1999)	A school-based teacher education program	62 pre-service teachers	Help teachers to carry out the routines of teaching
Woods et al (2000)	Methods course	26 pre-service teachers	Teacher came to know more about student interest and characteristics
Xiang et al (2002)	Field-based elementary physical education methods course	97pre-service teachers	Have positive impact on the participants' beliefs and motivation toward teaching
Senne and Rikard (2002)	Teacher education portfolio models	18 pre-service teachers	Improve teachers' reflection
Senne and Rikard (2004)	Three-semester sequence of course that emphasized portfolio development	18 pre-service teachers	Improve teachers' reflection
Light and Georgakis (2005)	The program focused on games teaching	90 pre-service teachers	Developed far more positive attitude for teaching
Curtner-Smith (2007)	A critically oriented methods course	24 pre-service teachers	Improved their understanding of the goals, curricula and based experience pedagogy
Literature Source	Intervention	Subjects	Effects
McKenzie et al (1993)	In-service training program and follow-up consultation	28 in-service teachers	The trained teachers provided more effective class than controlled group
Donnelly et al (1999)	Workshop focused on critical thinking teaching methodology	4 in-service teachers	Help teachers to modify their instruction to promote critical thinking in physical education
Ha et al (2004)	In-service training	183 in-service teachers	Improve teacher attitude for curriculum

	program		change
Deglau and O'Sullivan (2006)	Professional development program	24 in-service teachers	Positive impact on teachers' thinking and beliefs about teaching, themselves and students
Keay (2006b)	Nonintervention	8 in-service teachers	The learning opportunities reinforce teachers' perception of the role they should play as a PE teacher
Ince et al (2006)	A technology-focused professional development program	41in-service teachers	Increase teachers' technology competency
Tannehill and Zakrajsek (1990)	A self-directed training program	12 cooperating teachers	Trained cooperative teachers are less controlling, and more on task than untrained cooperative teachers
Fejgin and Hanegby (1999)	Nonintervention	5888 teachers including PE teachers and other general classroom teachers	The impact on PE teachers is different on other groups
Martin et al (2008)	Mentoring-based professional development workshops	15 experienced mentors and 15 inexperienced protégé teachers	Have positive effect on pedometer and computer efficacy

Table 3. Description of professional development types

Models	Interaction	Literature Source	Subjects	The mode of delivery	Purpose
Organization partnership models	District-wide collaboration	Sharpe et al (1999)	Pre-service teachers	Collaboration among teacher educators and practicing teachers in school districts	Improve teachers teaching practice, receptivity and recommitment to the teacher education process
Small group models	Peer coaching	Jenkins et al (2005)		Two or more teaching colleagues work together to provide in-class assistance, reflect and build skills and knowledge	Preparing pre-service teachers professionally in a support and safe environment
	Post-lesson conference	Bertone et al (2006)		A series of conferences following the lesson between pre-service teachers and co-operative teachers	To give an affective support to student teachers
Organization partnership models	School-university collaboration	O'Sullivan et al (1999); Morin (2004)	In-service teachers	Collaboration of school and university colleagues	Enhance teachers pedagogical learning about PE
Small group models	PEP talk	Deglau et al (2006)		Professional dialogue between teachers	Create an opportunity for teachers to share their teaching ideas and practice
	Professional community	Keay (2006a); Keay (2005); Duncombe andAmour (2004); Armour and Yelling (2007)		PE teachers work and learn with colleagues	Provide an environment for teachers and colleagues to exchange teaching ideas
	Mentoring	Patton et al (2005); McCaughtry et al (2005)		Mentors pass knowledge and experience to protégé	To promote the growth of beginning teachers
Individual models	Self-contained program	Faucete et al (1992)		A traditional self-contain teaching approach	Teachers using this model more consistently implement the curriculum and express more positive responses

Table 4. Influencing factors and literature resources

Influencing factors	Sub-issues	Subjects	Supportive literatures
Personal factors	Teachers' vision and beliefs	In-service teachers	Bechtel and O'Sullivan (2007); Cothran (2001); Henninger (2007); Ennis (1994), Ward and Doutis (1999);;
	Teachers Psychological dispositions		Rovegno and Bandhauer (1997a)
	Perception of teacher role		Solmon, Worthy and Carter (1993)
	Teachers' working experience		Ha, Wong, Sum and Chan (2008)
	Teacher reflection		Tsangaridou and O'Sullivan (1997)
	Teachers' emotional dimensions related to their students, colleagues and statues		McCaughtry, Martin, Kulinna and Cothran (2006)
Contextual factors	Support from principals, colleagues	In-service teachers	Henninger (2007); Pissanos and Allison (1996); Bechtel and O'Sullivan (2007); Stroot, Collier, O'Sulliva and England (1994)
	Students behavior, beliefs and background, students' needs		Henninger (2007); Pissanos and Allison (1996)
	District policy (negative)		Bechtel and O'Sullivan (2007)
	School culture		Rovegno and Bandhauer (1997b); Pope and O'Sullivan (1998)
	Statues of physical education (negative)		Pissanos and Allison (1996); Bechtel and O'Sullivan (2007)
	Working place condition		Doutis andWard (1999); Stroot et al (1994)
	Technology (computer science and video)		Pierre (1998); Sariscsany and Pettigrew (1997)
	The assistance of clinical teachers	Pre-service teachers	Rikard and Knight (1997); Graber (1995)
	Culture and social difference		Light and Tan (2006)