Using a Mixed-Method to Evaluate a Kindergarten Teachers' Professional Development Programme and to Investigate Teachers' Professional Growth

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Abstract

In this article, we present the evaluation of a kindergarten teachers' professional development programme, 'Upgrading the quality of the pre-school environment' conducted by the participating teacher—thee programme is aimed at the improvement of the quality of Early Childhood Education and Care. The evaluation, which followed a mixed-method design, combining quantitative and qualitative approaches, was based on Guskey's (2002) five levels model. The Interconnected Model of Teacher Professional Growth (Clarke, D., & Hollingsworth, H., 2002) was used to study participants' professional growth.Fourteen teachers serving in public Kindergartens in Greece participated in this study (n=14). Findings showed that the overall programme, the acquisition of knowledge and competences and the possibility of their application in the teaching practice were assessed as positive. The significance of a supportive context in the application of new knowledge and practices was also outlined. Moreover, the main correlations between domains of the Interconnected Model of Teacher Professional Growth are presented, which depict the sequences through which the changes in the teachers occurred. Therefore the present research provides valuable information regarding the design of future professional development programmes aiming to improve the quality of the pre-school environment.

Key Words: Mixed-method, teachers' professional development evaluation, Guskey's model, Teacher professional growth, pre-school education

Introduction

Research findings show that high-quality early childhood education and care (ECEC) can improve the overall development of children (Egert, Fukkink & Eckhardt, 2018; Sylva, Melhuish, Sammons, Siraj-Blatchford & Taggart, 2011), especially of those coming from poor and deprived socioeconomic and learning environments (Abreu-Lima, Leal, Cadima & Gamelas, 2013). Quality ECEC promotes social, linguistic, emotional, and cognitive development in children in the short and long term (Vandell, Belsky, Burchinal, Steinberg & Vandergrift, 2010). It benefits children's learning, academic achievements, self-esteem and attitudes towards lifelong learning (NICHD 2005; Sheridan et al. 2009). In contrast, low-quality programs appear to be associated with negative impact, disobedience and aggression (Deynoot-Schaub &

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Riksen-Walraven, 2005).

Contemporary research emphasizes the importance of teachers' professional development (PD) as a factor of support and upgrade of the teaching profession and, therefore, upgrade the overall quality of education (Eurofound 2015; Gibbons & Cobb, 2017).

However, research on an international level raises questions regarding the effectiveness of teachers' professional development programmes (PDP) and renders their evaluation of high necessity (Hunzicker 2011; Garet et al. 2001; Guskey 2002).

The present study aims to evaluate the teachers' PDP 'Upgrading the quality of the pre-school environment' from the participants' point of view. When the evaluator participates in the process (internal evaluation) she/he gains better knowledge of the specific situation and the problems that arise and conditions of self-development are formed (Nevo, 2001).

Theoretical Framework and Literature Review

Teachers' Professional Development

Research highlights the personal and the professional development of teachers as a key factor in enhancing and improving the quality of Early Childhood Education and Care (ECEC) (Eurofound 2015; Guskey 2002). Research data support the effectiveness of teacher PDPs in improving the quality of pre-school environments (Gibbons & Cobb, 2017; Yoshikawa et al., 2015).

The concept of teachers' PD is characterized by complexity and polysemy regarding its perception and clarification (Avalos, 2011). According to Day (1999):

> Professional development consists of all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school, which contribute, through these, to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purpose of teaching; and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues throughout each phase of their teaching lives (Day, 1999, p.p.4).

Kennedy (2014) described nine models of PD: Training, Deficit, Cascade, Award Bearing, Standards Based, Coaching / Mentoring, Community of Practice and Collaborative professional inquiry. Kennedy suggested that in the first three, we have the transfer of knowledge from experts to trainees (transmissive model), in the next four

we have a dynamic participation of the trainees (malleable model), and finally in the Collaborative professional inquiry (transformative model), there is a combination of positive elements deriving from different models.

The concept of Community of Practice, as a PD approach, has a wide response in the field of education as it is argued that teachers learn best when they apply new knowledge in their daily practice, reflect on it and get feedback from their group (Patton & Parker, 2017). Communities of Practice are groups of people who share a concern or passion for something they do and learn how to do it better as they regularly interact (Wenger, 2006).

Research has shown that PDPs are effective when they go beyond the traditional forms of education (Darling-Hammond, Hyler & Gardner, 2017). Furthermore, PDPs should refer to the connection between theory and practice, the daily problems in the classroom, and teachers' professional and training needs. Additional effectiveness is attributed to PDPs when they actively involve teachers throughout the process (from design to evaluation). This way, a climate of acceptance, trust, and support of interpersonal learning and collaboration is promoted (Hunzicker, 2011).

The recognition of the importance of teachers' PD led to a variety of studies regarding the determination of the principles and attributes that characterize effective and high-quality PDP. These studies consistently identify some key elements or aspects that are associated with effective practice and improved student outcomes which are: (1) The type of PD activities, (2) The documented practice which connects theory with practice, (3) Focus on content, (4) Focus on teacher training needs, (5) Coherence, (6) Active learning, (7) Integration into work, (8) Continuity and duration, (9) The collaboration between the teachers and (10) The training, guidance and support by experts (Darling-Hammond et al., 2017; Desimone, 2011; Hunzicker, 2011; van Driel et al., 2012).

In summary, we can say that the involvement of teachers in prolonged, flexible, individualized and collaborative PDPs, commencing from the needs of teachers, are characterized by coherence and focus on amplifying their knowledge of both content and pedagogy. They may result in long-term and consistent learning outcomes that improve teacher practice and the quality of education (Knight, 2002).

Teachers' Professional Growth

The main goal of the teachers' PDP is to bring about a change in teachers' attitudes and beliefs, in their classroom practices and in students' learning outcomes (Guskey, 2002). There are numerous models which aim at increasing our understanding about how changes in teachers' attitudes and beliefs occur as a result of the PDP.

Guskey (2002) proposed the Model of Teacher Change, a linear path model, based on the idea that change in teachers' beliefs and attitudes occurs primarily if teachers change their classroom practice after participating in a PDP and, afterwards observe

significant learning outcomes for their students.

The Interconnected Model of Teacher Professional Growth (IMTPG) is a multiple pathways model (Clarke & Hollingsworth, 2002). According to this model, teachers' change occurs in four distinct domains: (1) the domain of practice, which involves the teachers' behaviour, (2) the personal domain, which contains teachers' attitudes, behaviours and knowledge, (3) the domain of consequence, which contains the attitudes towards what will happen as a result of classroom practice and (4) the external domain, which contains the new information and stimuli (Figure 1). The model suggests that the procedure of teachers' change can begin with changes that occur in any domain. Change in one domain is translated into change in another through the mediating processes of 'reflection' and 'enactment'. 'Enactment' is understood as the act of putting in practice the learning or changed belief, or trying new practices and 'reflection' is interpreted as the active consideration leading to inferences that causes change in beliefs and practice (Boylan, Coldwell, Maxwell & Jordan, 2018).

The IMTPG places the domains of the teacher's world within the change environment represented by a box surrounding the model. The changed environment includes contextual factors that have the potential to lead to professional growth.
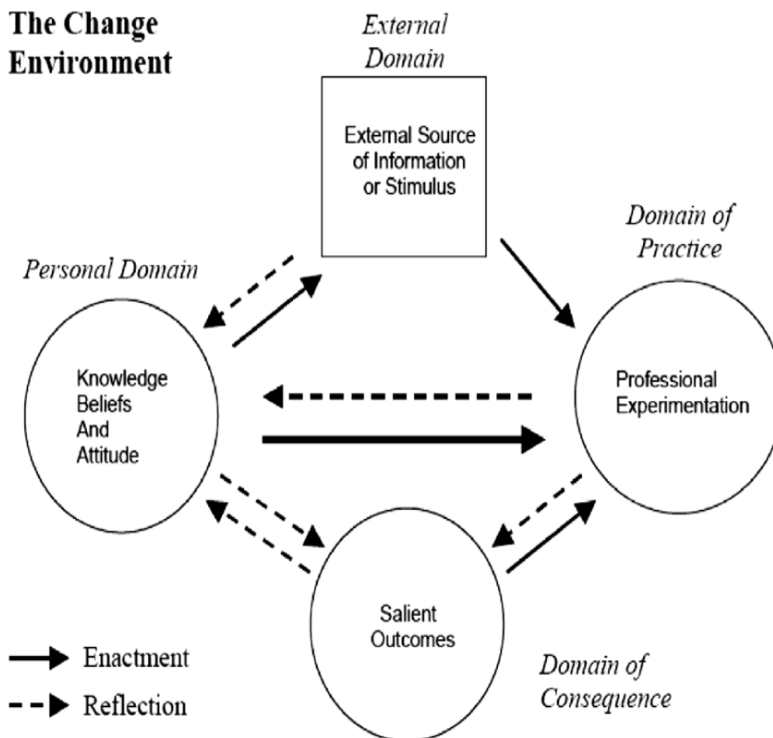

Figure 1. The Interconnected Model of Professional Growth
(Clarke & Hollingsworth, 2002)

Evaluation of Professional Development Programmes

Evaluation, according to Guskey (2000), is not a secondary activity, the conducting of which is optional. Instead, it is a process intertwined in every training programme and is a determining factor concerning the quality, the effectiveness and the interpretation of the positive or negative outcomes that derive from those programmes. As far as the concept and the content of the term evaluation is concerned, a lack of unanimity is noted amongst theoretical academics. For Scriven (1966), evaluation is the process for the systematic and objective definition of the value or price of an object. From this classic definition, we can understand the significance of such an attempt, but also its difficulties.

During the last decade, three models of PD evaluation have dominated the educational sector (Hanover Research, 2015): the models of Kirkpatrick, Guskey and Clarke-Hollingsworth. Each of these models differs in the 'teachers' change' concept. Kirkpatrick's and Guskey's models are linear approaches, in which the teachers' change in one level leads directly to the next level. On the contrary, Clarke-Hollingsworth's model is a distributed approach, in which every component of teachers' change is related to others, and change can start from multiple points (Hanover Research, 2015).

In the present study PDP's evaluation was based on Guskey's five levels model (Guskey 2002). This model is a simple and easy to use framework for the evaluation of PDPs and is characterized by completeness in terms of the evaluation items it includes. It has been successfully used in the educational research both worldwide and in Greece providing accurate results (Coldwell & Simkins, 2011; Grammatikopoulos, Gregoriadis et al., 2013; Nikolaidou & Petridou, 2013).

Guskey's model (2002) is based on Kirkpatrick but developed his specifically for the educational context. In Guskey's perception of causal change, alterations in teachers' attitudes and knowledge do not only occur as a result of information gained during a PDP. Teachers also change their attitudes and beliefs by changing their practices and observing the results. This model has five levels of evaluation of an educational programme:

(1) Participants' reaction, which refers to the reactions of the participants and explores the views of the trainees about their participation in the programme,
(2) Participants' learning, which includes the evaluation of the knowledge gained by the participants,
(3) Organizational support and change, which refers to the support provided at school level for the application of the knowledge and skills acquired,
(4) Participants' use of new knowledge and skills, which evaluates the application of the new knowledge and skills by the participants, and
(5) Student Learning Outcomes, which refers to the effects of learning outcomes.

The Teachers' Professional Development Programme' Upgrading the Quality of the Preschool Environment'

The PDP 'Upgrading the quality of the pre-school environment' aimed at supporting teachers on a theoretical, practical and reflectional level in order for them to critically review and enhance or improve their practices and, therefore, the level of quality of their Kindergartens and, by extension, of their students' outcomes.

The programme's design considered the results of the participating pre-schools' quality evaluation, which was conducted with the use of ECES-R scale (Harms, Clifford & Cryer, 2013), and teachers' training needs were detected through a questionnaire. The design and implementation of the PDP was based on the theoretical and research literature on the characteristics of effective PDPs and the conceptual framework of NPDCI (2008). This framework emphasises three key components of PDP: the learners (who), the content (what) and the educational methods and approaches employed (how), with contextual variables (Policies, resources, organizational structures, access, outreach, and evaluation) (Figure 2).

The PDP was flexible and was co-designed by the authors, the participating teachers and external lecturers (University staff of AUTh and psychologists). The content of the lectures was given in a dialogue format, was flexible and continuously changing depending on the questions raised by the teachers, their interests and the progress of the programme.

Eight meetings were organized over a five-month period, outside the school schedule. Each meeting lasted two and a half to three hours and included a brief introduction, in the form of dialogue, during which the teachers participated by expressing their viewpoints and presenting their pedagogical practices. At the beginning of every meeting, a reflection took place, where participants shared and analyzed their experiences regarding their efforts to implement in the classroom what had been discussed in the previous meeting. During the programme, the researcher had a coordinating, supporting and facilitating role. The concepts that were discussed and the supporting material that was administered regarded the:

• Program quality standards and the ECERS-R criteria
• Measurement and documentation of the quality of pre-school environment
• Classroom management
• Physical space and educational processes
• Verbal interactions in kindergarten
• Collaborative Approach
• Collaboration - communication with parents
• Programme structure - planning and organization of activities

At the end of the PDP, the quality of the participating kindergartens was re-evaluated with the ECERS-R scale, in order to make a comparison between the EG and the

CG as well as between the measurements before and after the intervention for every group. The final goal was the evaluation of the effectiveness of the PDP to improve the quality of kindergartens. The results that came out of this comparison show that although the mean scores of quality before the implementation of the programme did not differ significantly ($t = 6.45$, $p = .52$), the mean scores, for the EG ($M = 4.71$, $SD = .62$) were significantly higher after the intervention than those of the CG ($M = 3.78$, $SD = .37$) ($t = 4.30$, $p < .001$). The follow-up quality evaluation that was carried out in the kindergartens of the EG one and a half years after the end of the PDP, confirmed the maintenance of the programme results in improving the quality of kindergartens ($M = 4.96$, $SD = .73$) (Gidari & Kakana, 2021).
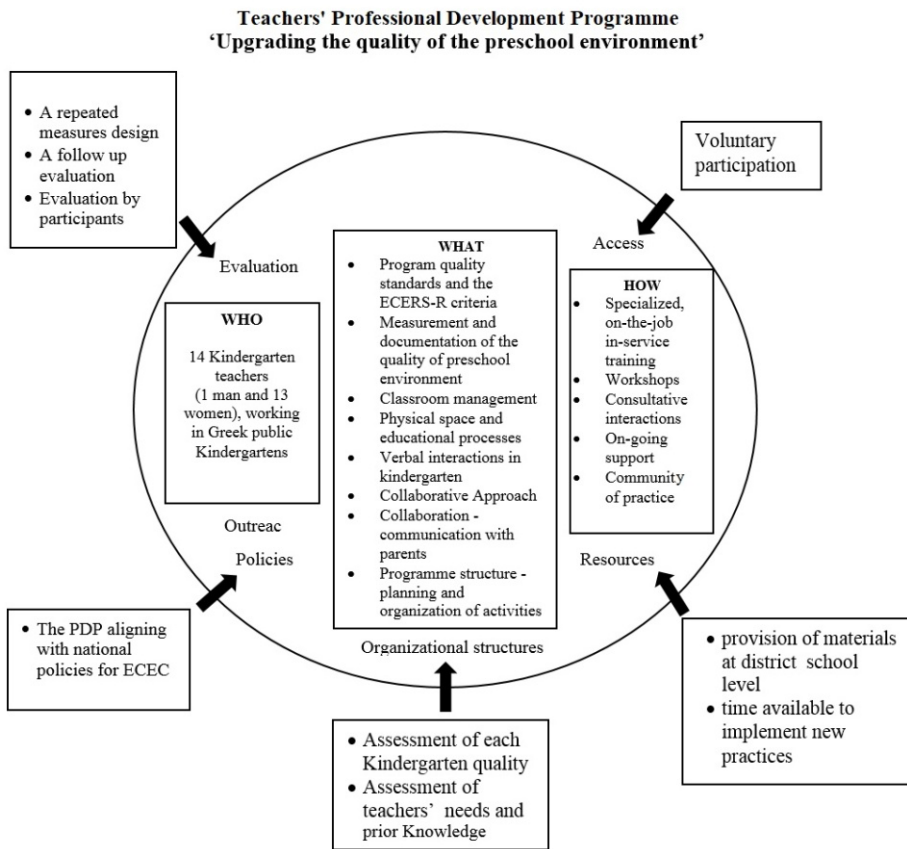

Figure 2. The framework of the PDP 'Upgrading the quality of the pre-school environment', adapted from the conceptual framework of NPDCI (2008)

In this article we attempt to explore teachers' views on the implementation and effectiveness of the programme 'Upgrading the quality of the pre-school environment'. Our focus is on understanding how teachers' participation in the programme led to the change and maintenance of their practices, which resulted in the improvement of the quality of the pre-school environment.

Our research questions were the following:

1. What were, according to the teachers, the key components of the PDP that contributed to the change in teachers' learning and practices?

2. Through what pathways of change was the professional growth of teachers taking place?

Methodology

In this study, a mixed-method design was implemented to examine the complex situation of the educational process (Creswell, 2015; Robson, 2007). The research followed a Convergent Parallel Design, in which the researcher collects both quantitative and qualitative data during the research process. The two sets of results are then merged, compared or correlated leading into their overall interpretation. A key advantage of the mixed-method research design is the reduction of the weaknesses of a mono-method design. In the present study, quantitative data analysis is limited by a small sample size and the inclusion of qualitative data can strengthen the findings (Creswell & Plano Clark, 2010; Morgan, 2007).

In the present study an evaluation based on Guskey's five-level model (Guskey, 2002) was incorporated into the mixed method. The evaluation used only the four levels of the model, since the results of students' learning were not to be assessed by the participating teachers. These results were indirectly assessed through the evaluation of the improvement in the quality of the Kindergarten (Gidari & Kakana, 2021), which is, according to research data, directly connected to the students' better learning outcomes (Auger et al., 2014; Grammatikopoulos et al., 2017; Sylva et al., 2011).

Sample

The sample comprised of 14 Kindergarten teachers (one male and 13 women), working in Greek public Kindergartens. Their mean age was 50.36 years old (SD = 2.67 years), having 20.57 years of educational service in schools (SD = 6.58 years). All aspects of ethics were taken into account in the present study.

All participants were informed of the purpose, procedure and duration of the research by a letter and agreed to sign a document to confirm their participation. The conduct of the research was approved by the Institute of Educational Policy (Act no. 28 / 10-7-2017 of the Board of IEP).

Instruments

Data were collected with the following instruments.

The Professional Development Programme Evaluation Questionnaire (PDPEQ.)

The Professional Development Programme Evaluation Questionnaire (PDPEQ) was developed for the needs of this research and was based on Guskey's model (Guskey, 2002). It contained 44 closed-ended items, in a 5 Likert-type scale (1 not at all/ unacceptable and 5 very much/very good) and 3 open-ended questions with which teachers were asked to indicate the strong and weak aspects of the programme and express concerns or make comments. The close-type items addressed four levels:

(1) Participants' reaction that includes four dimensions:
• Overall evaluation of the programme's quality (10 items, e.g. Did the programme correspond to your training needs?),
• The lecturers (seven items, e.g. Used the time effectively),
• The provided material (three items, e.g. It was useful) and
• The content (10 items, e.g. Was the content of the lectures explicit and clear?).
(2) Participants' learning (three items, e.g. How would you evaluate the overall acquisition of knowledge regarding the quality of the pre-school environment after your participation in the programme?),
(3) Organizational support and change (seven items, e.g. The director supports and encourages innovations),
(4) Participants' use of new knowledge and skills (four items, e.g. How easy was it for you to implement in your classroom the things you learned in the programme?).

The questionnaire had good internal consistency: Participants' Reactions (α= .92), Overall evaluation of the programme's quality (α = .95), The lecturers (α = .95), The provided material (α = .94), The content (α = .97), Participants' Learning (α = .97), Organization Support & Change (α = .60) and Participants' Use of New Knowledge and Skills (α = .55).

Focus group

A focus group session about the assessment and the evaluation of the programme, was held after the end of the PDP (Krueger & Casey 2000). The meeting lasted 2.5 hours, was videotaped with the permission of the participants and then the researcher.

Procedure

After the end of the PDP 'Upgrading the quality of the pre-school environment' the participating kindergarten teachers evaluated it , according to Guskey's five levels model (Guskey, 2002). They filled in the PDPEQ and participated in the focus group. Consequently, the qualitative and quantitative data were analyzed.

Data analysis

The analysis of the quantitative data of the research was completed using descriptive statistical techniques with the use of SPSS for Social Sciences (IBM SPSS 25), which were used in order to describe the evaluation of the PDP from the participants' point of view.

Qualitative data that were selected by the open-ended questions and the focus group were analyzed using the method of conceptual content analysis. The unit of content was a theme about a particular idea or event. An initial set of categories was formed by authors to reflect the five levels of Guskey's model (Figure 3). Afterwards, the data were reviewed and coded according to the predetermined categories.

Findings

Quantitative Data

The results of the PDPEQ are presented in Table 1. The mean values for each of the four evaluation level scales were higher than the mean value of three.

Table 1.

Means and SD of the Subscales of the PDPEQ

Evaluation Level	Mean	SD
Participants' Reactions	4.58	.45
Overall evaluation of the quality of the programme	4.52	.43
The lecturers	4.57	.54
The provided material	4.45	.53
The content	4.56	.46
Participants' Learning	4.19	.62
Organization Support & Change	4.04	.40
Participants' Use of New Knowledge and Skills	4.26	.38

Qualitative Data

For the qualitative data, conceptual categories were initially formed (Figure 3), quotes were found in the text, which were then classified based on the system of these categories. Our results from the qualitative data analysis regarding Guskey's four-level model were formed as followed:

Participants' Reactions (Guskey's 1st level)

The data collected indicate the participants' high satisfaction for every aspect of the programme. As stated, the programme corresponded to the participants' expectations, met their training needs, had clear aims, good organization, punctual programming of the meetings and remarkable social events. Among the strong elements of the programme were the positive, cooperative and friendly environment, the interaction, the exchange of views and experiences between colleagues and work on small, familiar groups. Some examples of the teachers' responses were:

> It is important because it wasn't similar to any other prior training from our School Consultant throughout the years. All of the previous training with the School Consultant was … almost inadequate [there was basically no interaction (N121)], it was mostly lectures [in a big group (N1)] in which either the School Consultant just spoke to us, or we were presented with project plans from our colleagues… there was no interaction. That was the reason I think this particular training was significant (N9).

> This training had a sufficient duration and an excellent interaction, which was very positive. Previous training resembled the internet in its older version where the user just received information without being able to interact. However, this programme was like the internet nowadays, where the user can employ web2 tools and no longer be just the recipient of information but also add or delete the content. It had a different form; more interactive (N13).
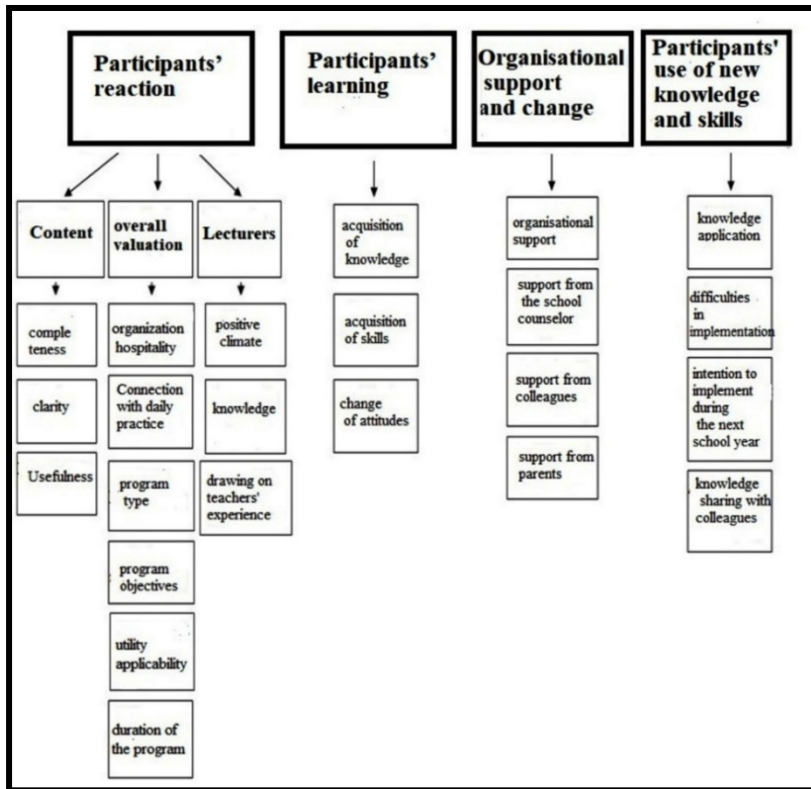
Figure 3. Categories and subcategories of qualitative data analysis

Moreover, the participants positively evaluated the lecturers for the knowledge they demonstrated and the way they presented the topics, which were consistent and amplified by using examples, techniques, and ideas for applications in the classroom. In addition, they acknowledged that clear instructions were given to every question of the participants, a safe and trusting environment was formed, positive interactions were developed, and the lecturers used the participants' experiences. The teachers felt comfortable, equal toward the lecturers and free to participate in the discussion. Some distinctive examples are:

> The most important thing was that here we discussed things that hap-
> pened in our classroom, in our everyday lives (N9).

> I felt like this, the lecturers helped me feel comfortable, I don't know
> if I have ever felt like this before (N1).

> And it was all so nicely put, and the information provided was always
> accurate (N4).

> And we were free to speak (N7).

The material administered to the participants was evaluated as particularly useful, comprehensive, and matching the aims of the programme. The content of the lectures was characterized as complete and articulate. Moreover, the participants acknowledged that the duration of the programme was sufficient to cover the subject fully:

> Has to do (the success of the programme) ... with the way we were presented the issues but also the variety of issues that we discussed (N9).
>
> And it was generally all very nicely given, it was applicable (N3).
>
> However, it is different when you hear them during a two or three hours lecture… The positive thing was that this training had adequate duration (N13).

Participants' Learning (Guskey's 2nd level)

The teachers expressed their satisfaction for the new knowledge they acquired or the refreshment of the what they already knew, they experimented, they realized the weaknesses of the past and changed their attitude towards issues regarding the quality of their pre-schools environment. They also made interesting proposals towards an alteration of their teaching approaches, aiming at a more cooperative teaching model, a fact that was counted as one of the programme's strong points. However, the participants considered the reflection on their practices to be the most important aspect of the programme. More specifically they mentioned:

> I learned many new things but also enriched my knowledge on topics that I already had some experience on (N9).
>
> The programme led me to this self-examination and reconsideration of my practices and convinced me to re-evaluate my approaches towards some topics (N1).
>
> It felt like an internal push, it ignited my interest for my job in order not to remain stable but keep evolving as a teacher (N12).
>
> We saw that our space can be flexible and it is up to us to use it in various ways to make it of higher quality… but there are some fine details that we hadn't thought of (N7).
>
> We improved our knowledge on a practical and theoretical level (N2).

Organizational Support and Change (Guskey's 3rd level)

The support given to teachers by the School Consultant and the educational system, was evaluated by the teachers slightly above the mean. Teachers consider the support from the School Consultant as important, but insufficient, since for the last two years there was no School Consultant appointed for the region:

Maybe it is that we haven't had a School Consultant for two years now…for the last two or three years no seminars were held to shake the ground… (N2).

I learnt about Collaborative approach a few years ago…I tried it, but haven't found the formula, I let go, I said to myself you're a loser, let it go, focus on what you can do, those that are successful…(N13).

Support from parents was evaluated as medium and it was believed that in some cases, parents were involved in school events in a way that may act as a limiting factor in the implementation of innovations. However, teachers believed that if a trusting environment is cultivated among teachers and parents, parents can offer important support for the transfer of knowledge gained at school. Teachers mentioned:

The greatest damage is caused by parents. How many worksheets did you complete today? It is all about what parents do or say… So, if we always take into consideration what the parents have to say or how they judge us, we will never move forward, because the parents do not know… they don't know our work [they don't, bravo, say it (N14)] they are no experts to know… (N9).

Parents must see an organization…even in something different, if they see organization, they will like it (N2).

The infrastructure in schools needs to be upgraded and the funds available are very limited. In the PDPEQ, the director's, the colleagues' and the school's cultural contributions were evaluated highly regarding their support for implementing everything acquired through the PDP. Qualitative data however, seem to differ, and in some cases, it appears that colleagues and the school culture may invalidate the transfer and implementation of the knowledge and innovations gained through the training programme into the school practice. As mentioned by the teachers:

When you share the same classroom, that may be a problem… you tell your colleague something, she/he doesn't do it and you are on a difficult spot…You get over it, sure…but you can't move forward with the groundbreaking changes that you wanted to do (N12).

Participants' Use of New Knowledge and Skills (Guskey's 4th level)
Teachers made significant efforts to embed in their practice what they have gained from the programme, to the degree that the special conditions of each school and the available time allowed them to. They affirmed that they did not encounter difficulties in implementing what they have learnt. They shared the new knowledge with their colleagues promoting the dissemination of the programme. Moreover, they expressed their intentions to implement what they learnt in the next school year. The discussions from the focus group are revealing:

Yes, it is mostly about working in small groups, I tried it this year…I asked the kids if they liked it and I was surprised that all the children from both groups affirmed that it is better to work on a smaller group rather than a big one (N14).

We made a lot of changes in the classroom from the first day. We enriched the place, we created corners, I created a corner for fine mobility, which I didn't have separately before [Me too (N7)], a costume corner and amplified some corners, to make them as they should be… We changed the signs, we added some pictures of kids from different ethnicities, and pictures of fathers, grandparents… (N11).

I had tried a long time ago when we first started working on a project, but I could not succeed. As X said, I was desperate, I had given up then and, the truth is that this year I had a certain reservation again, (A.: Phobia). However, after all the things that I heard and learned here, I will definitely try next time, I will do it first for myself and then for the children (N13).

The aim of the PDP was to better align the outcomes of PD with change in a classroom teacher's knowledge and practices to enhance pre-school quality. Enduring sequences of change in this study are considered to depict professional growth. The classroom teacher needed to see change in salient outcomes in terms of improvement of the pre-school quality and the feedback by their students about the implementation of new practices and learning outcomes for themselves as this was the intention of the PD. As highlighted by a teacher during the follow-up evaluation:

Our legacy from the programme was the experience we gained. Every year we try to apply what we have learned. We must dare to try, to insist, and not get disappointed. The results do not appear quickly. We set goals together with the children. We worked in a more organized way, more methodically with the teams and ended up with a more dynamic team composition. From October to May we saw a significant improvement in the children, they participated more and collaborated better. They developed their vocabulary and their ability to express themselves, ask questions, argue, explain and present their work. The programme helped us experiment and maintain things that work well in our classroom (N3).

As Clark and Hollingworth (2002) underline, the IMTPG can be used as an analytical tool to identify both the processes by which teachers grow professionally and the structural patterns in teachers' growth. Our research data suggest a model on how the programme promoted changes in teachers based on the Interconnected Model of Professional Growth (Figure 4).

The external domain includes all the information and stimuli gained by teachers through their participation in the programme and its characteristics. The personal domain consists of the knowledge, beliefs and attitudes of teachers regarding the quality

of the pre-school environment. Kindergarten teachers participated in the programme voluntarily because of their interest in improving the quality of their work and started the programme with pre-existing knowledge, beliefs and attitudes related to the quality of the pre-school environment (Arrow 1, Figure 4). Through their participation in the programme and the discussions held in the Community of Practice, they created the conditions for self-examination and reflection of their knowledge, attitudes and beliefs (Arrow 2, Figure 4).

With the new knowledge gained, the constant support from the researcher and the reflection and feedback from the Community of Practice (Arrow 3, Figure 4), teachers experimented in their classrooms, enriching the materials used, implementing new teaching methods, taking into consideration the teaching practices they implemented, the structure of the programme, the collaboration with the parents and their colleagues and the cultural diversity of their students (Arrow 4, Figure 4).

Teachers reflected upon the significant and observable improvement of the quality of the pre-school environment, as a result of the implementation of new practices, the positive responsiveness, the substantial engagement and satisfaction of students by the new practices that were implemented (Arrow 5, Figure 4).
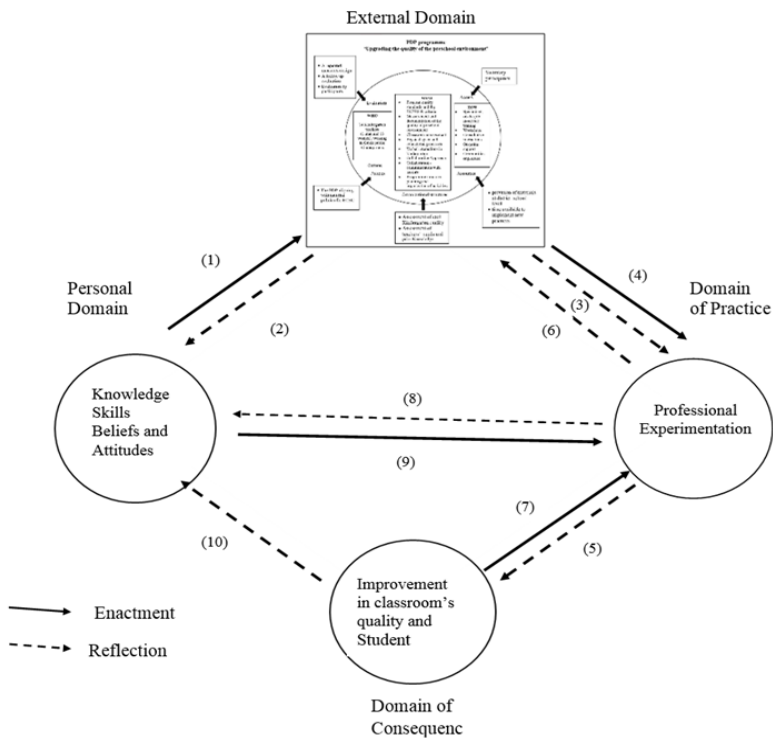

Figure 4. The Interconnected Model of Professional Growth adopted for this study from Clarke and Hollingsworth (2002)

At the same time, the same reflexive processes led to changes in the external sector (Arrow 6, Figure 4) through the dynamics and the interactions of the Community of Practice, as teachers present the results of their experiments in their classrooms. In addition, the acknowledgement of the consequences (the quality improvement and the students' responses to the implementation of the new practices) valued by the Community of Practice members led teachers to adopt this new practice. It implied more experimentation in the domain of practice (Arrow 7, Figure 4).

Reflecting upon the experience from the implementation of new practices, reinforced teachers' new pedagogical beliefs (Arrow 8, Figure 4), which led to the re-evaluation and optimization of these practices for future use (Arrow 9, Figure 4).

Finally, after reflecting upon the improvement of the quality of their classrooms and the positive responsiveness of their students, teachers reviewed their knowledge, beliefs and attitudes accordingly (Arrow 10, Figure 4).

Discussion

In this paper, we attempted to illustrate the evaluation of the teachers from their experience in the participation of the PDP 'Upgrading the quality of pre-school environment' and to identify the characteristics of the programme that render it effective in improving the quality of the pre-school environment. Moreover, we define the patterns that may have caused the change in teachers.

The evaluation of PDP was not restricted to the simple recording of teachers' reactions, where the evaluation of PDPs usually stops. It went further on to measure the level of the understanding of the theory and the depiction of the support towards teachers from the school and wider context in order to implement what they learnt. It also measured the integration of the new knowledge in the teachers' everyday practice.

Teachers evaluated positively every aspect of the programme, which seems to have successfully achieved all of its aims, mainly because its design was based on the conceptual context and took into consideration environmental factors as well. A programme of PD is efficient when it is focused on specific content (Desimone, 2011). This PDP was focused on programme quality standards, on ECERS-R criteria and on the measurement and documentation of the quality of the pre-school environment and aligned with the national policies.

Also, the research team took into consideration the participants' needs and suggestions, their strong points and the parts in which they needed support, as they were determined by the evaluation of their classrooms' quality. A training programme is efficient when it is targeted in accordance with the teacher's level of skills, prior knowledge and existing beliefs. Also when it focuses on the satisfaction of teachers' particular needs and in the treatment of the specific requirements of the particular schools (Schachter, 2015; Sheridan et al., 2009). Moreover, teachers participated in the programme voluntarily and had an active role in designing the programme, a fact that

reinforced their commitment to the programme and enhanced their motives to learn (Hunzicker, 2011).

Another factor that contributed to the programme's success was the development of a collaborative culture and the shift to a Community of practice. Over a period of time, this created an environment of equality, security and comfort that allowed participants to engage in interactions with one another and with their lecturers, to share their problems, experiences, ideas and opinions, accept feedback and work together in order to find solutions (Hunzicker, 2011; Mundry, 2005; Lave & Wenger, 1991).

In addition, the programme managed to mix theory and practice and to connect the theoretical knowledge to the everyday practice at school. It was embedded, as it was specifically designed for teachers' and individual classroom needs. Teachers think that PD is important and that learning becomes authentic when there is a link between the learning experience and their everyday practices and duties at school (Fokiali and Kaila 2005). Teachers in our study noticed that the knowledge and skills they gained from the PDP were feasible and easy to implement without additional materials.

As far as the support from the school and broader context is concerned, there is a need for the development of a school culture that is open to cooperation and innovation. Moreover, such a culture should establish an essential communication line between the parents and the school to foster understanding, trust and respect that would enhance any effort of educational change (Desimone et al., 2002; Kapachtsi & Kakana, 2010). Additionally, it is necessary to organize long-term PDPs and support teachers steadily and consistently as they implement innovative practices, as well as keeping them from quitting and returning back to their comfort zones (Darling-Hammond et al., 2017; Gregoriadis, Grammatikopoulos, & Zachopoulou, 2018).

Another element of the programme that contributed to its effectiveness was, according to kindergarten teachers, its duration. Many studies show that a significant amount of time (both time span and contact hours) is necessary for PD to be effective (Yoon et al., 2007). According to Garet et al. (2002), the duration of PD activities is important in two ways: Firstly, longer duration is more likely to offer teachers the opportunity for in-depth discussion of content, student perceptions and misunderstandings and pedagogical strategies, and secondly, long-term PD activities are more likely to allow teachers to try out new classroom practices and receive feedback on their teaching.

The participating teachers embedded the knowledge and competences gained through the programme to a certain extent in their everyday practice and made significant changes in their schools. However, the fact that the programme was launched in the middle of the school year, when some behaviours were already stabilized; and finished before the end the end of the school year, did not provide the participants with the necessary timeframe for educational changes to be implemented efficiently (Fullan, 2007). Despite the aforementioned limitations, the participants expressed their will

to use the knowledge they acquired through the programme in the following school year. The follow-up measurement one and a half year after the programme showed the maintenance and improvement of the pre-schools' level of quality after the implementation of the PDP. This suggests that the changes brought by the programme in the way of thinking and viewpoint of the teachers may lead to sustainable long-term changes in their educational practices.

The Greek educational system is largely centralized and bureaucratic, leaving little space for self-action and initiatives at the district-school level. As a result, teacher training is based on traditional models, has an academic and theoretical profile and is designed and implemented centrally through bureaucratic procedures, while teachers have a passive role (Karras & Oikonomides, 2015). Our research provides some remarkable evidence for the design of a small scale effective kindergarten teachers' PDP, which is organized locally, taking into account the special needs of specific schools and teachers. According to Day (2003) teachers do not develop passively and those responsible for the development of PDP will have to take into consideration the teachers' opinions when they design, apply and evaluate effective PDPs. This research presents the assessment of PDP by the participating teachers, featuring the characteristics that the teachers themselves believe contributed to the enhancement of their professional development and the improvement of their everyday practices. Moreover, it seeks to explain the learning processes followed by the trainees in order to achieve change and quality improvement. Our findings can add to the existing knowledge about the design and implementation of effective teachers' PDP. They could be taken into account by the designers of the teachers' PDP aiming at improving teachers' professional growth and quality of the classroom and enhancing the overall development of children. Future studies should also further investigate the contents, methods and delivery of the PDP with a view to developing typologies that can effectively improve the quality of ECEC.

Conclusion

To summarize, both qualitative and quantitative data supported the efficiency of the programme and provided with feedback for its improvement and continuance. Although the small number of participants and the specialized content of the programme do not allow us to generalize our results, they, support the idea that the use of mixed-methods can strengthen the evaluation of PDPs and contribute to the development of evidence-based PDP for Kindergarten teachers. Our data demonstrate that the PDP was designed, implemented and evaluated using best practices from adult education and the characteristics of an effective PDP, aiming to meet the specific needs of the local context and therefore, had a major impact on teachers' learning and practice.

The IMTPG proved to be a helpful tool that allowed us to better understand the processes through which teachers' growth was facilitated and to identify the charac-

teristics of the PDP that made it successful. Our findings can contribute to the research literature by providing empirical data for the synthesis of teachers', PD frameworks that will effectively support them to improve their PD and, consequently, the quality of ECEC.

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