# Greek pre-service and in-service early childhood teachers' beliefs about approaching and teaching Science in the early years

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**ABSTRACT**
*Many contemporary societies anticipate Science education to have a critical role in educational reality in early childhood settings. However, several studies have shown that a significant proportion of early childhood teachers, both pre-service and in-service, face a lack of confidence and competence in approaching and teaching Science. This study aims to give an insight into Greek early childhood teachers' beliefs in Science as well as into the way their beliefs are formed during diverse phases of their career such as at the end of their academic studies and after gaining teaching experience. Fifty-four pre-service and thirty-two in-service early childhood teachers in Greece participated in the study. The analysis has shown an overall positive positioning towards approaching and teaching Science as well as a coherence between the self-reported beliefs of the two groups. Issues associated with the broader orientation of early childhood teachers' academic and professional learning and development in Science teaching are discussed to inform policy.*

**KEYWORDS**
*Pre-service and in-service early childhood teachers, professional learning and development, beliefs, early childhood education, early years, science, science pedagogy*

**RÉSUMÉ**
*De nombreuses sociétés contemporaines estiment que l'enseignement des sciences joue un rôle essentiel dans la réalité éducative de la petite enfance. Cependant, plusieurs études ont montré qu'une proportion importante des enseignants de la petite enfance, tant en formation initiale qu'en cours d'emploi, sont confrontés à un manque de confiance et de compétence pour aborder et enseigner les sciences. Cette étude vise à donner un aperçu des croyances des enseignants grecs de la petite enfance par rapport aux sciences ainsi que de la manière dont leurs convictions se forment au cours des différentes phases de leur carrière, par exemple à la fin de leurs études universitaires et après avoir acquis une expérience de l'enseignement. Cinquante-quatre enseignants de la petite enfance en formation initiale et trente-deux en cours de service en Grèce ont participé à l'étude. L'analyse a montré un positionnement globalement positif en ce qui concerne l'approche et l'enseignement des sciences ainsi qu'une cohérence entre les convictions déclarées par les deux groupes. Les questions liées à l'orientation plus large de l'apprentissage et du développement académique et professionnel des enseignants de la petite enfance dans l'enseignement des sciences sont examinées afin d'éclairer les politiques.*

**MOTS-CLÉS**
*Enseignants en formation initiale et en service, apprentissage et développement professionnels, croyances, éducation de la petite enfance, premières années, sciences, pédagogie des sciences*

## INTRODUCTION

Teachers' beliefs are a critical aspect of the educational process that affects their pedagogical positioning and consequently the process of learning and development of the child (Fang, 1996). In some cases, teachers' beliefs may have a negative effect on their confidence and competence to address the teaching requirements from diverse learning areas and highly demanding disciplines. In particular, in the field of early childhood Science education teachers are required to design, implement, and assess complex learning tasks and activities related to concepts and phenomena of the natural and technical world. However, research has shown that much has to be done to allow early childhood teachers to position themselves as confident and competent enough to approach and teach Science.

In this paper, we explore pre-service and in-service early childhood teachers' beliefs about approaching and teaching Science in everyday educational reality in early childhood settings. Fifty-four pre-service and thirty-two in-service early childhood teachers in Greece participated in the study. Quantitative data were gathered through questionnaires. The study begins with a literature review in studies that explore teachers' beliefs about Science teaching, learning, and development in the early years. This is followed by an overview of the methodological framework that shaped the present study. Results are presented in parallel for the two groups of participants. The findings revealed an overall positive positioning towards Science as well as a coherence between the self-reported beliefs of the two groups. Academic and professional learning and development aspirations are also highlighted. The overall outcomes of the study inform policy suggesting a pedagogical framework in Science and general in STEM teaching, learning, and development tailored to the needs of early childhood teachers and the conditions of early years education.

## FACTORS THAT AFFECT EARLY CHILDHOOD TEACHERS IN APPROACHING AND TEACHING SCIENCE

A growing number of empirical studies shows that early childhood teachers define a wide range of factors that leads to specific difficulties in incorporating Science in everyday educational reality in early childhood settings. Evidence from international literature appears to come in line with evidence from studies conducted in Greece.

At the international level, research regarding the confidence and competence of early childhood teachers to teach Science has a long history. Regarding pre-service early childhood teachers, Appleton (1995) has argued that a high percentage of pre-service early childhood teachers are not confident to teach Science. According to Appleton the main reason that causes this lack of confidence is the feeling of limited content knowledge of Science that pre-service early childhood teachers express. However, empirical findings (Stepans & McCormack, 1985) have shown that the number of courses that pre-service students have undertaken in the subject of Science and Science teaching does not secure a deeper understanding of the subject. As Cox and Carpenter argued (1989) the quality of the undertaken course is interrelated to the depth of teachers' understandings in Science. Garbett (2003) argued that pre-service early childhood teachers' attitudes, misunderstandings, and misconceptions in Science can limit their confidence, competence, and willingness to engage with Science and plan a high-quality environment for teaching and learning Science in early childhood settings. Regarding in-service early childhood teachers, Fleer's research in the field (2006, 2009, 2017) has shown that while facing a strong societal demand for increasing and improving Science learning outcomes in early childhood settings, early childhood teachers are struggling with a lack of a supportive

pedagogical framework able to reflect the early childhood teachers' needs and to build on their strengths.

A set of empirical studies have been conducted in Greece with the same research focus. Regarding pre-service early childhood teachers, evidence has also shown that, despite several difficulties in approaching Science, pre-service early childhood teachers empower their confidence to teach Science over the time of their studies (Christonasi & Plakitsi, 2012). Regarding in-service early childhood teachers, research has shown that although in-service early childhood teachers conceptualize Science as a critical aspect of young children's learning and development, they do not appear to have the confidence and competence to plan Science tasks and activities due to lack of content knowledge (Jimoyiannis, 2002). This comes in line with findings from an action research conducted by Bagakis, Papadimitriou and Xatziandreou (2004) that also underscores that early childhood teachers express a positive relation between content knowledge and confidence and competence in Science teaching. Findings from the research of Papandreou and Kalaitzidou (2014) also show that in-service early childhood teachers conceptualize Science as a demanding teaching area and, in some cases, tend to avoid engagement with Science due to the lack of content knowledge. However, an overall positive positioning in Science has been highlighted (Minadopoulou & Partsali, 2001).

## THE PRESENT STUDY

Although several studies have highlighted early childhood teachers' beliefs about Science in early childhood education, there are limited evidence about how pre-service and in-service teachers' beliefs about Science are interrelated. This study aims to give an insight into the beliefs of these two cohorts of early childhood teachers as well as the way their beliefs are formed during diverse phases of professional development such as at the end of their academic studies and after gaining teaching experience. From this standpoint, the research questions are shaped as follows:

1. What are the beliefs of pre-service early childhood teachers about approaching and teaching Science in early childhood educational settings?
2. What are the beliefs of in-service early childhood teachers about approaching and teaching Science in early childhood educational settings?
3. How these beliefs of pre-service and in-service early childhood teachers are interrelated?

## METHODOLOGICAL FRAMEWORK

### *The study design and the research tool*

In line with the aim and the research questions of the study, pre-service early childhood teachers and in-service early childhood teachers were asked to complete a survey about their beliefs of approaching and teaching Science in early childhood settings. A set of questionnaires was designed. One questionnaire was addressed to pre-service early childhood teachers and one to in-service early childhood teachers. The questionnaire was developed in two sections (Sections A and Section B). The first section (Section A) focused on the demographic characteristics of the participants. The second section (Section B) focused on the beliefs of pre-service and in-service early childhood teachers about approaching and teaching Science in the early years. The structure of the two questionnaires was mainly the shame. The two questionnaires were only differentiated in the demographic characteristics section (Section A). In the case of pre-service early childhood teachers, the section involved questions regarding a) their gender, b) years of

studies, c) previous experience in academic courses around Science and Science education, and d) the number of courses undertaken in the area. In the case of in-service early childhood teachers, the section involved questions regarding a) gender, b) years of work experience as an early childhood teacher, c) previous experience in academic courses around Science and Science education, d) the number of courses undertaken in the area, e) previous experience in professional learning and development programs in the area of Science education, and f) the number of programs undertaken in the area. Thus, the pre-service early childhood teachers' questionnaire included twelve (12) questions and was distributed through printed material. The in-service early childhood teachers' questionnaire included fourteen (14) questions and was distributed electronically. The electronic questionnaire was developed through the Google Forms application. Both questionnaires were anonymous and included closed as well as open-ended questions. A 5-point Likert scale was used at a set of questions to indicate the degree of the participants' competence and confidence in approaching and teaching Science in the early years.

### *The sample and the data analysis*

In total, fifty-four (54) pre-service early childhood teachers, fifty-three (53) women, and one (1) man, and thirty-two (32) in-service early childhood teachers, thirty-one (31) women, and one (1) man participated in the study. Both groups were located in the same urban area in Greece. In the pre-service early childhood teachers' group, fifty-two (52) students were in the last year of their studies and two (2) pending graduate students. In the in-service early childhood teachers group, three (3) individuals were in service less than (5) years, one (1) was in service five (5) to ten (10) years, elven (11) were in service ten (10) to fifteen (15) years, eleven (11) were in- service fifteen (15) to twenty (20) years, three (3) were in service twenty (20) to twenty five (25) years, and three (3) of them were in service twenty-five (25) to thirty (30) years. Forty-five (45) pre-service early childhood teachers had attended academic courses about Science Education in the early years and nine (9) had not. Of those who had attended academic courses, twenty-six (26) had attended one (1) course, sixteen (16) had attended two (2) courses, and three (3) had attended three (3) courses. Regarding the in-service early childhood teachers, all of them had attended academic courses apart from one (1) case. Of those who had attended academic courses, five (5) had attended one (1) course, eleven (11) had attended two (2) courses, two (2) had attended three (3) courses, one (1) had attended nine (9) courses including a master course. In-service early childhood teachers replied to two additional questions regarding their participation in professional learning and development programs. Thirteen (13) individuals had attended professional learning and development programs and nine (9) had not. Of those who had attended the programs, six (6) had attended one (1) program, four (4) had attended two (2), two (2) had attended three (3), and one (1) had attended four (4) programs.

A descriptive statistical analysis of the responses of the participants in the questionnaire was conducted. The collected data were coded and categorized. A description of the categories used for the analysis is provided below. A satisfactory agreement between the independent coding of the responses that was conducted by the two authors was noted. The data were further processed through the Excel program. The results are presented through percentage frequencies and indicative examples.

## RESULTS

The analysis of the overall responses to the set of questions of the questionnaires has shown a significant correlation between the self- reported beliefs of the pre-service early childhood teachers and the beliefs of the in-service early childhood teachers.

The following table (Table 1) illustrates the findings of the analysis based on the responses given by the two groups of the early childhood teachers (ECT) that participated in the study on how they position themselves towards Science in everyday life. The categories presented in the table are defined and described as follows:

a) *"Positive attitude"* is defined as the case when the participants in the research appeared to recognize the importance of Science in everyday life. Indicative extracts follow: *"Positive. I believe that Science provides several stimuli.", "Positive. I sense that Science is very interesting".*
b) "Negative attitude*"* is defined as the case the participants in the research appeared not to position themselves positively towards Science. Indicative extracts follow: *"It is not good.", "I feel that I do not approach Science with a sense of confidence".*
c) "Neutral attitude*"* is defined as the case the participants in the research appeared to express either a positive or negative attitude. Indicative extracts follow: *"I am a kind of neutral since I do not feel that this is something I am interested in although I believe that I can gain some knowledge on this", "My engagement with Science is limited".*
d) *"Cautious attitude"* is defined as the case the participants in the research appeared to be nervous towards Science. Indicative extracts follow: *"I am familiarized with some elements but a little bit cautious for difficult aspects of it", "Superficial engagement"*.

**TABLE 1**

*Pre-service and in-service early childhood teachers' self-reported attitudes to Science in everyday life*

| Categories of responses | Pre-service ECT percent frequency (%) | In-service ECT percent frequency (%) |
|---|---|---|
| **Positive attitude** | 79.6 | 78.12 |
| **Negative attitude** | 7.4 | 9.38 |
| **Neutral attitude** | 7.4 | 6.25 |
| **Cautious attitude** | 1.9 | 6.25 |
| **No response** | 3.7 | 0 |
| **Total** | 100 | 100 |

The evidence presented in the above table (Table 1), shows that the majority of the pre-service early childhood teachers (79.6%) described their attitude to Science as positive. This outcome comes in line with the responses of the in-service early childhood teachers. The majority of them (78.12%) also expressed a positive positioning towards Science. No statistically significant difference is noted.

The following table (Table 2) illustrates the findings of the analysis based on the responses given by the two groups of participants on how they position themselves towards Science in everyday educational reality. The categories presented in the table are defined and described as follows:

a) *"Positive attitude"* is defined as the case when the participants in the research appeared to recognize the critical role of Science learning and development and the importance of approaching concepts and phenomena from the natural world during educational reality. Indicative extracts follow: *"It is very important for the children to engage with and get to know better the environment in which they live", "It is very important because in this way the children familiarize themselves with Science from a very early age".*
b) *"Negative attitude"* is defined as the case when the participants in the research did not appear to recognize the critical role of Science learning and development and the

importance of approaching concepts and phenomena from the natural world during educational reality. An indicative extract follows: *"It might be not safe"*.

c) *"Neutral attitude"* is defined as the case the participants in the research appeared to express either positive or negative attitude. An indicative extract follows: *"It is difficult but, still feasible".*

d) *"Cautious attitude"* is defined as the case the participants in the research appeared to be nervous towards Science. An indicative extract follows: *"I think there are not many activities we could do in Science. They (the activities) can easily become dangerous"*.

**TABLE 2**

*Pre-service and in-service early childhood teachers self- reported attitudes to Science in everyday educational reality*

| Categories of responses | Pre-service ECT percent frequency (%) | In-service ECT percent frequency (%) |
|---|---|---|
| **Positive attitude** | 81.5 | 84.38 |
| **Negative attitude** | 3.7 | 0 |
| **Neutral attitude** | 7.4 | 9.37 |
| **No response** | 7.4 | 6.25 |
| **Total** | 100 | 100 |

The evidence presented in the above table (Table 2), shows the majority of the pre-service early childhood teachers of the sample (81.5%) expressed a positive attitude towards Science as part of everyday educational reality. This finding comes in line with the findings regarding in-service early childhood teachers. The majority of them (84.38%) appeared to express a positive positioning towards Science in early childhood educational settings. No statistically significant difference is noted.

The following table (Table 3) illustrates the findings of the analysis based on the responses given by the two groups of participants on how familiar they consider themselves with basic principles of approaching Science concepts and phenomena in early childhood educational settings.

**TABLE 3**

*Pre-service and in-service early childhood teachers' responses regarding their familiarization with basic principles of approaching Science concepts and phenomena*

| Categories of responses | Pre-service ECT percent frequency (%) | In-service ECT percent frequency (%) |
|---|---|---|
| **Not familiarized** | 1.85 | 3.1 |
| **Not so familiarized** | 33.33 | 21.9 |
| **Familiarized** | 40.75 | 50 |
| **Very familiarized** | 24.07 | 18.8 |
| **Extremely familiarized** | 0 | 6.2 |
| **Total** | 100 | 100 |

The evidence presented in the above table (Table 3) indicates that the highest percentage of pre-service early childhood teachers (40.75%), as well as of the in-service early childhood teachers (50%), reported that are familiar with basic principles of approaching Science concepts and phenomena. However, what is also important here is that a high percentage of both groups

(33.33% and 21.9% respectively) appeared to report that they have a limited familiarization with basic principles of approaching Science concepts and phenomena.

The following table (Table 4) illustrates the findings of the analysis of the responses given by the two groups of participants on what they consider as a teaching and learning opportunity in Science during educational reality in early childhood settings. The categories presented in the table are defined and described as follows:

a) *"Observation of natural phenomena"* is defined as the case when the participants in the research appeared to identify observation of natural phenomena during everyday life in the classroom as possible learning opportunities. An indicative extract follows: *"It could be an accidental even that happens, e.g., the rainbow, or a child's question during the outdoors time or organized activities".*
b) *"Use of objects, materials, tools, and means"* is defined as the case when the participants in the research appeared to identify objects that exist in the classroom as well as various media as possible learning opportunities. An indicative extract follows: *"Free play in the Science corner".*
c) *"Stimulated wondering"* is defined as the case when the participants in the research appeared to consider as a possible learning opportunity the teacher to pose questions to the children and for them to try to find the answer. An indicative extract follows: *"Creating questions for children".*
d) *"Random incidents"* is defined as the case when the participants in the research appeared to believe that a learning opportunity can be anything that happens or exists in our daily lives. An indicative extract follows: *"Potential learning opportunities can be given by any stimulus, as long as we, the teachers, make a proper connection with the phenomenon".*

**TABLE 4**

*Pre-service and in-service early childhood teachers' responses regarding teaching and learning opportunities in Science during the educational reality*

| Categories of responses | Pre-service ECT percent frequency (%) | In-service ECT percent frequency (%) |
|---|---|---|
| **Observation of natural phenomena** | 29.65 | 78.13 |
| **Use of objects, materials, tools, and means** | 53.7 | 0 |
| **Stimulated wondering** | 1.85 | 12.5 |
| **Random incidents** | 9.25 | 0 |
| **No response** | 5.55 | 9.37 |
| **Total** | 100 | 100 |

The evidence presented in the above table (Table 4) illustrates the responses of the early childhood teachers regarding the teaching and learning opportunities in Science during the educational reality. The 53.7% percent of the pre-service early childhood teachers mentioned that the learning opportunities in Science are mainly related to the use of objects, materials, tools, and means. However, the majority of the in-service early childhood teachers (78.13%) mentioned that the learning opportunities in Science are mainly related to the observation of natural phenomena. The highest percentages of the responses of the two groups differ in this case.

The following table (Table 5) illustrates the self-reported pre-service and in-service early childhood teachers' suggestions of the type of equipment that should be available in early childhood settings classrooms.

**TABLE 5**

*Pre-service and in-service early childhood teachers' responses regarding the type of equipment available in classrooms*

| Categories of responses | Pre-service ECT percent frequency (%) | In-service ECT percent frequency (%) |
|---|---|---|
| **Science corner** | 16.67 | 31.2 |
| **Objects, material and tools** | 75.93 | 62.5 |
| **Everyday objects** | 1.85 | 0 |
| **No equipment is required** | 5.55 | 3.15 |
| **No response** | 0 | 3.15 |
| **Total** | 100 | 100 |

The evidence presented in the above table (Table 5) illustrates the responses of the early childhood teachers regarding the type of equipment that has to be available in classrooms to promote Science engagement, learning, and development. The majority of the pre-service early childhood teachers (75.93%) mentioned that objects, materials, and tools are highly needed. This comes in line with the majority of the responses on behalf of the pre-service early childhood teachers (62.5%). No statistically significant difference is noticed.

The following table (Table 6) illustrates the findings of the analysis based on the self-reported responses of the participants on how confident they feel to plan, implement, and assess Science tasks and activities as part of their overall educational planning.

**TABLE 6**

*Pre-service and in-service early childhood teachers' responses regarding their confident to plan, implement, and assess Science tasks and activities*

| Categories of responses | Pre-service ECT percent frequency (%) | In-service ECT percent frequency (%) |
|---|---|---|
| **Not confident** | 3.7 | 6.3 |
| **Not so confident** | 27.79 | 18.6 |
| **Confident** | 46.29 | 43.8 |
| **Very confident** | 20.37 | 21.9 |
| **Extremely confident** | 1.85 | 9.4 |
| **Total** | 100 | 100 |

The evidence presented in the above table (Table 6) illustrate the responses of the early childhood teachers regarding the degree of their confidence in planning, implementing, and assessing Science tasks and activities. The highest percentage of the pre-service early childhood teachers (46.29%) as well as of the in-service early childhood teachers (43.8%) mentioned that they feel confident to plan, implement, and assess Science tasks and activities. However, it is quite interesting that the immediately higher percentages of the two groups' responses differ. More specifically, 27.79% percent of the pre-service early childhood teachers stated that they do not feel so confident while the remaining 21.9% percentage of the sample of in-service early childhood teachers feel very confident.

The following table (Table 7) illustrates the self-reported factors that the pre-service early childhood teachers and the in-service early childhood teachers indicated as factors that complicate the approach and teaching of Science during everyday educational reality.

**TABLE 7**

*Pre-service and in-service early childhood teachers' responses regarding the factors that complicate the approach and teaching Science*

| Categories of responses | Pre-service ECT percent frequency (%) | In-service ECT percent frequency (%) |
|---|---|---|
| **Lack of content knowledge** | 57.4 | 18.75 |
| **Lack of equipment** | 11.11 | 46.88 |
| **Lack of teaching experience** | 7.4 | 0 |
| **Difficulty in understanding children's thinking in Science** | 14.84 | 18.75 |
| **Safety issues** | 1.85 | 0 |
| **Inappropriate space** | 3.7 | 6.25 |
| **No difficulty** | 1.85 | 6.25 |
| **No response** | 1.85 | 3.12 |
| **Total** | 100 | 100 |

The highest percentage of the sample of pre-service early childhood teachers (57.4%) states that the main factor that prevents them from organizing Science tasks and activities is the lack of familiarity with the subject as opposed to in-service early childhood teachers (46.88%) who considered their main difficulty to be the lack of equipment. Pre-service early childhood teachers and in-service early childhood teachers appeared to specify different factors that have a negative effect on their planning Science tasks and activities.

The following table (Table 8) illustrates the self-reported anticipations of pre-service early childhood teachers and in-service early childhood teachers from an academic course or a professional learning and development program that focuses on approaching and teaching Science in the early years.

**TABLE 8**

*Pre-service and in-service early childhood teachers' self-reported anticipations from an academic course or a professional learning and development program for Science*

| Categories of responses | Pre-service ECT percent frequency (%) | In-service ECT percent frequency (%) |
|---|---|---|
| **Enrichment of content knowledge and guidance on how to use this knowledge** | 79.63 | 78.12 |
| **Planning Science tasks and activities** | 20.37 | 9.38 |
| **Adjustment to Greek educational reality** | 0 | 3.12 |
| **No response** | 0 | 9.38 |
| **Total** | 100 | 100 |

The majority of pre-service early childhood teachers (79.63%) as well as of the in-service early childhood teachers (78.12%) mentioned that their anticipations are related to gaining more content knowledge in Science as well as more skills of how to use this knowledge. What is also important here is that a significant percentage (20.37%) of the pre-service early childhood teachers also expressed their need for support in planning Science tasks and activities.

## DISCUSSION

Taken together, the results have shown that there are no statistically significant differences between pre-service and in-service early childhood teachers regarding the way they conceptualize and approach Science in early childhood settings. In particular, what is noted is that the main differences between the responses of pre-service early childhood teachers and in-service early childhood teachers focus on the potential opportunities for teaching, learning and development in Science in early childhood settings as well as on the factors that have negative affect to the engagement with Science. Specifically, when asked to describe possible opportunities for learning and developing in Science within the educational routine, the majority of pre-service early childhood teachers considered that potential learning opportunity can arise through the use of objects, materials, means, and tools as opposed to the majority of in-service early childhood teachers believing that potential opportunities can mainly exist through observation of natural phenomena. The second important difference between the two groups of the sample is in the factors that raise difficulties in the process of organizing activities from Science in early childhood settings. More specifically, in-service early childhood teachers considered that lack of equipment as the main factor of difficulty, while pre-service early childhood teachers considered that the main factor is the lack of knowledge. Nevertheless, it is worth noting that in-service early childhood teachers, while considering that their lack of equipment is a factor of difficulty, also expect a professional learning and development program for Science in early years to support them to enrich their knowledge and overall understanding in the field.

## CONCLUSIONS

This paper explored Greek pre-service and in-service early childhood teachers' beliefs about approaching and teaching Science during everyday educational reality in early childhood settings. The results have shown that, despite defining several factors that discourage them to approach and teach Science, such as lack of content knowledge or difficulty in understanding children's thinking in Science, both groups have an overall positive positioning towards Science. Both groups also recognize the critical role of Science engagement, learning, and development in Science during the early years. Importantly, participants in both groups mainly expressed their familiarization with basic principle and their confidence in Science teaching. Although some of the pre-service early childhood teachers and in-service early childhood teachers have some reservations about the approach and teaching of Science, these reservations are not found to such an extent as in studies in the international literature (Appleton, 1995; Levitt, 2002; Garbett, 2003; Irez, 2006; Fleer, 2006, 2009; Edwards & Loveridge, 2011). The findings also revealed a focus on traditional practices of Science Pedagogy such as the use of concrete elements, spaces, and equipment as well as the utilization of observational techniques and the emphasis on content knowledge.

The overall outcomes of the study highlighted a coherence between pre-service early childhood teachers' and in-service early childhood teachers' beliefs in approaching and teaching Science in the early years. This outcome suggests that teaching experience is not critical in shaping or transforming early childhood teachers' beliefs about Science in the early years. Considering this outcome, the study suggests that ongoing and quality improved professional learning and development programs should be offered to support, orient, and keep motivated early childhood teachers in this area. Professional learning and development programs may also provide intellectual and dialogical spaces where the critical role of the social and cultural aspects of engagement, learning, and development in Science can be introduced

and unpacked. From this standpoint, Science can be conceptualized as an everyday real-life phenomenon in early childhood educational settings. This realization can make Science more accessible, meaningful as well as enjoyable for early childhood teachers over the time of their career.

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