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Author(s): Soini, Anne; Takalo, Susanna; Kalari, Joonas; livonen, Susanna

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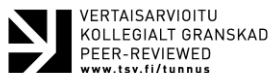
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Physical education in Finnish early childhood teacher education–curricula and preservice teachers' perceptions

Anne Soini^a, Susanna Takalo^b, Joonas Kalari^c & Susanna Iivonen^d

^a University of Jyväskylä, Finland, corresponding author, e-mail: anne.j.soini@jyu.fi,
<https://orcid.org/0000-0001-9168-9437>

^b University of Oulu, Finland, <https://orcid.org/0000-0002-9319-5446>

^c Tampere University, Finland, <https://orcid.org/0000-0003-4044-4549>

^d University of Eastern Finland, Finland, <https://orcid.org/0000-0003-1334-8025>

ABSTRACT: Physical education (PE) course curricula in Finnish universities were reviewed and compared, and 274 preservice teachers' perceptions of their PE studies in Finnish early childhood teacher education (ECTE) programmes were investigated using quantitative and qualitative methods. The results of the inductive content analysis revealed both knowledge- and skill-based learning outcomes, with teaching skills receiving the most emphasis. One-way ANOVAs revealed that the preservice teachers were relatively satisfied with their PE studies. They reported being prepared for teaching PE and provided detailed information on the policies regulating early childhood education and care (ECEC). However, they perceived their training with children as insufficient and felt they would have benefited from further training in inclusive PE. Preservice teachers reported inculcating joy of movement as the most important aim of PE teaching in ECEC. These findings suggest that future PE course curricula should place greater emphasis on teaching joy of movement, provide more knowledge on inclusive PE, and include more practical training with children. It is recommended that PE studies in Finnish ECTE should continue to account for at least five ECTS.

Keywords: *physical education, curriculum, early childhood teacher education, pre-service teacher*

Introduction

Early childhood education and care (ECEC) has been identified as the most influential setting for promoting children's holistic development and acquisition of a healthy lifestyle, including sufficient lifetime physical activity (PA) (Finn et al., 2002; Lu & Montaque, 2016; Maitland et al., 2020). These outcomes are better achieved if purposefully promoted in early childhood (Telama et al., 2014). Furthermore, research has shown that ECEC teachers have a central role in encouraging children to engage in PA (Brown et al., 2009; Cheung, 2020; Veldman et al., 2020) and that teacher training can be fundamental in changing children's PA habits (Bruijns et al., 2021; Mavilidi et al., 2021). Moreover, it has been shown that physical education (PE) studies predict early childhood teacher education (ECTE) preservice teachers' higher perceived competence to implement PE (i.e., support a child's PA, teach PE, and observe and assess a child's motor skills and PA) (Soini et al., 2021). Hence, ECEC teachers competent in PE instruction are required (Martyniuk & Tucker, 2014). This mixed-method study explores PE course curricula and preservice teachers' perceptions of their PE studies in ECTE programmes in Finnish universities.

Physical education in early childhood

The Association for Physical Education (2015) defines quality PE as follows:

PE is a planned, progressive learning experience that takes place in school curriculum in timetabled time and which is delivered to all pupils. This involves both 'learning to move' (i.e., becoming more physically competent) and 'moving to learn' (e.g., learning through movement, a range of skills and understandings beyond physical activity, such as co-operating with others). (p. 3)

In comparison, McLennan and Thompson (2015) state that "*Physical education is the most effective means of providing all children and youth with the skills, attitudes, values, knowledge, and understanding for lifelong participation in society*" (p. 8).

In Finland, PE has two main functions: to *educate children to move* and *educate children through movement* (Laakso, 2003, p. 17). According to Jaakkola et al. (2013), educating children through movement means teaching children knowledge, skills, and attitudes related to PA, a healthy lifestyle and wellbeing, socioemotional and interaction skills and ethical thinking. PA also includes encouraging children's bodily expression and giving space and appreciation to experiencing somatic and kinesthetic aesthetics. (Jaakkola et al., 2013, p. 20.)

In guiding young children towards a physically active lifestyle, Stork and Sanders (2008) state that early childhood PE must include:

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(a) The learning of developmentally appropriate skills, (b) personnel trained in appropriate instructional practices for PA, (c) promotion of a positive and safe PA environment, including child-sized equipment, and (d) an inclusive curriculum based on an understanding of moving concepts and skill themes (p. 205).

Providing appropriately challenging experiences in diverse physical and social environments is the optimal way of promoting children's intrinsic motivation and enjoyment of movement and their physical, cognitive and emotional efforts to learn and achieve (Stodden et al., 2021). According to Donnelly et al. (2017), implementing developmental PE involves first studying how children acquire the motor, fitness, cognitive and affective skills needed to become physically active throughout their lifetime. Gagen and Getchell (2006), however, remind us that ECEC teachers may know the importance of designing developmentally appropriate activities but are not always trained in how to do this. It is also common for teachers worldwide to professionally engage with the placement of children with disabilities in general classes and the need to provide support and access to adapted PE (Hutzler et al., 2019). Nevertheless, PE teachers often do not feel prepared or self-confident to implement supported and adapted PE (Hutzler et al., 2019; Rekaa et al., 2019).

In Finland, PE in ECEC is regulated by legislation on children's rights, including the Act on ECEC 580/2018 (regulating ECEC), the Basic Education Act 628/1998 (regulating pre-primary education), and the national core curricula. Accordingly, every child is entitled to planned, goal-oriented, and diverse PE. In ECEC, children have the right to rest, leisure, age-appropriate play, and PE (Finnish National Agency for Education, 2022). The Finnish recommendations for early childhood physical activity (2016) mandates the amount and type of PA for under eight-year-olds, the roles of the physical, psychological and social environments, and the planning and implementation of structured and unstructured PE. In this paper, the term ECEC refers to early childhood education and care and pre-primary education.

PE is mentioned twice in the National Core Curriculum for ECEC: under “*Forms of ECEC services*” and “*I grow, move and develop*” (Finnish National Agency for Education, 2022, p. 9, 31). More specifically, the National Core Curriculum states that PE must be goal-oriented, child-centred, regular, and encourage children to be physically active in versatile ways and experience the joy of PA. Furthermore, PE must encourage children to engage in movement, varying in duration and intensity, indoors and outdoors, and in all seasons, and to practice their fundamental motor skills (Finnish National Agency for Education, 2022). The National Core Curriculum for Pre-primary Education (2014) does not mention the term PE or its role in pre-primary school education. However, it states that pre-primary schools should lay the foundation for a lifestyle that values health and wellbeing, PA, and the development of health and safety skills. Particular attention is paid

to adequate PA as a prerequisite for learning. Children are also to be guided in understanding the importance of PA, rest, and good relationships for their wellbeing and health. (Finnish National Agency for Education, 2014.)

The Finnish Education Evaluation Centre evaluates the implementation of curricula and develops ECEC services. Its findings show that PE principally follows the criteria laid down in the National Core Curriculum for ECEC (Repo et al., 2019). However, one-fifth of the ECEC staff who participated in the evaluation estimated that children do not have the opportunity for daily vigorous PA (Repo et al., 2019). Similarly, another Finnish study revealed that, on average, only two-thirds of 4-6-year-olds met the daily one-hour vigorous PA recommendation (Finnish recommendations for physical activity in early childhood, 2016; Sääkslahti et al., 2021).

Physical education in early childhood teacher education in Finland

In Finland, ECEC teachers must demonstrate a solid multi-professional identity and high pedagogical competence (Ministry of Education and Culture, 2021). Finnish ECTE is a university-level, three-year bachelor's degree program (180 ECTS under the European Credit Transfer System; one ECTS = 27 study hours). ECTE is offered by the University of Helsinki, University of Turku, Tampere University, University of Jyväskylä, University of Eastern Finland, Åbo Akademi, and University of Oulu. All seven universities also offer master of education courses (120 ECTS, two years), a requirement for ECEC centre managers.

While Finnish higher education is guided by the Universities Act (558/2009), higher education institutes also set their own strategic and financial guidelines (Ministry of Education and Culture, 2021). PE is also considered a key learning area in ECEC, and Finnish ECEC teachers are committed to teaching a national PE curriculum (including supporting a child's holistic development, observing, assessing, and documenting children's play) (Finnish National Agency for Education, 2022). However, universities are not subject to standard PE curriculum criteria. Instead, those providing ECTE programmes have the autonomy to create their own PE course curriculum, core contents and competence areas. Nevertheless, they share some core content.

Previous studies have suggested that including PE in ECTE studies benefits preservice teachers' PA self-efficacy to engage preschoolers in PE (Bruijns et al., 2021). PA training also positively influences preservice teachers' values and perceptions (Mavilidi et al., 2021) and may even reverse preservice teachers' negative attitudes to PA (Sevimli-Celik, 2020). Soini et al. (2021) found that preservice teachers' PE studies and previous experiences of PE predicted their higher perceived competence in teaching PE, supporting a child's PA, and observing and assessing a child's motor skills and PA. Moreover, PA can

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support ECEC teachers' own wellbeing and reinforce the value of healthy and active lifestyles for children (Mavilidi et al., 2021). Previous professional development studies have typically focused on in-service teachers (Wang & Ha, 2008). Hence, more research on preservice teachers and PE studies during their educational phase is warranted (e.g., Soini et al., 2021). Martyniuk and Tucker (2014) highlighted the importance of ensuring that early childhood preservice teachers enter the workforce with sufficient competence to implement developmentally appropriate PE; therefore, an improved understanding of preservice teachers' perceptions of high-quality PE in ECTE is required (e.g., Bruijns et al., 2021; Soini et al., 2021; Wang & Ha, 2008).

Methods

Aims of the study

The study was designed to explore PE course curricula and investigate preservice teachers' perceptions of their PE studies in Finnish ECTE programmes with a view to assisting teacher educators and policy-makers involved in developing ECTE programmes. The findings of this study may offer the subtle yet transformative potential for practitioners in planning, modification or revalidation of stages of preservice teachers' programmes. The research questions were:

1. What kinds of PE course curriculum inform Finnish universities' ECTE programmes, and what are their projected learning outcomes?
2. How do preservice teachers perceive and experience the adequacy, the content, and the importance of their PE studies?
3. What do preservice teachers perceive as the most important tasks of PE in ECEC?

Data sources

Physical education course curricula

All the PE courses of seven Finnish universities analysed and discussed in this article formed part of compulsory ECTE studies. Optional courses were not included. As the official PE course curricula are in Finnish, it was deemed appropriate to conduct the analysis in that language. However, the reports on the findings have been translated into English. A description of the obligatory PE course curricula studies component in the universities' ECTE programmes is appended as a supplementary file (Table S1).

Questionnaire for preservice teachers

This research used purposive sampling within a cross-sectional in design. Participants were recruited during their final year (i.e., third) of bachelor's degree studies. Prior to the completion of mandatory PE studies, eligibility for involvement in the research was required. Request for participation was initially made by university personnel. Preservice teachers responded to the questionnaire as part of their ordinary course of study or leisure time. The recruitment and data collection took place in Autumn 2019 and Spring 2020. As the literature contained no ideal questionnaire that would enable preservice teachers' perceptions of their PE studies in Finnish ECTE programmes to be collected in detail, the researchers developed a new questionnaire. The questions of the current instrument reflected the objectives and requirements of 'The National Core Curriculum for Early Childhood Education and Care, 2018' and 'Recommendations for Physical Activity in Early Childhood 2016'. Furthermore, research from PE teacher education (PETE) areas was utilised when developing the questionnaire for this study (Mäkelä, 2014; Nieminen & Salminen, 2010; Valtonen, 2016). The six professionals with research experience in ECTE or PETE programme reviewed this tool to establish logical validity. The questionnaire was piloted with 27 preservice teachers outside the study. Overall, the test-retest for the questionnaire variables intraclass correlation coefficients (ICCs) resulted in a moderate agreement (range .55–.92) for most items (see also Soini et al., 2021).

The demographic section of the questionnaire comprised eight items on, e.g., age, gender, and university. Eight items and sub-items were designed to address education-related patterns, and three items and sub-items to evaluate preservice teachers' perceived importance of their PE studies. To enable a broader understanding of PE studies in Finnish ECTE, the questionnaire data complement the PE course curricula data. The English version of the questionnaire is available on request from the corresponding author.

Participants were asked to evaluate their experience of the adequacy of the PE studies (11 sub-items; e.g., *"I have adequate training in my PE studies to teach PE in ECEC"*) on a scale from 1 = completely disagree to 5 = completely agree. The subscale for *the adequacy of PE studies* showed satisfactory reliability (Cronbach's alpha coefficient [α] .81). Evaluation of PE studies in ECTE were assessed using the modified version of the task perception scale initially developed by Eccles et al. (1983). The preservice teachers were asked, *"How important do you think PE is in ECTE?"* and select the option that best corresponded with their level of agreement on five-point Likert scales ranging from 1 (completely disagree) to 5 (completely agree).

The preservice teachers were also asked to tick from a list of 32 options all those they had studied during their ECTE PE courses. The items were based on objectives and

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requirements contained in the National Core Curriculum for ECEC (2018) and the Finnish recommendations for physical activity in early childhood (2016). Several subscales were included: *policies regulating ECEC* (sub-items 1, 2, 3, 4, 5, 6, 7), *planning PE* (sub-items 8, 9, 10, 11, 12, 13, 14, 15), *teaching PE* (sub-items 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26), and *evaluation of PE* (sub-items 27, 28, 29, 30, 31, 32). Participants were also requested to indicate which of the 32 PE content areas they felt they would have benefited from further training in. Finally, they were asked the open-ended question: “Name in order of importance the three most important tasks of PE in ECEC.”

Analysis

Quantitative and qualitative analysis of physical education course curricula

First, the PE course curricula of seven Finnish universities were reviewed and compared using quantitative methods (see Table 1). Inductive content analysis was then applied to obtain a concise and comprehensive description of PE learning outcomes in Finnish ECTE programmes. According to Elo and Kyngäs (2008), inductive content analysis moves from the specific to the general; thus, specific instances are first observed and then combined into a larger whole or general statement in a three-phase process of preparing, organising and reporting the analysis and its results. In the preparation phase, two independent researchers (A. S. & J. K.) carefully read the stated learning outcomes of the PE course curricula. The analysis only concerned PE-related learning outcomes. The units for analysis were selected and divided into knowledge- and skill-based learning outcomes. Examination of the two categories of learning outcomes revealed the repetition of specific verbs. In the *knowledge-based* category these were *understands* (*ymmärtää*), *is aware of* (*tiedostaa*, *tietää*, *saaneet käsityksen*), and *knows* (*tuntee*, *on perehtynyt*), and in the *skill-based* category they were *can, is able to* (*osaa*, *hallitsee*) and *has the skills or capacity* (*on valmiudet*).

In the organising phase, the researchers looked for similarities in outcomes and colour-coded those with the same content. Next, to identify sub- and main categories, abstraction and grouping were performed (Elo & Kyngäs, 2008). The same learning outcome could, however, be assigned to from one to three different categories. For example, “*Is able to organise activities and learning environments indoors and outdoors in different season, in both children's free and structured play, thereby stimulating PA and practice of motor skills.*” was assigned to three sub-categories: working methods, implementing PE, and supporting a child’s free play and outdoor PA/play. After both researchers had completed these steps individually, they compared results and achieved a consensus through discussion. The results were then translated into English for reporting purposes and checked to ensure that the content remained original. The qualitative findings are presented in Table 2.

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Quantitative analysis of questionnaire: preservice teachers' perceptions and experiences of their PE studies

One-way ANOVAs were used to compare preservice teachers' perceptions of the adequacy and importance of their PE studies in the different Finnish universities. The university (University of Helsinki; University of Turku; Tampere University; University of Jyväskylä; University of Eastern Finland; Åbo Akademi; University of Oulu) was an independent variable, and the adequacy of PE studies in ECTE (1 = completely disagree, 5 = completely agree), and the importance of PE studies (1 = completely disagree, 5 = completely agree) were dependent variables. Effect sizes were determined using the Eta squared (η^2) for the one-way ANOVA analysis, and Cronbach's Alpha was used to report subscale reliability. Descriptive statistics of the preservice teachers' perceptions of the content of their PE studies and the areas they would have wanted further training in are expressed as means (*M*) with standard deviations (*SD*) or 95% confidence intervals (*CI*) and counts with percentages. The *p*-value was set at <.05. All statistical analyses were performed using SPSS Version 26.

Qualitative analysis of questionnaire: preservice teachers' perceptions of the most important PE tasks in ECEC

Finally, the preservice teachers were asked to "*Name in order of importance the three most important tasks of PE in ECEC.*" The first of the three tasks was deemed the most important and taken for the qualitative analysis. The preservice teachers responses were also selected for inductive content analysis. First, two researchers (A. S. & S. T.) carefully read the questionnaire responses independently. They then colour-coded similar responses and calculated their frequencies. Thus, similar responses were assigned to specific sub-categories, as suggested by Elo and Kyngäs (2008). Each named primary task or value of PE in ECEC was assigned to from one to three different sub-categories. For example, "*The joy of movement, children's fun and experiences of success, encouraging children to move and when moving.*" were classified into three different sub-categories: joy of movement, positive and successful movement experiences, and encouraging, supporting and motivating children to move. When the sub-categories had been identified and themed, they were, by applying abstraction, merged into main categories, and thus formed the most crucial themes for the study (see Elo & Kyngäs, 2008). At the end of their independent analyses, the researchers compared their results and reached a consensus. The findings were then translated into English (see Table 5).

Ethical issues

The risks to participants in this research were negligible. The study followed the ethical guidelines on research with humans and the human sciences laid down by the Finnish

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National Board on Research Integrity (2019) and by the EU General Data Protection Regulation (2016/679). The department heads of all seven universities consented to the data collection. Respondents were informed about the research objectives and given a detailed description of the data collection protocol and assurances regarding their rights and privacy. They were also encouraged to scrutinise the privacy statement provided and approved by the University of Jyväskylä, where the study was initially based. Answering and returning the questionnaire was deemed as consenting to participate in the study. Participation was voluntary, and no personal information except age, gender, and nationality was requested.

All participants in the study were over age 18. The advantages and disadvantages of participating in the survey were individual. For some respondents, sharing their views and experiences and being heard may have been a positive experience whereas answering questions related to their personal competence may have been discomforting and lowered their self-esteem. However, the respondents were reminded that the research aim was to ascertain their opinions and experiences on the issue, and hence there were no right or wrong answers to the survey items. They could also withdraw from the study at any time. Their privacy was fully guaranteed in accordance with the data protection legislation. All questionnaires were to be handled confidentially, and individual respondents would not be identifiable in publications. All data would be archived anonymously, and the principal investigator (A. S.) would be responsible for data storage throughout the project. The data would be stored on the University of Jyväskylä's password-protected server and would be accessible solely by the principal investigator. (A. S.). A secure destruction scheme would be adopted and all hard copy questionnaires shredded.

Results

All seven of the Finnish universities offering ECTE programmes agreed to participate in the study. Thirteen preservice teachers were excluded from the final dataset due to incompleteness of their PE studies and two due to incomplete questionnaires. In total, 274 (54%) of the 509 invited preservice teachers answered the self-report questionnaire. Answers were given in Finnish (98%, $n = 269$) or English (2%, $n = 5$) either online (49%, $n = 134$) or on paper (51%, $n = 140$). Time taken to complete the questionnaire was approximately 15 minutes. The participants were aged 20–49 ($M = 26$; $SD = 6.26$), and 92% were female.

Qualitative results of PE course curricula: emphasis on teaching skills in the Finnish PE course curricula

The compulsory PE course curricula of Finnish universities exhibited several common features. For instance, each curriculum included: (a) course title, (b) name of the person in charge, (c) schedule, (d) number of lectures and practice hours, (e) learning outcomes, (f) contents, (g) study methods, (h) learning materials, and (i) assessment and grading criteria (see supplementary Table S1). The course titles and numbers of ECTS and lectures and practice hours are presented in Table 1.

TABLE 1 PE course curricula in seven Finnish universities' ECTE programmes

UNIVERSITY	COURSE TITLE	ECTS	LECTURE + PRACTICE HOURS
UH	Physical education pedagogy	5	10+26
UTU	Physical and health education	4	12+28
TAU	Physical education	5	10+30
JYU	Physical education Integrating arts and physical education	5	10+40
UEF	Basics of physical education in the early years A Basics of physical education in the early years B Movement, science, and mathematics 1-3 years	6	11+59
ÅA	Movement, science, and mathematics 3-5 years Movement, science, and mathematics in preschool education	8	18+42
UO	Art, skills and science 3: mathematics and science education and physical education Art, skill and science 5: physical education and music education	5	4+36

UH = University of Helsinki; UTU = University of Turku; TAU = Tampere University; JYU = University of Jyväskylä; UEF = University of Eastern Finland; ÅA = Åbo Akademi; UO = University of Oulu; ECTS = European Credit Transfer System; 1 ECTS = 27 study hours.

The content analysis revealed a total of 30 knowledge- and 31 skill-based learning outcomes in the seven universities' PE course curricula. The knowledge- and skill-based learning outcomes could be grouped into 22 sub-categories and seven main categories, as shown in Table 2. The main categories were: (1) *teaching skills*, (2) *supporting a child's physical development and health*, (3) *enabling learning environments*, (4) *supporting a child's transversal competence*, (5) *documents regulating ECEC*, (6) *supporting a child's learning prerequisites*, and (7) *co-operation*.

TABLE 2 Findings of the inductive content analysis on learning outcomes in the seven PE course curricula

MAIN CATEGORY	SUB-CATEGORY
Teaching skills (45%)	<ul style="list-style-type: none"> ▪ Didactics (knowledge) ▪ Pedagogy (knowledge) ▪ Working methods (skills) ▪ Planning (skills) ▪ Implementation (skills) ▪ Evaluation and feedback (skills) ▪ Observation (skills)
Supporting a child's physical development and health (21%)	<ul style="list-style-type: none"> ▪ Health and wellbeing (knowledge) ▪ Growth and development (knowledge) ▪ A child's need for support (knowledge) ▪ Development and health (knowledge)
Enabling learning environments (14%)	<ul style="list-style-type: none"> ▪ Learning environments (knowledge) ▪ Learning opportunities in everyday life (knowledge) ▪ Supporting free play (skills) ▪ Supporting outdoor PA/play (skills)
Supporting a child's transversal competence (10%)	<ul style="list-style-type: none"> ▪ The importance of skills and art education (knowledge) ▪ Integration (knowledge) ▪ Integration and adaptation (skills)
Documents regulating ECEC (4%)	<ul style="list-style-type: none"> ▪ Regulating documents (knowledge)
Supporting a child's learning prerequisites (3%)	<ul style="list-style-type: none"> ▪ Learning prerequisites (knowledge)
Co-operation (2%)	<ul style="list-style-type: none"> ▪ Cooperation with stakeholders (knowledge) ▪ Family-based exercise (skills)

The percentages represent the amount relative to all learning outcomes ($N = 61$).

Quantitative results of questionnaire: preservice teachers' satisfaction with the adequacy of their PE studies

Preservice teachers were relatively satisfied with the adequacy of their PE studies. The highest scores ($M = 4.16$; $SD = .96$), were given for "*PE studies did not bring any new knowledge*" (*using reverse scores > "*PE studies brought me new knowledge*"). The lowest scores ($M = 2.48$; $SD = 1.1$) were given for "*the amount of practical training with children was adequate*". The one-way ANOVAs revealed statistically significant differences between the preservice teachers at the different universities in all the sub-items except "*Can develop new ideas based on learning*" and "*PE studies did not bring any new knowledge*". The power results of the inferential comparisons showed the typical medium effect ($\eta^2 = .037 - .275$). The results on the adequacy of PE studies for each university are presented in Table 3. In all seven universities, the preservice teachers' scores on the importance of PE studies were relatively high ($M = 4.86$, $SD = .40$) and showed no statistically significant differences ($p = .604$).

TABLE 3 Preservice teachers' perceptions and experiences of the adequacy of PE studies in the seven universities providing ECTE

ITEMS	All <i>n</i> = 271	UH <i>n</i> = 39	UTU <i>n</i> = 34	TAU <i>n</i> = 44	JYU <i>n</i> = 65	UEF <i>n</i> = 31	ÅA <i>n</i> = 12	UO <i>n</i> = 46	ANOVA	
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	η^2	<i>P</i> -VALUE
PE studies did not bring me any new knowledge*	4.16 (.96)	3.95 (.97)	3.97 (.94)	4.11 (1.0)	4.48 (.77)	4.16 (.92)	4.00 (1.3)	4.11 (1.0)	.040	.087
Can apply learning to practice	4.03 (.76)	3.92 (.77)	4.12 (.73)	3.98 (.92)	4.20 (.72)	4.16 (.63)	4.27 (.65)	3.72 (.72)	.053	.024
My thinking evolved through PE studies	3.89 (.90)	3.74 (.82)	3.91 (1.0)	3.51 (.97)	4.37 (.70)	3.90 (.87)	4.08 (.90)	3.63 (.83)	.117	< .001
My PE studies did not leave me with a clear picture of how to implement PE in my future job*	3.84 (.95)	3.87 (.86)	3.94 (.87)	3.53 (1.0)	4.26 (.74)	3.91 (.93)	3.58 (1.3)	3.46 (.96)	.097	< .001
I am able to develop new ideas based on learning	3.80 (.82)	3.82 (.68)	3.80 (.80)	3.78 (.88)	4.03 (.87)	3.75 (.62)	3.58 (1.2)	3.57 (.75)	.037	.122
Numbers of theory-based lectures	3.64 (1.0)	3.49 (.89)	4.06 (.87)	3.22 (1.1)	4.03 (.85)	3.47 (.98)	4.08 (.90)	3.28 (1.1)	.119	< .001
Numbers of practical activities	3.59 (1.2)	3.54 (.97)	4.03 (1.0)	3.49 (1.0)	4.08 (.99)	3.91 (.73)	4.17 (.84)	2.33 (1.2)	.275	< .001
I have adequate training to teach PE in ECEC	3.36 (.94)	3.31 (.89)	3.73 (.91)	3.27 (.92)	3.71 (.88)	3.41 (.71)	3.58 (.79)	2.67 (.92)	.147	< .001
I am now more critical about the implementation of PE in ECEC	3.35 (.99)	3.08 (1.0)	3.62 (1.0)	3.60 (.96)	3.47 (.98)	3.28 (.85)	3.33 (1.2)	3.00 (.87)	.056	.017
The overall content of my PE studies	3.30 (1.1)	3.28 (1.0)	3.94 (.97)	3.02 (1.1)	3.50 (1.0)	3.59 (1.1)	4.00 (.85)	2.41 (1.0)	.186	< .001
Adequacy of PE studies sub-scale	3.25 (.50)	3.20 (.49)	3.43 (.44)	3.15 (.49)	3.50 (.40)	3.29 (.46)	3.47 (.51)	2.88 (.46)	.186	< .001
Amount of practical training with children	2.48 (1.1)	2.72 (1.1)	2.76 (1.1)	2.64 (.93)	2.40 (1.1)	2.53 (1.0)	3.00 (1.2)	1.83 (.83)	.094	< .001

Likert-scale 1–5 (1 = completely disagree; 5 = completely agree). Reverse scores*. UH = University of Helsinki; UTU = University of Turku; TAU = Tampere University; JYU = University of Jyväskylä; UEF = University of Eastern Finland; ÅA = Åbo Akademi; UO = University of Oulu.

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Most participants (81%) considered that their PE studies had included knowledge of *teaching PE*. For instance, 96% of the preservice teachers reported that they felt their PE studies had prepared them for teaching rule- and ball games. Moreover, 95% also considered that their PE studies had included information on how to plan PA sessions, use diverse learning environments (indoors and outdoors), and teach children fundamental motor skills. The majority (77%) also reported that their PE studies had included education on ECEC *policies*. Almost all mentioned that their studies had included information about the 2018 National Core Curriculum for ECEC (97%) and the 2016 Finnish recommendations for PA in early childhood (96%). In contrast, 72% reported that they would have needed more training for inclusive PE (e.g., supporting a child with low PA, overweight children, or children in need of support in moving with other children). More than half of the participants also reported they would have benefited from further training in how to encourage families to adopt a health- and wellbeing-enhancing lifestyle (59%) and create an annual plan for the ECEC setting (56%). Finally, 54% reported that they would have needed more information on coping at work (e.g., ergonomics, healthy lifestyles). (Table 4.)

TABLE 4 Preservice teachers' perceptions of the core contents of their PE studies and content in which they would have benefited from further training (%)

UNI	POLICIES		PLANNING PE		TEACHING PE		EVALUATION OF PE	
	CONTAINED	NEED FOR FURTHER TRAINING	CONTAINED	NEED FOR FURTHER TRAINING	CONTAINED	NEED FOR FURTHER TRAINING	CONTAINED	NEED FOR FURTHER TRAINING
All	77	21	71	31	81	22	59	36
UH	84	23	75	30	74	28	61	31
UTU	81	16	71	26	78	19	66	28
TAU	69	27	57	44	83	21	41	49
JYU	80	16	76	26	91	16	74	31
UEF	70	24	70	33	78	21	53	37
ÅA	75	24	71	19	78	21	57	26
UO	76	24	77	31	76	30	51	44

UNI = university; UH = University of Helsinki; UTU = University of Turku; TAU = Tampere University; JYU = University of Jyväskylä; UEF = University of Eastern Finland; ÅA = Åbo Akademi; UO = University of Oulu

Qualitative results of questionnaire: the most important task of PE in ECEC was inculcating joy of movement

Altogether, 307 tasks or values of PE in ECEC were named as most important by the preservice teachers ($n = 259$) in Finnish ECTE programmes. These responses were categorised and sub-categorised under the two definitions of PE: (a) *educate to move* and (b) *educate through movement*. (See Table 5). Educate to move comprised four main

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categories and 11 sub-categories and education through movement five main categories and 19 sub-categories. The PE tasks in ECEC considered most critical and which were most frequently mentioned were all in category *Joy of movement* (28%).

TABLE 5 Preservice teachers' perceptions of the most important tasks of PE in ECEC ($N = 307$)

PE DEFINITION	CATEGORY	SUB-CATEGORY
Educate to move ($n = 209$; 68%)	Joy of movement ($n = 85$; 28%)	<ul style="list-style-type: none"> Joy of movement ($n = 77$) Fun of movement ($n = 4$) Enjoyment of movement ($n = 4$)
	Supporting a child's PA and motor skills ($n = 42$; 14%)	<ul style="list-style-type: none"> Supporting a child's motor skills ($n = 23$) Maintaining and increasing PA and enabling a child's mobility ($n = 14$)
	Encouraging a child to move ($n = 41$; 13%)	<ul style="list-style-type: none"> Versatile forms of movement ($n = 5$) Encouraging, promoting, and motivating a child to move ($n = 24$) Strengthening a child's attitude towards movement ($n = 17$)
	Promoting a child's health and wellbeing ($n = 41$; 13%)	<ul style="list-style-type: none"> Promoting a child's healthy lifestyles ($n = 21$) Teaching a child to adopt a physically active lifestyle ($n = 12$) Promoting a child's wellbeing ($n = 8$)
Educate through movement ($n = 98$; 32%)	Supporting a child's psychological skills ($n = 48$; 16%)	<ul style="list-style-type: none"> Enabling positive movement experiences ($n = 25$) Strengthening self-esteem ($n = 12$) Increasing a child's body knowledge and positive body image ($n = 8$)
	Supporting a child's holistic growth and development ($n = 23$; 7%)	<ul style="list-style-type: none"> Expanding a child's self-efficacy ($n = 2$) Promoting a child's positive self-perception ($n = 1$) Supporting a child's holistic growth and development ($n = 21$)
	Supporting a child's socio-emotional skills ($n = 16$; 5%)	<ul style="list-style-type: none"> Supporting a child's growth ($n = 1$) Supporting a child's development ($n = 1$) Supporting a child's social and collaborative skills ($n = 8$)
	Strengthening a child's autonomy ($n = 8$; 3%)	<ul style="list-style-type: none"> Promoting a child's interaction skills ($n = 5$) Increasing social cohesion ($n = 3$) Promoting equality ($n = 3$)
	Supporting a child's cognitive skills ($n = 3$; 1%)	<ul style="list-style-type: none"> Supporting a child's participation ($n = 1$) Strengthening a child's individualism ($n = 1$) Supporting inclusiveness ($n = 1$) Supporting a child-orientation ($n = 1$) Enabling voluntary participation ($n = 1$)
		<ul style="list-style-type: none"> Supporting a child's learning ($n = 2$) Promoting a child's cognitive skills ($n = 1$)

The percentages represent the amount relative to most of important tasks of PE in ECEC ($N = 307$).

Discussion

This study examined the PE course curricula of Finnish ECTE programmes and preservice teachers' perceptions and experiences of their PE studies. This is the first study to provide

an overall picture of the PE studies offered in university-level ECTE programmes in Finland.

Minor differences were found between the Finnish universities in the number of PE courses offered. PE was offered as whole courses, although in University of Oulu, Åbo Akademi and University of Jyväskylä, PE studies were integrated into other academic programmes, such as music, mathematics, science, and arts. Such integration may have contributed to the lower scores on the adequacy of their PE studies given by the preservice teachers in University of Oulu. However, these low ratings may be explained by the fact that the second PE course was not implemented in University of Oulu. Thus, preservice teachers in University of Oulu had only acquired two of the five ECTS required in PE. PE was also integrated into mathematics in Åbo Akademi, where, however, the preservice teachers gave the highest ratings in the data for the numbers of theory-based lectures and practical activities. Åbo Akademi also offered the most credits for PE and provided the highest number of lectures (18 hours). In comparison, the preservice teachers at University of Jyväskylä reported satisfaction with the overall adequacy of their PE studies. They also considered that their thinking on PE had evolved and that their PE studies had given them a clear picture of how to implement PE in their future career. Surprisingly, the preservice teachers at University of Turku, who reported having had adequate training to teach, despite having the lowest number of PE credits, were also more doubtful than peers in the other universities about their ability to implement PE in ECEC. Moreover, most participants across the universities reported least satisfaction with their amount of practical training with children; hence, this issue should be addressed when planning the amount and contents of PE studies in future. To support preservice teachers' learning and understanding of all the possibilities for PE in ECEC, it is recommended that the amount of PE studies in Finnish ECTE remains at the level of least five credits.

Joy, happiness and fun of movement are often associated with PE (Stevens, 2017). Regardless of their skills or disabilities, all children should be enabled with the joy of movement. Children with higher motor competence typically perceive PA as more enjoyable and rewarding than their less advanced peers (Stodden et al., 2008). According to Rekaa et al., (2019), children with disabilities may experience exclusion and lack of belonging. However, recent studies have also observed children with disabilities who 'love PE' (Rekaa et al., 2019). In this study, the joy of movement was seen by the preservice teachers as the most vital task of PE in ECEC. This finding was unexpected, as joy was not among the learning outcomes of the reviewed curricula. The definitions of PE (e.g., Association for Physical Education, 2015; Laakso, 2003; McLennan & Thompson, 2015) and Guidelines on physical activity and sedentary behaviour and sleep for children under 5 years of age (World Health Organization [WHO], 2019) also do not mention joy.

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Is, then, supporting the joy of movement a taken-for-granted outcome that does not need to be explicitly stated? The fact that the preservice teachers' self-reports emphasised the importance of the joy of movement prompts the question of whether this was triggered by their personal experiences of PE. It would be gratifying to think that preservice teachers experience joy when they move and thus would want to see it as a necessary objective in their role as a PE educator. It has been found that ECEC plays an important role in children's PA, motor skills and experiences of the joy of movement (Sääkslahti et al., 2021). Reunamo (2016), in turn, highlights the role of vigorous PA in increasing the joy of movement. Nevertheless, the current study findings draw the importance of joy of movement in PE and subsequently encourage those designing PE curricula to think about joy more explicitly in learning outcomes.

Most participants considered that their PE studies had included knowledge on how to teach PE in ECEC. They also reported that no additional training was needed to teach different games. This finding was not unexpected, as the teaching methods and the importance of structured PA were also strongly emphasised in the learning outcomes stated in the PE course curricula. The learning outcomes of the various teaching skills (e.g., didactics, pedagogy, working methods, planning PE, implementation of PE, evaluation and feedback, and observation skills) in the curricula were informed by the knowledge- and skill-based outcomes. Supporting a child's health and wellbeing was also seen as a vital task for PE in ECEC, as several previous studies have emphasised (e.g., Cheung, 2020; Finn et al., 2002; Lu & Montaque, 2016; Maitland et al., 2020; Veldman et al., 2020). The learning outcomes in the curricula also detailed several objectives related to promoting a child's physical development and health. It is thus reasonable to conclude that the learning outcomes stated in the curricula were also reflected in the preservice teachers' perceptions.

In Finland, all children have the right to participate in ECEC together and receive equal treatment regardless of their support needs, disability, or cultural background. ECEC staff are also responsible for ensuring that every child has the possibility to participate in cooperative and physically active play according to their own skills and abilities (Finnish National Agency for Education, 2022). Previous studies have outlined teachers' lack of resources and competence in implementing PE inclusion; therefore, more teacher training is warranted (Hutzler et al., 2019; Rekaa et al., 2019). Similarly, the preservice teachers' self-reports in this study indicated that they would have wanted more training in inclusive PE, such as supporting children with low PA, overweight children, or children needing support to move with other children. Furthermore, the preservice teachers felt that they did not have the tools for coping at work or encouraging families to adopt a lifestyle that enhances health and wellbeing. Examination of the curricula also showed that these PE learning outcomes received less attention. It is known that daily PA and good

fitness assist teachers in coping with physically demanding work (Smuka, 2012). Cheung (2020) found that teachers' PA and fitness levels stimulate their participation in children's physically active play.

A rewarding result was that the preservice teachers perceived themselves as knowledgeable and familiar with the documents regulating PE in ECEC and able to use them in planning PE. Although laws and national curricula were given relatively little attention in the learning objectives, the preservice teachers considered they had been comprehensively covered in their PE courses and felt no need for additional training in these areas. This may be explained by the occurrence and use of these regulatory documents as learning material in other ECTE courses. The curriculum is a significant guideline in teacher education, and it is essential that preservice teachers know how to use and develop a curriculum (see Vitikka et al., 2012, p. 9). Vlasov et al. (2018) found that the use of curricula in pedagogy positively affected children's development and learning and predicted the faster development of their skills. This study also found that research and the development of teacher education could play a vital role in preservice teachers' perceptions and their professional development. The study also yielded information on the content of PE studies in Finnish ECTE, knowledge which may help in finding ways to support preservice teachers' skills and positive attitudes towards early years PE before they are entering the ECEC teacher profession. This is essential, as preservice teachers who experience themselves as qualified have self-confidence and create trust in their preschoolers when they enter the workforce (Bruijns et al., 2021).

Strengths and limitations

Due to the exploratory design of this study, no causal relationships can be advanced. It is also noteworthy that the PE course curricula discussed in this article were in force in 2019–20, and thus some of the preservice teachers might have completed their studies within a different curriculum. However, since significant changes in PE course curricula are rare, examining the 2019–20 curricula was justified. Furthermore, the time spent on each topic in the curriculum or how content was processed in courses could have influenced the results; however, such information was not available. A strength of the study was that all universities providing ECTE programmes were involved. It also should be noted that the study used researcher and method triangulation. Both qualitative and quantitative analyses were included, and the qualitative analysis was performed by a pair of researchers.

Conclusions and implications

The study findings provided information on PE studies in Finnish ECTE programmes. The research produced knowledge that can be used in building good practices in future PE studies internationally. The results also suggest how the learning outcomes of the different PE course curricula might be further harmonised between the universities and how preservice teachers' skills as PE educators can be better supported. Based on the findings, we recommend that learning outcomes continue to include knowledge and skill-based outcomes. In the future, learning outcomes should take children's joy of movement better into account. It would also be useful to provide more knowledge on inclusive PE and practical training with children. To meet these expectations, the number of ECTS of PE studies should continue to comprise five credits, and PE should be taught as a separate subject. It would also be beneficial to study how preservice teachers' PE-related perceptions and skills change during their studies and compare whether the PE skills and knowledge acquired in studies are still relevant after ECEC teachers have been in working life for at least a couple of years.

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SUPPLEMENTARY TABLE S1 Mandatory PE studies in ECTE in Finnish universities' PECC

UNIVERSITY	ECTS	LECTURE+ PRACTICE HOURS	TITLE	ECTS	TIMING	CONTENTS	LEARNING OUTCOMES	LEARNING MATERIALS	EVALUATION	GRADING
University of Helsinki (UH)	5	10+26	Physical education pedagogy	5	1	<ul style="list-style-type: none"> Documents regulating ECEC and their content. Supporting children's health and wellbeing, general learning conditions, a positive body relationship, and social skills through PA. Motor development and fundamental motor skills of children in ECEC. Planning, implementing, and evaluating the unstructured and structured exercise and learning environments in ECEC. Cooperation with various parties. 	<ul style="list-style-type: none"> Knows and is familiar with the documents regulating PE in ECEC and can use them as a basis for planning PE. Understands the importance of PA for children's health and wellbeing, general learning conditions, positive relationships, and social skills and can support them in their development. Recognises the stages of a child's motor development and can support the development and expression of a child's FMS and body management and perceptual-motor skills through guided versatile exercise situations, play, and free PA. Implements and evaluates diverse, all-child-friendly, competence-developing, structured, and free play for different children and groups of children. Identifies, manages, and knows how to use and modify different learning environments for PA, considers sustainable development, and understands the importance of cooperation with other actors. 	1. Sääkslahti, A. (2015). Liikunta varhaiskasvatuksessa. 2. Finnish recommendations for physical activity in early childhood ,2016. 3. The scientific justification for the Finnish recommendations for physical activity in early childhood, 2016.	Learning task or exam or essay	0-5
University of Turku (UTU)	4	12+28	Physical and health education	4	2	<ul style="list-style-type: none"> Documents regulating ECEC. The role of PA in supporting children's growth, development, learning, and overall wellbeing. Development of children's perceptual motor and motor skills, including observing, evaluating, and supporting their development. Practising fundamental motor skills in children's unstructured and structured PA and play sessions. Planning and implementing diverse PE and creating activity and learning environments enabling PA. Health education in ECEC. 	<ul style="list-style-type: none"> Knows the contents of the documents regulating PE in ECEC and possibilities of PE in supporting a child's growth, development, learning, and wellbeing. Has knowledge on children's motor development and is able to observe and support children's perceptual motor and motor skills. Able to plan and organise activity and learning environments that stimulate free and structured play indoors and outdoors. Understands the importance of health education in promoting children's wellbeing. Can implement planned, goal-oriented and versatile PE in ECEC. 	1. Sääkslahti, A. (2015). Liikunta varhaiskasvatuksessa. 2. Finnish recommendations for physical activity in early childhood ,2016. 3. Changes in literature as agreed.	Learning task or exam or essay and exercise works	0-5
Tampere University (TAU)	5	10+30	Physical education	5	1	<ul style="list-style-type: none"> Familiarising students with children's spontaneous and playful PA as well as guided PE. Training in planning, implementing and evaluating PE based on observations of children. Examination of the pedagogical possibilities of PA in different environments to support children's growth and development . 	<ul style="list-style-type: none"> Understands the importance of PE (health, well-being and learning preconditions). Is able to arrange a safe and inspiring environment for spontaneous movement. Is capable of designing, implementing, and evaluating guided physical exercises. Understands the possibilities of PE in supporting the physical, psychological, and social growth of children. 	1. Sääkslahti, A. (2018). Liikunta varhaiskasvatuksessa. 2. The scientific justification for the Finnish recommendations for physical activity in early childhood, 2016. 3. Literature agreed at the beginning of the course	Essay and exam	0-5

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University of Jyväskylä (JYU)	5	10+40	Physical education	4	1	<ul style="list-style-type: none"> ▪ The importance of PA for the holistic growth, development, and learning of children. ▪ Planning and implementation of PE, and training of the educator's observation and instruction skills. ▪ Versatile training of children's perceptual motor and fundamental motor skills indoors and outdoors, both in unstructured and structured PA and play sessions. 	<ul style="list-style-type: none"> ▪ Is familiar with PE objectives and understands the potential of PE in supporting children's holistic growth and development. ▪ Knows how implement planned, goal-oriented and versatile PE in ECEC. ▪ Knows the content of PA recommendations in the early years. ▪ Is familiar with children's motor development and can observe and support children's FMS and perceptual motor skills. ▪ Can arrange an activity environment for children that enables their mobility. ▪ Can plan and implement indoor and outdoor PA for children. ▪ Masters the teaching methods of PE. 	1. Sääkslahti, A. (2015). Liikunta varhaiskasvatuksessa. 2. Finnish recommendations for physical activity in early childhood, 2016. 3. Articles and other material indicated at the start of the study module.	Active participation in teaching and approved completion of a learning task/exam.	0-5
			Integrating arts and physical education	1*/4	3	<ul style="list-style-type: none"> ▪ Importance, integration, and application of visual arts, music, PE, drama, and literature in ECEC. 	<ul style="list-style-type: none"> ▪ Understands the importance of arts and PE subjects for children's holistic development, growth, and learning. ▪ Is broadly aware of the importance of arts and PE from social and research perspectives. ▪ Can apply and integrate visual arts, music, PE, drama, and literature in ECEC. 	1. Literature by agreement.	Active participation in teaching and approved completion of a learning task/exam.	0-5
University of Eastern Finland (UEF)	6	11+59	Basics of physical education in the early years A	3	1	<ul style="list-style-type: none"> ▪ Documents regulating PE in ECEC. PA and motor skills promoting children's holistic development, learning, and wellbeing. ▪ Observation, evaluation, development, and support of children's perceptual motor and motor skills. ▪ Applied PE. ▪ PE in different environments outdoors and indoors in different seasons. 	<ul style="list-style-type: none"> ▪ Knows and is familiar with the documents regulating PE in ECEC and can use them as a basis for planning PE. ▪ Recognises the importance of PA in supporting a child's overall development, learning, and wellbeing. ▪ Is knowledgeable about children's motor development and is able to observe and support the development of children's perceptual and fundamental motor skills. ▪ Knows how PE is applied in different ECEC learning environments. 	1. Sääkslahti, A. (2018). Liikunta varhaiskasvatuksessa. 2. Finnish recommendations for physical activity in early childhood, 2016. 3. The scientific justification for the Finnish recommendations for physical activity in early childhood, 2016. 4. The National Core Curriculum for ECEC, 2018. 5. The National Core Curriculum for Pre-Primary Education, 2014. 6. Finnish Schools on the Move's website for the 'Ilo kasvaa liikkuen' (Joy increases through movement). 7. Suomen latu. 8. Other material indicated at the start of the study module.	Active participation in lectures and exercises. Learning tasks and teaching exercises.	Fail-Pass

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			Basics of physical education in the early years B	3	1	<ul style="list-style-type: none"> ▪ Pedagogy and didactics of PE in the early years. ▪ Designing and implementing PE that supports children's holistic development in different environments outdoors and indoors at different times of the year. 	<ul style="list-style-type: none"> ▪ Is able to implement planned, goal-oriented and versatile PE in ECEC. ▪ Knows the pedagogy and didactics of PE in the early years. ▪ Is able to organise activities and learning environments indoors and outdoors in different seasons, both in children's free and structured play, thereby stimulating PA and practice of motor skills. ▪ Is able to observe children's movement and give developmentally supportive and encouraging feedback. ▪ Understands the importance of health education in promoting children's wellbeing. 	<ol style="list-style-type: none"> 1. Sääkslahti, A. (2018). Liikunta varhaiskasvatuksessa. 2. Finnish recommendations for physical activity in early childhood, 2016. 3. The scientific justification for the Finnish recommendations for physical activity in early childhood, 2016. 4. National Core Curriculum for ECEC, 2018. 5. National Core Curriculum for Pre-primary Education, 2014. 6. Cleland-Donnelly, F., Mueller, S., & Gallahue, D. (2017). Developmental Physical Education for All Children: Theory into Practice. 7. Finnish Schools on the Move's website for the 'Ilo kasvaa liikkuen' (Joy increases through movement). 8. Neuvokas Perhe-sivusto. 9. Suomen latu. 10. Other material indicated at the start of the study module. 	Active participation in lectures and exercises. Learning tasks, teaching exercises, and an exam.	0-5
Åbo Akademi (ÅA)	8	18+42	Movement, science, and mathematics 1-3 years	3*/5	2	<ul style="list-style-type: none"> ▪ Young children's mathematics, science, and movement education. ▪ The adult's pedagogical approach as a prerequisite for young children's learning. ▪ How to translate theoretical knowledge into practical activities by developing the ability to plan, implement and evaluate activities with young children. ▪ Interpreting and taking advantage of the pedagogical opportunities that everyday situations offer. ▪ Children's health and their physical and motor development. ▪ Nature and the forest as a place for movement games, fairy tale gymnastics, and children's motor skills. 	<ul style="list-style-type: none"> ▪ Is able to translate theoretical knowledge into practical activities by developing PSTs' ability to plan, carry out, and assess young children's activities. ▪ Gains an understanding of the adult's pedagogical approach as a prerequisite for young children's learning. ▪ Gains an understanding of rich, everyday opportunities for learning. ▪ Gains fundamental knowledge on how children develop in mathematics, science, movement, and health. 	<ol style="list-style-type: none"> 1. Jagtøien, GL., Hansen, K. & Annerstedt, C. (2002). Motorik, lek och lärande. (selected parts). 2. Sigmundsson, H. & Pedersen, AV. (2004). Motorisk utveckling. Nyare perspektiv på barns motorik. 3. Sociaali- ja terveystieteiden tutkimuskeskus (2005). Varhaiskasvatuksen liikunnan suositukset. 4. Changing literature as agreed 	Exam and a literature seminar	0-5

University of Oulu (UO)	5	4+36	Movement, science, and mathematics 3-5 years	2.5*/5	2	<ul style="list-style-type: none"> The adult's approach to mathematical, scientific, and PA. Planning, inspiring, and evaluating educational activities. The role of the environment for children's learning. Variety and versatility. Gains an understanding of the subjects' possibilities for integration. The role of play. Different movement activities. Children's health, motor skills, gymnastics, and winter activities. 	<ul style="list-style-type: none"> Has acquired knowledge of the importance of the environment for children's learning. Has deepened understanding of planning, implementation, and evaluation of educational activities from a didactic perspective. Understands the importance of variety and versatility regarding children's learning. Understands the importance of play in learning. Has deepened knowledge of the adult's pedagogical approach as a prerequisite for children's learning. Has gained knowledge on the possibilities that subject integration entails. Has Increased in-depth understanding of how children develop and learn in mathematics, science, movement, and health. 	1. Jämsen, A. ym. (2013). 3–4-vuotiaiden lasten fyysinen aktiivisuus päiväkodissa eri vuodenaikoina sekä varhaiskasvattajan kannustuksen yhteys lasten fyysiseen aktiivisuuteen. 2. Osnes, H. ym. (2012). Kropp, rörelse och hälsa i förskolan. (selected parts) 3. Zimmer, R. (2002). Liikuntakasvatuksen käsikirja. Didaktis-metodisia perusteita ja käytännön ideoita. (selected parts). 4. Glädje, lek och gemensamma aktiviteter. Rekommendationer för fysisk aktivitet under de första åren. 5. Changing literature as agreed	essay and teaching exercise	Passed-rejected
			Movement, science, and mathematics in preschool education	2.5*/5	3	<ul style="list-style-type: none"> Mathematics, movement, science, children's learning, pedagogical approaches, goals and means, critical aspects. Athletics, play orienteering, ball games, and outdoor activities. 	<ul style="list-style-type: none"> Understanding of using mathematics, science, and movement both as means and goals in a didactic perspective. Knowledge of critical aspects of learning. Deepened knowledge of the pedagogical approach as a prerequisite for children's development and learning. Deepened knowledge of children's needs for challenges and support. Understanding of similarities, differences, and opportunities in pre-primary and primary education. Deepened knowledge of play and learning. Deepened knowledge of the conditions that affect children's learning. 	1. Ericsson, I. (2018). Betydelsen av fysisk aktivitet och motorisk kompetens för lärande. 2. Raustorp, A. (2004). Att lära fysisk aktivitet. 3. Sollerhed, A-C. (2017). Fysisk aktivitet en universalmedicin – förutsatt att man tar den!	Literature seminar and essay	Passed-rejected
			Art, Skills, and Science 3: Mathematics and Science Education and Physical Education	2*/5	1	<ul style="list-style-type: none"> Versatile indoor and outdoor facilities. Didactics of PE in early childhood education. Child-centered research. 	<ul style="list-style-type: none"> Is able to shape the physical environment to attract children under the age of eight to engage in various forms of PA Is able to apply the didactic principles of PE to support PA among children under the age of eight. Is able to explain the concepts of natural sciences through research work. Is able to implement integrative ECE. 	1. Sääkslahti, A. (2015). Liikunta varhaiskasvatuksessa. 2. Finnish recommendations for physical activity in early childhood, 2016. 3. Changing literature as agreed	Exam	Fail-Pass
			Art, skills, and science 5: physical education and music education	3*/5	2	<ul style="list-style-type: none"> Music and PE and the holistic growth and development of children under the age of eight. Joy in Motion - a national physical activity and well-being programme for early childhood and Recommendations for PA in early childhood, PAs for families. Planning, implementation, and evaluation of PE. 	<ul style="list-style-type: none"> Is able to plan for, implement, and evaluate PE and music education to support children's holistic growth and development in an early childhood education environment. Is able to apply and evaluate the meanings of PAs for families to support children's physical development Is able to make music according to their skill level and moving according to the music played and listened to. Is able to plan, use, and develop different application areas and musical processes in early childhood music education, e.g., through stories, images, movement, and drama plays. Is able to implement integrative and expressive ECE. 	1. To be agreed on at the start of the study course	Exercise works	0–5

Note. Original Finnish documents were translated into English and summarised for the table. *PE in the shared course.

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