

## Article

# Australian Preservice Early Childhood Teachers' Considerations of Natural Areas as Conducive and Important to Include in Educational Experiences

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**Abstract:** Understanding preservice early childhood teachers' perspectives on education in nature is important in the context of risk aversion and the future of education for sustainability. In the present study, 296 early childhood preservice teachers examined 16 photographs of outdoor areas from four categories: park with fence, park without fence, grassy area, forest. They selected the photographs depicting areas they most preferred and least preferred. They then selected photographs depicting areas they considered most or least conducive to education. The participants also completed a series of questions related to their beliefs about education in nature and the benefits for child development and health. There were clear associations between the areas participants preferred and those they considered educationally conducive. Likewise, there were associations between areas participants least preferred and their ratings of least conducive. The belief that nature experiences belong within school settings was the strongest predictor of perceived educational and developmental benefits. The findings suggest more opportunity to spend time in a range of natural environments and a belief in the importance of nature experiences should be emphasised in early childhood preservice teacher training.



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## 1. Introduction

Reductions in children's engagement in high quality outdoor activities have raised concerns internationally [1,2]. The main difficulties are the lack of opportunity for contact with nature [3] and risk aversion that inhibits risk-taking during play [4,5]. Contact with nature has been identified as having both short- and long-term positive impacts on health and wellbeing [6–8]. Education in nature is widely recognised as having benefits for teaching that cannot be achieved in a traditional indoor classroom [9]. This century has seen an increasing recognition of the role of early childhood teachers in both education in nature [10] and education for sustainability [11]. Professional development programs have been built to promote skills in these areas [12] with recognition that early childhood teachers have not been adequately prepared for this pedagogical shift. Alongside education in nature and education for sustainability has been an appreciation that play in nature is important but also perceived as risky [13,14]. Play that involves risk has been found to promote healthy child development [15,16]. Risky play does not always require natural elements, although much of the research that has occurred to demonstrate benefits has been in nature or in large outdoor spaces [13,15].

Despite the known benefits, opportunities for education in nature are not available for all children and generally do not feature in early childhood quality standards or quality measures. Furthermore, early childhood teacher education courses are generally not required to include content on outdoor play or education in nature. Nonetheless, many early educators are committed to outdoor education for health and development benefits

and to achieve broader objectives such as an appreciation of nature and understanding of sustainability. There are clear examples of well-developed programs around the world such as the European nature schools [17] and Australian bush kinder [18]. Nonetheless, even within countries that have exemplary programs and associated professional training, the opportunities for access may be restricted to particular regions.

While there may be increasing recognition of benefits of education in nature, it occurs in a context of risk-aversion [4]. Teachers frequently acknowledge the importance of allowing children to engage in experiences in nature and/or experiences that involve risk, yet they are concerned about the consequences of injury [14,16,19]. There are contradictory demands of allowing children to explore and experience nature but at the same time keeping children safe and injury-free [20].

Preservice early childhood teacher education is thought to have an important role in determining the likelihood that students will use natural areas when they graduate as teachers. This is especially important with increased recognition that education for sustainability should start in early childhood. Numerous studies have, however, indicated that preservice teachers may not have the knowledge or other predispositions that will support them in working effectively in nature. For example, a Spanish study with 421 preservice early childhood teachers found high levels of ‘plant blindness’ [21]. The study involved recording living beings during a walk in a park. Although the main biomass was plants, the majority of responses provided were of animals. A Turkish study of 402 preservice early childhood teachers found a positive worldview of nature but that they would prefer not to be outdoors in nature [22].

Ernst and Tornabene [23] examined 110 early childhood preservice teachers’ perceptions of outdoor areas as conducive to education. The study was conducted in USA (Minnesota). The study involved a new procedure in which preservice teachers viewed photographs of areas in four categories: water, forest, grassy area, park. They then selected photographs considered most/least conducive to education and that depicted environments they most/least preferred. Overall, preservice teachers considered parks to be most conducive to children’s education. Lack of access to natural settings and safety concerns were considered as barriers. They found preservice teachers’ personal preferences to have limited impact on the environments they selected as conducive to education. Preservice teachers were also asked a series of questions regarding time in nature, nature connectedness and intentions to use nature in future educational experiences. The latter was predicted by reported nature connectedness. Ernst and Tornabene’s method were subsequently used with 300 Turkish preservice early childhood teachers [24]. Findings were similar with parks considered the most conducive environment for education. There was no clear relationship between the places educators preferred and the places selected as conducive for education.

While the abovementioned studies are informative, it is important to consider that there may be variations across countries related to factors such as climate, cultural practices and injury prevention campaigns. For example, prevalence of skin cancer is relatively high in Australia, and this has led to a series of ‘Sun Safety’ campaigns aimed at changing people’s behaviours when outdoors [25]. Australia is also one of the few countries to have mandatory wearing of helmets when cycling [26] and has high levels of investment in prevention of child drowning [27]. Fencing of public parks is also valued by adults in Australia [28]. These country-specific factors may have an influence on the types of outdoor environments preservice teachers consider appropriate or easy to manage when working with young children.

Following from Ernst and Tornabene’s research, the present study has six aims:

1. To identify the outdoor environments preservice teachers consider conducive to education;
2. To consider whether preservice teachers preferred outdoor environments are associated with their perceptions of environments conducive to education;
3. To consider whether environments preservice teachers avoid are considered not conducive to education;

4. Identify predictors for preservice teachers to anticipate use of nature areas for education in their future work;
5. Understand whether preservice teachers' preferences for spending time outdoors is related to perceived benefits of education in nature;
6. To determine whether there is a relationship between the age-group preservice teachers intend to work with and perceived benefits of education in nature.

When considered in the context of previous studies, the present research contributes to understanding similarities and differences in responses to natural environments of preservice teachers from different countries. The study also promotes understanding of practices that may be more dominant or controversial in Australia, such as use of fencing, and may influence preferences for natural areas.

## 2. Materials and Methods

### 2.1. Participants

The initial participant group included 445 first year undergraduate students enrolled in an infancy and toddler development course. Responses from students indicating they were not in an early childhood teaching degree and/or they did not intend to teach in early childhood in the future were removed. This left 296 participant who could be identified as preservice teachers. There were 95 enrolled in a birth-5 teaching qualification, 201 enrolled in a Bachelor of Education. Early childhood degrees in Australia can cover birth-12 years. The Bachelor of Education qualification covers birth-12 years. Students were asked to indicate their preferred age/grade for future teaching. Preschool and K-1 were the most popular with 89 each, followed by Infants/Toddlers (48), Grades 2–3 (38), Grades 4–6 (24), Early Childhood Special Education (8). At the point of participating in this study, the preservice teachers had completed two courses relevant to outdoor play in nature. One had a focus on children's health and the other had a focus on play pedagogy. These courses covered theory, research and practice.

Participants were recruited online through their course website and received credit for research participation. They included their student identification number to claim credit but did not include their name and were assured that their responses would remain anonymous. The study was approved by the Macquarie University Human Research Ethics Committee.

### 2.2. Research Instrument

A modified version of Ernst and Tornabene's [23] instrument for assessing preservice early childhood educators' perceptions of outdoor settings as learning environments was used for this study. Modifications included changes to the questions relating to student degrees and more importantly, to the 16 stimulus photos. The questionnaire was delivered online using SurveyMonkey. The stimulus photos included outdoor setting types and it was considered important that these were setting relevant to Sydney, Australia. The set of 16 photographs were from four categories typical of outdoor contexts in Sydney; park with fence, park without fence, grassy area (such as a sports field), forest. Previous studies have included locations with water, but Australia has had significant campaigns to reduce drownings [27] and it was thought this would influence the findings. There are debates in Australia about whether parks should be fenced or remain unfenced. Therefore, these two types of parks were included. Table 1 includes a description of each photograph. Published photographs from areas around Sydney were used. Care was taken to ensure all photographs featured a sunny day and did not include people.

The photographs were ordered randomly for presentation. Participants were not aware of the category of the photographs. Instead, the photographs were presented to participants as a set of 16. The photos were displayed on a 4 × 4 grid accessed electronically. It was possible for participants to enlarge the photos to see more detail. The 4 × 4 grid allowed participants to see all photographs when responding to answers. The photos were

provided in a separate link and not embedded in the questionnaire to enable continued access to the photos when responding.

Participants initially asked to select three photos that indicated places they would most likely visit. They were then asked to nominate three places they would be least likely to visit. Questions about the photos then moved to nomination of the three places most conducive to educational outcomes and least conducive to educational outcomes. When answering these questions, participants were prompted to think about their future students. This ensured the focus was on the age-group they intended to work with rather than a broader range of ages. Justifications for the decisions were requested with participants using free text to respond.

**Table 1.** Description of photographs included in the 4 × 4 grid.

Outdoor Type	Photo Grid Location	Description
Park with Fence	First, Line 1 (No.1)	A park including children’s play equipment and large established trees
	Last, Line 4 (No.16)	A sandy surface with sparse, low vegetation. Includes a variety of logs and stones and a climbing structure
	3rd, Line 3 (No.11)	Established trees, rocks and small climbing structures. Ground includes fallen leaves, soil and dried grass.
	3rd, Line 4 (No.15)	Established trees, concrete footpath, mulch, grass, ‘managed’ garden, no play equipment
Park without Fence	1st, Line 2 (No.5)	Sand, concrete, grassy incline, large fort with play equipment, bench
	Last, Line 1 (No.4)	Sandy area, with replica boats and climbing ropes + established trees.
	Last, Line 3 (No.12)	Established trees, leafy ground cover, logs connected to ropes and a mound.
	Last, Line 2 (No.8)	Grassy area, young trees, maintained gardens, colourful shade cloth and play equipment.
Forest	2nd, Line 2 (No.6)	Rainforest including a dry creek with a bridge and built pathway. A variety of trees and ferns.
	2nd, Line 1 (No.2)	A dirt path through established and young trees and extensive native grass cover. No built features.
	2nd, Line 3 (No.10)	An open area in dense forest that includes trees and ferns. The open area has a shaded and an unshaded seating area.
	3rd, Line 1 (No.3)	Established trees. Forest floor is mainly leaves. No built features.
Grassy	3rd, Line 3 (No.7)	Extensive lawns with a concrete path leading to a shaded area. Non-native trees along the perimeter.
	1st, Line 4 (No.13)	Grassy field with small trees and a mound. Includes direct access to a larger group of trees.
	2nd, Line 4 (No.14)	Extensive lawns, trees on the perimeter and some scattered within the area, posts for volleyball or other sports.
	1st, Line 3 (No.9)	Grassy hills with sand and shrubs.

Participants were then asked to respond to a series of Likert scale items [23]. The first set of questions asked about participants’ likelihood of using natural outdoor spaces in future teaching, level of perceived difficulty in using natural outdoor spaces (Cronbach  $\alpha$  0.45). The second set of questions were about perceived educational/developmental

benefits of education in nature (Cronbach  $\alpha$  0.94) and the final set of questions asked about likelihood of using maintained spaces in future teaching (Cronbach  $\alpha$  0.74). For all questions, ratings ranged from 1 indicating Very Unlikely to 5 indicating Very Likely. Please see the Appendix A for details of the questions used.

### 2.3. Data Analysis

Responses were downloaded from SurveyMonkey into an Excel file. Data were removed for participants who indicated they did not intend to teach in early childhood. The Excel file was copied with open-ended responses removed from the duplicate. The data were then uploaded to SPSS Version 25 for statistical analysis. Examples from open-ended response are provided to illustrate reasons participants provided for their decisions. Response data were initially described in terms of means and standard deviations. The main relationships were examined using Spearman's correlations. Linear regressions were conducted to examine educational outcomes as an independent variable. Oneway ANOVAs were used for comparison of preservice teachers' selected age-group for teaching. These statistical procedures were selected due to suitability for the ordinal data generated from use of Likert items.

## 3. Results

### 3.1. Outdoor Environments Considered Most and Least Conducive to Achieving Educational Outcomes

Table 2 includes the number of nominations and rankings for each photo as depicting one of the three most conducive and the three least conducive. It is important to note that the survey instrument did not force participants to select three photos. Therefore, some participants selected less than three and a few participants selected more than three. The most conducive were represented in the two park types and the forest. The diversity within categories is noteworthy, with the 'Park with Fence' category including both the highest and the lowest number of nominations. Participant comments regarding selection often related to the self-directed nature of possible activities, e.g., "I selected these photos because they are open spaces for the children to do whatever they would like, it would be self-directed play, as well as because they are open spaces sporting equipment could be brought out for the children to play with". Others were related to safety and management, "They all seem to be smaller play areas that are enclosed, making it easier to monitor preschool children. The equipment is more accessible and easier for young children to engage with".

**Table 2.** Number of nominations, ranking and correlations for each photograph.

Category	Photo Ref. No.	Personal Preference Total/Rank	Conducive to Education	Correlation: Preference and Conducive	Personal Avoid Total/Rank	Not Conducive to Education	Correlation: Avoid and Not Conducive
Park with fence	1	58/6	59/6	0.372 **	47/9	50/7.5	0.273 **
	16	145/2	154/1	0.278 **	16/14	17/15	0.340 **
	11	29/11	42/7	−0.004	15/13	11/11	0.079
	15	7/16	10/14	0.094	73/6	80/5	0.375 **
	<b>Total</b>	<b>239</b>	<b>265</b>		<b>151</b>	<b>158</b>	
Park with no fence	5	35/9	30/10	0.258 **	49/8	50/7.5	0.212 **
	4	101/4	127/2	0.269 **	26/12	21/13	0.240 **
	12	62/5	104/4	0.212 **	13/15	29/16	0.045
	8	38/8	39/8.5	0.239 **	42/10	40/10	0.207 **
	<b>Total</b>	<b>236</b>	<b>300</b>		<b>130</b>	<b>140</b>	

Table 2. Cont.

Category	Photo Ref. No.	Personal Preference Total/Rank	Conductive to Education	Correlation: Preference and Conductive	Personal Avoid Total/Rank	Not Conductive to Education	Correlation: Avoid and Not Conductive
Forest	6	150/1	118/3	0.224 **	10/16	19/14	0.027
	2	105/3	72/5	0.238 **	31/11	25/12	0.333 **
	10	13/15	8/16	0.168 **	93/3	100/2	0.301 **
	3	36/10	26/11	0.396 **	82/5	49/9	0.354 **
	<b>Total</b>	<b>304</b>	<b>224</b>		<b>216</b>	<b>193</b>	
Grassy	7	46/7	39/8.5	0.219 **	60/7	88/4	0.187 **
	13	19/14	20/13	0.259 **	94/2	72/6	0.324 **
	14	28/12	25/12	−0.015	84/4	89/3	0.208 **
	9	24/13	9/15	0.236 **	152/1	139/1	0.320 **
	<b>Total</b>	<b>117</b>	<b>93</b>		<b>390</b>	<b>388</b>	

\*\*  $p < 0.01$  (2-tailed).

Results for least conducive are much clearer. The four Grassy Areas ranked in the top 6 for least conducive. The four ‘Park with no Fence’ environments were far less likely than the other categories to be nominated as least conducive. Participant responses included reference to their own interests, for example “Do not interest me and I feel they’re a bit boring with not enough for holistic exploration”, lack of equipment “There aren’t (sic) any play equipment available for the students in order to develop their motor skills efficiently and effectively.”, the openness of the areas “there are only trees and open space, least construction for children to play with.”, and safety “these places have uneven surfaces and insecure outdoor area for toddlers to play ... They might trip and fall down and hurt themselves badly ...”.

### 3.2. Personal Preferences and Selection of Environments Based on Educational Outcomes

A series of Spearman’s correlations were conducted to examine whether there is a relationship between preservice teachers’ own preferred environments and those they rate as most or least conducive for children’s education. As can be seen from Table 2, there are many clear associations between the environments preservice teachers prefer for their own activities and those they see as beneficial for children. Likewise, there are many clear associations between the environments preservice teachers avoid and those considered not conducive to education.

### 3.3. Environments Likely to Be Selected for Educational Opportunities

Participants were asked to select how likely they were to use natural areas and maintained outdoor areas in their future teaching with a rating of 1 indicating Very Unlikely and 5 indicating Very Likely. They were also asked to rate their perceived difficulty in using natural areas for future educational opportunities with a rating of 1 for Very Difficult and 5 for Very Easy. As can be seen from the mean ratings in Table 3, there was an overall tendency towards being likely to use natural areas and maintained outdoor areas in future teaching. There was a more neutral response for rating ease of use of natural environments in the future.

There was a significant correlation between likelihood of using natural areas and maintained areas in the future ( $r = 0.297$ ,  $p < 0.001$ ). There was no statistically significant relationship between perceived difficulty and likelihood of using natural areas ( $r = 0.025$ ,  $p = 0.666$ ) or maintained areas ( $r = -0.051$ ,  $p = 0.378$ ).



**Table 3.** Means, Standard Deviations and Skewness for Main Questionnaire Items.

Item Rated between 1–5	Mean/SD	Skewness
Experiences in nature important for child appreciation of environment	4.74/0.76	−1.81
Experiences in nature important for child physical development	4.70/0.77	−1.76
Experiences in nature important for child overall health and wellness	4.65/0.79	−3.14
Nature experiences belong within the formal school setting	4.52/0.85	−2.90
Experiences in nature important for child cognitive development	4.40/0.83	−3.45
Experiences in nature important for child social-emotional development	4.36/0.86	−2.22
Likely to use natural areas for educational opportunities in the future	4.00/1.23	−1.18
Likely to use maintained outdoor environments in the future	3.87/0.99	−0.09
Perceived difficulty of using natural areas (difficult to easy)	2.84/0.67	−0.96

### 3.4. Relationship between Environments Likely to Be Selected and Anticipation Educational Outcomes

Participants were asked to rate on a 5-point scale whether they were likely to use natural areas and maintained areas for education experiences. They were also asked to indicate ease or difficulty in using natural areas and whether experiences in nature have an important impact on children's: cognition, socio-emotional development, physical development, overall mental and physical health, development of appreciation for the environment. They also rated their belief that "Nature experiences belong within the school setting".

There is a significant positive relationship between expressing likelihood of using natural areas or a maintained environment and each of the educational outcomes (see Table 4). The belief that nature experiences belong in schools is also associated with educational outcomes.

**Table 4.** Correlations between environments likely to be selected and educational outcomes.

	Cognitive	Social-Emotional	Physical	Overall Health	Appreciation of Nature
Likely to use natural areas	0.213 **	0.173 **	0.172 **	0.200 *	0.172 *
Difficult to use natural areas	0.038	0.020	−0.037	−0.018	0.027
Likely to use maintained	0.153 **	0.168 **	0.163 **	0.124 *	0.117 *
Nature belongs in school	0.696 **	0.658 **	0.759 **	0.736 **	0.791 **

\*  $p < 0.05$ , \*\*  $p < 0.01$  (2-tailed).

Preservice teachers who indicated they were highly likely to use natural areas in the future provided open-ended responses such as "Nature has so many aspects to it which would aid the learning of young students. It also helps them understand the world around them, their environment as well as not limiting learning to the physical classroom". Some indicated the importance of education in nature because there are limitations on these experiences in other contexts "Many parents doesn't (sic) care more about outdoor playing, teachers need to care with students and to make them to do more exercise in future life with the natural areas".

A series of linear regressions was conducted including the educational outcomes as dependent variables and likely to Likely to Select Natural Areas, Perceived Difficulties with use of Natural Areas, Likely to Use Maintained Areas and the response to Nature Experiences Belong Within the Formal School Setting. Enter method was used for the independent variables. These models explained between 66.6–79.2% of the variance for each of the educational outcomes. The response to Nature Experiences Belong Within the Formal School Setting was the only significant contributor to the models: Cognitive development ( $\beta = 0.665$ ,  $p < 0.000$ , 95%CI [0.583, 0.747]); Social-Emotional Development

( $\beta = 0.653, p < 0.000, 95\%CI [0.564, 0.742]$ ); Physical Development ( $\beta = 0.681, p < 0.000, CI 95\% [0.612, 0.750]$ ); Overall Health ( $\beta = 0.675, p < 0.000, CI 95\% [0.601, 0.748]$ ); Appreciate Environment ( $\beta = 0.702, p < 0.000, CI 95\% [0.638, 0.767]$ ).

Participants were asked to provide comments if they perceived education in natural areas to be either ‘Difficult’ or ‘Very difficult’. The responses generally indicated conflict, with awareness of the value of education in nature, but enormous difficulties for teachers. Many responses related to pressure of current urban environments and not being able to find suitable natural areas and regulatory requirements, for example “First of all, children’s safety. The process needs educators to supervise in certain ratios. Secondly, materials need to be prepared under comprehensive consideration, which takes a lot of work from any aspects. Lastly, in the cities today, it’s not a super easy thing to find a natural area that is safe enough for the children”. Others discussed safety issues but were conflicted about the benefits of experiences with the potential for minor accidents. For example, “Worries about the children being in harm, too much risk etc. For example, branches, falling from a tree, tripping over rocks. But this is what I think is needed, for children not to be covered in bubble wrap, as life is full of challenges whether physical or not”.

### 3.5. Relationships with Participant Characteristics

Students were asked a series of questions about their characteristics. These were rated on a 5-point scale with 1 indicating Strongly Disagree and 5 indicating Strongly Agree. As can be seen from Table 5, there was a significant negative relationship between the response to ‘I don’t often go into nature’ and the likelihood and perceived ease of use of natural areas. There was also a significant negative relationship with beliefs that experiences in nature are important for children’s educational outcomes. This contrasts with associations observed based on ratings for Enjoying Outdoors Even in Unpleasant Weather and Noticing Wildlife Wherever I Am.

**Table 5.** Relationship between participant characteristics and education outcome ratings.

	Enjoy Outdoors	Rarely in Nature	Enjoy Dirt on My Hands	Notice Wildlife Wherever I Am
Likely select natural	0.247 **	−0.291 **	0.276 **	0.309 **
Difficulties with natural areas	0.051	−0.136 *	0.017	0.060
Likely select maintained	−0.004	0.000	−0.011	0.038
Cognitive	0.262 **	−0.299 **	0.234 **	0.290 **
Social-Emotional	0.156 **	−0.195 **	0.248 **	0.285 **
Physical	0.081	−0.192 **	0.097	0.238 **
Overall health	0.187 **	−0.249 **	0.158 **	0.272 **
Appreciation of nature	0.096	−0.212 **	0.095	0.290 **
Nature important in schools	0.119 *	−0.244 **	0.098	0.273 **

\*  $p < 0.05$ , \*\*  $p < 0.01$  (2-tailed).

### 3.6. Relationships with Selected Age/Grade for Teaching

Early childhood preservice degrees can cover teaching from birth–12 years. Participants were asked to nominate their preferred age/grade and to think of children within this age/grade when responding to questions. Potentially, preservice teachers may consider outdoor experiences in nature to be more challenging for particular age groups.

Comparisons using Oneway ANOVAs for Likely to Use Natural Areas and Likely to Use Maintained Areas showed no differences based on age/grade ( $F_{(5,290)} = 0.259, p = 0.935$ ;  $F_{(5,290)} = 0.481, p = 0.791$ , respectively). There was no difference in perceived difficulty in use of natural areas ( $F_{(5,290)} = 0.548, p = 0.305$ ).



#### 4. Discussion

Preservice teachers expressed knowledge of the relationship between education in natural environments and major developmental outcomes. Despite this knowledge, the intention to use nature in future teaching was less clear. Personal attributes of individual preservice teachers seemed to contribute to the intention to use nature in future teaching. More important was an expressed belief that natural experiences should be part of the formal school setting. Interestingly, preservice teachers intending to work with children in prior-to-school settings were less likely to rate using natural areas for educational opportunities as difficult.

The preservice teachers in this study were most likely to select parks as areas conducive to education. This finding is consistent with earlier findings [23,24]. As noted in earlier research, parks are potentially easier for preservice teachers to use with specific equipment and clear boundaries. Fenced parks seemed more controversial than unfenced parks with unfenced parks attracting both high and low rankings. This may reflect ongoing debates within Australia regarding use of fences around parks [29].

There were clear associations between preservice teacher selection of areas as educationally conducive and the areas they preferred. This finding is not consistent with previous research [23,24]. However, the previous studies found participants to have a personal preference for locations with water. The present study did not include photographs of locations with water and this likely accounts for the difference.

To some extent it is not surprising that areas preservice teachers are unlikely to visit were rated as less conducive to education. Experience within an environment can build appreciation for the opportunities available. It may also be that preservice teachers have negative experiences with particular outdoor areas. For example, the grassy areas included sports fields, and these may be perceived as catering to the needs of older children and adults but not suitable for younger children. Large grassy areas such as those depicted in the photographs are usually much easier to access than bush areas and have potential to be a space for which children can have regular access to space and 'managed' nature. It therefore seems that opportunities may be missed for use of available outdoor spaces.

The open-ended responses frequently revealed awareness of conflicting discourses related to children's experience. Whilst aware of benefits, preservice teachers mentioned safety and risk as a difficulty, including parental concerns about childhood injuries. There may be a need to reframe perceptions of risk in these outdoor spaces using [30]. Previous studies have found teachers to restrict outdoor activity if they dislike dirt or cold weather [31]. Future research could include an investigation of ways to improve tolerance and build enjoyment of a range of outdoor environments.

Although much of the data suggests that preservice teachers' direct experience with nature is a significant factor, there is also a clear indication that a belief in the importance of nature experiences in school is more influential. This belief is potentially modifiable as part of preservice teacher training and/or later professional development. Many previous researchers in this area have argued that preservice early childhood training needs to include more content regarding the complexities of nature and more direct experiences in nature [14,32,33].

At the time of completing this questionnaire, participants had completed a course in pedagogy and play and another in early childhood health. Both courses emphasised the importance of outdoor play for all aspects of health and development with practical classes related to outdoor play in nature. Preservice teachers involved in this research are part of a campus that has significant green spaces with significant native flora and fauna. Practical classes are sometimes held outside. The prior exposure to relationships between nature and education/development outcomes is possibly reflected in the high ratings on items related to these outcomes. Interestingly, the connection to likelihood of using nature areas in future teaching is less clear. Further research is required to understand how information and practical experiences in preservice teaching transfers to aspirations and practice in teaching.

The present study provides insight into some of the areas that could be enhanced for preservice teachers. Those who commented on the difficulties discussed aspects such as staff-child ratios and safety measures. Understanding of protocols used in Forest Schools and Bush Kinder could help to alleviate these concerns. It is important to note that participants in this study were in the early stages of their degree and perhaps later in their degree would appreciate the Australian and international professional knowledge they can connect to for protocols rather than considering time in nature as having a series of unique and onerous problems to solve. The study does indicate the importance of encouraging experiences in nature for extra-curricular activity of preservice teachers. The results also suggest that greater attention could be paid to Early Childhood Education for Sustainability [34,35] to enhance preservice teacher understanding of the value of education in nature.

This study has multiple limitations. The data were collected from one institution only and at one time in the preservice degree. It is unknown whether beliefs changed during the degree or will change when students become teachers. The data are cross-sectional and report associations. The scores for most items were negatively skewed and this most likely reduced sensitivity in the analysis. It is not possible to infer causality from the present findings. Participants were asked to respond to a series of photos. Responses may have been different if they had been in the context and experienced the environments more fully.

## 5. Conclusions

Considered in the context of previous studies, the present findings contribute to evidence for the need for preservice early childhood teachers to have better education about nature and more experience in nature. Preservice early childhood teachers in this study demonstrated an appreciation of the benefits of education in nature. More generally, early childhood preservice teachers may benefit from greater opportunities to learn about education in nature. Recent evidence (30) indicates specific excursions in preservice training could play an important role in filling this gap.

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**Informed Consent Statement:** Informed consent was obtained from all participants involved in this study.

**Data Availability Statement:** The data presented in this study are available on request from the corresponding author.

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**Conflicts of Interest:** The author declares no conflict of interest.

## Appendix A. Likert Scale Questions

1. Please indicate how likely you are to use natural areas for educational opportunities with your future early childhood students (natural areas = outdoor environments that range from relatively natural to wild, as opposed to maintained/developed spaces such as mowed grassy areas, landscaped park settings, playgrounds, etc.).

☐ Very Unlikely   ☐ Unlikely   ☐ Possibly   ☐ Likely   ☐ Very Likely

If you indicated you are likely or very likely to use natural areas with your future students, please indicate why you plan to do so (what motivates you to want to use natural areas with your students?).

2. How difficult do you perceive it will be to use natural areas for educational opportunities with your future early childhood students?

☐ Very Difficult ☐ Difficult ☐ Neither difficult nor easy ☐ Easy ☐ Very Easy

If you indicated use of natural areas with your future students may be difficult or very difficult, what do you feel will be the primary obstacle to your use of natural areas for educational opportunities with your future early childhood students?

3. Please indicate how likely you are to use maintained outdoor environments for educational opportunities with your future early childhood students (landscaped school yards, mowed grassy areas, landscaped park settings, playgrounds, etc.).

☐ Very Unlikely ☐ Unlikely ☐ Possibly ☐ Likely ☐ Very Likely

4. Please rate the extent to which you agree/disagree with each of the following statements. There are no correct or preferred responses. Please respond based on your opinion, not based on how others might respond.

experiences in nature are important for children's:	strongly disagree	neither agree	strongly disagree	disagree agreeor	or agree
Cognitive development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Socio-emotional development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall health and wellness (mental and physical)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Development of appreciation for the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nature experiences belong within the formal school setting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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