

Home and school gardening: Practices, attitudes, and beliefs of pre-service teachers

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ABSTRACT

The study investigates the attitudes and beliefs of pre-service teachers on home and school gardening as the basis for incorporating gardening activity in teacher education courses. Utilizing a descriptive research design, the data was gathered through a researcher-made survey and analyzed using various statistical methods such as percentage, mean, standard deviation, t-test for independent sample means, and Pearson r. The findings reveal a high positive regard for gardening among pre-service teachers, irrespective of sex and geographical location. The geographical location shows some variations in beliefs about gardening, particularly between coastal-rural and other areas, whereas attitudes were consistently positive across locations. A significant correlation between beliefs and attitudes suggests that fostering positive beliefs may enhance positive attitudes toward gardening. These results underscore the potential for integrating gardening into teacher education, promoting values like environmental conservation, and healthy habits. The study acknowledges limitations like the limited diversity of the sample and unexplored translation of attitudes into practice and recommends the incorporation of gardening into the curriculum and the provision of practical gardening spaces and training. The conclusions affirm the role of pre-service teachers in addressing challenges like limited food supply and environmental degradation and emphasize the need to include gardening values in teacher education. This study recommends that gardening activities be integrated into the pre-service teacher education curriculum.

1. Introduction

In a time where the significance of environmental sustainability and ecological consciousness cannot be overstated, the assimilation of gardening techniques into learning environments has surfaced as a crucial subject to explore (Williams & Dixon, 2013). The relationship between gardening at home and in schools has been recognized for its wide-ranging benefits, including educational, social, and psychological gains (Ozer, 2007).

Gardening's role in education practiced both at home and within school settings, is gaining increased prominence. It serves as an influential educational instrument that fosters a connection with nature, amplifies scientific comprehension, and encourages a sense of environmental responsibility (Smith & Motsenbocker, 2005). The intention of this study is to probe into the beliefs, attitudes, and practices of pre-service teachers concerning the role of gardening in home and school environments.

The perspectives and values of pre-service teachers about gardening are pivotal. These not only shape educational content but also guide students' perception of sustainability and care for the environment (Desmond, Grieshop, & Subramaniam, 2002). The current investigation's core aim is to uncover these underlying beliefs and practices, thereby shedding light on the ways in which gardening might be woven into modern teaching methods.

Numerous academics have emphasized the potential of school gardening in cultivating a sense of ecological duty and refining skills like collaboration, critical thinking, and problem-solving (Klemmer, Waliczek, & Zajicek, 2005; Skelly & Bradley, 2000). However, the nexus between home gardening and teacher education remains largely uncharted territory. This inquiry aspires to fill this void, enriching the existing understanding of how gardening practices can impact educational approaches and results.

Various studies have accentuated the positive impact of gardening within educational contexts. It has proven to augment students' awareness of nutrition, enhance healthy eating behaviors, and build competencies in problem-solving, accountability, and cooperation (Ozer, 2007). Moreover, the inclusion of gardening offers a tangible way to make learning more stimulating and pertinent to real-life situations (Blair, 2009).

Yet, these merits notwithstanding, the fruitful integration of gardening into schools calls for the endorsement and active involvement of teachers. Previous studies affirm that the beliefs and attitudes of teachers are decisive in the execution of gardening initiatives (Waliczek, Logan, & Zajicek, 2003). Therefore, grasping the perspectives and preparedness of pre-service teachers who are on the verge of entering the field becomes essential.

Various elements might shape the attitudes of pre-service teachers towards gardening, such as their own experiences with gardening, their educational history, and their confidence in conducting gardening exercises (Ray, Wei, & Barrett, 2013). Nevertheless, there exists a noticeable gap in research that concentrates specifically on their viewpoints, rendering this investigation a noteworthy addition to the discipline.

By gaining insight into how aspiring teachers perceive home and school gardening, valuable information can be gleaned to guide the creation and execution of teacher training programs. This could empower the next wave of educators with the know-how and assurance required to employ gardening as an instructional asset. Ultimately, this research has the potential to sow the seeds for a fresh cohort of educators eager and prepared to incorporate gardening into their educational methodologies.

One of the innovative teaching tools and strategies that educators integrate into hands-on activities in a diversity of interdisciplinary, standards-based lessons is gardening. With the help of gardening, teachers can engage their children by giving them a lively setting in which to watch, learn, experiment, and grow. As opposed to using textbook examples, it serves as a living laboratory where lessons can be learned through actual situations (Fisher-Maltese & Zimmerman, 2015; Relf, McDaniel, & Butterfield, 1992). It is where student participation in the learning process will be more active. Students' knowledge of plant and animal life cycles, ecosystems, and the sources and nutritional value of food all grow as a result of gardening activities (Chan, Tan, & Yun, 2022). While doing so, students pick up lifelong, useful horticulture skills. Lastly, according to Van Den Berg and Custers (2011), gardening activity is advantageous because it is a therapeutic and stress-relieving activity, and based on their research, results show that participants improve

their mood positively after gardening activity. However, Blair's study (2009) demonstrates that children's environmental attitudes or social behavior did not consistently improve with gardening.

One of the major ways to survive, especially in rural areas, is agricultural production. Farming was certainly helpful during the Covid-19 pandemic when a great number of job opportunities closed. This was the time when people realized how important agriculture is for survival (Farm Schools, n.d.). Hence, gaining one type of farming can be a good source of food production and can be of help to everyone during times of uncertainty.

The concept of school gardening originated in Europe and arrived in the United States in the 1890s. In the 20th century, school gardening in the United States had sprung up with the intention of helping increase the supply of food during World War I and World War II (Lawson, 2005). In the 1790s, the first botanical garden in Manila was conceived by Juan de Cuellar, a Spanish botanist (Madulid, n.d.). From then on, gardening was noticeable in all houses, buildings, and most especially in both private and public schools.

In Basic Education, teachers, students, and stakeholders collaborate to maintain a botanical, vegetable, and ornamental garden within the school's vicinity. This program was supported and accepted as part of the Basic Education Curriculum by the Department of Education (DepEd) until the recent 21st century. In fact, the DepEd has continually encouraged and supported all schools that have "Gulayan sa Paaralan" (Vegetables in School) with the purpose of helping the students and pupils alike to have a good supply of nutritious food in their locality. According to the DepEd Secretary, Leonor Magtolis Briones, "I am very happy that we are establishing farm schools. I promise to support this proposal because, through farm schools, we provide not only for our physical needs as people in terms of nutritious food but also beauty" (Department of Education, n.d.).

Similarly, the concept of school gardening is to develop students' habits of eating vegetables instead of junk foods displayed in their respective school canteen. The study by Lineberger and Zajicek (2000) shows that students had more positive attitudes toward fruit and vegetable snacks after gardening (Childs, 2011). This can also improve the nutritional condition and dietary habits of the students and may somehow contribute to the scarcity of food in the community and nutrition security (Draper & Freedman, 2010). Gardening can also be promoted as a learning site for students' entrepreneurship. Studies show that participants appreciated the non-tangible advantages of food gardening highly, frequently even more so than the production of food such as relaxation, contentment, and fulfillment (Zahina-Ramos, 2013). In fact, the move of the Department of Education (DepEd) is in support of the Republic Act 10618, also known as the Rural Farm Schools Act, which is to promote the opening of at least one public rural farm school in each province across the nation (Official Gazette of the Republic of the Philippines, n.d.)

One of the basic training or programs offered by Higher Education Institutions is practical and industrial art. This training comprises Technology and Livelihood Education (TLE) programs. At present, TLE is one of the subjects in the Basic Education Curriculum where gardening is one of its major topics. However, TLE is only one of the major programs in Higher Education Institutions. There are programs that do not emphasize gardening in their specific curriculum.

The challenge of gardening posed in the country is that teachers who are non-TLE specialists obviously lack the necessary skills to teach and encourage students to make gardens at home and school. This lack of gardening skills by the teachers will result in low practice and attitudes towards gardening among students and teachers in school.

As part of the higher education institution, and as mandated by the Environment and Green Technology Education Hub in the country, Philippine Normal University Visayas (PNUV) aims to train pre-service teachers who are stewards of the environment and to be stewards of the environment as to know how to make use of the environment to help other people in terms of healthy food production. To produce healthy food is to teach the pre-service teachers the necessary skills in gardening so that they may be able to share their knowledge on gardening with their future students and schools.

The study titled “Home and School Gardening: Practices, Attitudes, and Beliefs of Pre-Service Teachers” endeavors to investigate the perceptions and approaches of pre-service teachers towards gardening both at home and within school environments. These practices are being considered increasingly important, as they provide experiential learning opportunities for students, connecting them with nature and encouraging holistic development (Blair, 2009).

It is with the premises mentioned above that this study should be conducted to know the practices, attitudes and belief of pre-service teachers of PNU Visayas towards gardening.

1.1. Statement of the problem

Specifically, it sought to answer the following research questions:

1.1.1. What are the home and school gardening practices of pre-service teachers?

1.1.2. What is the level of attitudes and beliefs towards home and school gardening of pre-service teachers when taken as a whole and when grouped according to sex and type of community?

1.1.3. Are there significant differences in the level of attitudes and beliefs towards home and school gardening of pre-service teachers when grouped based on sex and type of community?

1.1.4. Is there a significant relationship between the attitude and beliefs of the pre-service teachers towards school and home gardening?

1.2. Hypothesis

The study tested the following hypotheses:

1.2.1. There are no significant differences in the level of attitudes and beliefs towards home and school gardening of pre-service teachers when grouped based on sex and type of community.

1.2.2. There is no significant relationship between the attitude and beliefs of the pre-service teachers towards school and home gardening.

1.3. Scope and limitations of the study

This study was conducted on the First Term of the Academic year 2019 - 2020 at the Philippine Normal University (PNU) Visayas. The participants of the study were the graduating pre-service teachers of the university. The study focused on determining the practices, beliefs, and attitudes of the graduating pre-service teachers of PNU Visayas. A validated researcher-made instrument was generated through Google Forms and was sent to target respondents.

1.4. Significance of the study

The results of this study may help curriculum makers in the inclusion of home and school gardening in the content of teacher education. Furthermore, the results may benefit Higher Education Institutions (HEIs) in the Philippines to encourage their pre-service teachers to indulge themselves in practical yet sustainable practices such as gardening.

2. Theoretical basis

The study “Home and School Gardening: Practices, Attitudes, and Beliefs of Pre-Service Teachers” examines how pre-service teachers perceive and engage with gardening’s many elements. In order to completely address the mentioned study goals, the following theories were used to offer the theoretical framework for the paper.

The foundation of learning, according to Kolb’s (1984) Experiential Learning Theory, is experience. Hence, this theory can be used to understand pre-service teachers’ gardening practices since it emphasizes the value of real-world, hands-on experiences in the learning process.

On the other hand, the Theory of Planned Behavior (TPB) developed by Ajzen (1991) can be used to assess pre-service teachers’ attitudes and beliefs on home and school gardening. The theory can help illuminate how teachers’ gardening practices are influenced by their beliefs, arbitrary norms, and perceptions of behavioral control.

The Social Learning Theory, put forth by Bandura (1986), stresses how social interactions and observational learning affect people’s behavior and attitudes. This theory offers a theoretical framework for investigating how pre-service teachers’ attitudes and ideas about gardening are influenced by their personal experiences, observations of other educators, and early exposure to gardening techniques. Effective gardening pedagogies can be included in teacher education programs to benefit pre-service teachers by recognizing the significance of observational learning in the building of attitudes and beliefs. Similarly, the Community of Practice Theory (Wenger, 1998), which emphasizes the social learning that happens when individuals with similar interests work together over time, can be used to comprehend how community type affects gardening.

3. Methodology

3.1. Research design

The descriptive research design was considered the most appropriate for this study. A descriptive study design aims to deliberately collect information to describe a phenomenon, situation, or population. More specifically, it helps in addressing the research problem’s what, when, where, and how questions rather than its why (Yazon, Buenvenida, & Callo, 2019). Likewise, this design is appropriate for describing the characteristics of a large population (Fraenkel, Wallen, & Hyun, 2012). According to Creswell and Creswell (2018), descriptive research entails gathering information in order to respond to inquiries regarding the subject’s current state. Additionally, Fraenkel et al. (2012), said that this approach to study is used to learn more about a group of people’s preferences, attitudes, habits, worries, or interests.

3.2. Respondents of the study

The participants of the study were the randomly selected 150 graduating pre-service teachers of the Philippine Normal University Visayas.

3.3. Sampling technique

Using simple random sampling, participants in the research were picked at random from the total population, with each person having an equal chance of being selected for the sample. Each potential sample of a given size has an equal probability of being chosen (Yazon et al., 2019). The population of the research was identified by the recovered replies obtained from the Google Forms that were issued to the intended respondents since the survey was done online.

3.4. Research instruments

This study used a researcher-made instrument. The instrument was divided into four (4) parts; the first part is all about the demographic profile of the respondents. The second part deals with the practices of the pre-service teachers in home and school gardening. The third part deals with the attitudes of the pre-service teachers towards home and school gardening, while the last part deals with the beliefs of the preservice teachers towards home and school gardening.

The researcher-made instrument underwent validation. There were three (3) experts in the field of this study who validated the instrument. The validation instrument developed by Good and Scates was used by the experts in judging the content of the researcher-made instrument. The validators were expected to delete, revise, and improve the questionnaire to suit the needs of the study. The result of validity is 4.3 which means that the validators strongly agree on the items of the questionnaire.

After the validity test, the researcher conducted a one-shot reliability test. Reliability testing was done by distributing the questionnaire to a group of preservice teachers from another university. The researcher himself distributed the questionnaire and retrieved it after the administration. Cronbach's Alpha was used in determining the reliability of the instrument. Cronbach's alpha is 0.760, which indicates a high level of internal consistency.

3.5. Data gathering procedure

When the instrument was ready, the researcher sought permission from the university to conduct a study through a thru-channel letter. Next, when permission was granted, the researcher furnished a copy of the letter to the advisers of the pre-service teachers to facilitate the distribution of the Google Form link of the questionnaire. All selected respondents were told to answer the questionnaire using their android phones or their laptop. After this, the research retrieved the responses of the respondents in the Google Drive. The researcher retrieved the tallied and consolidated, results for the Google Sheets and organized the data based on the statement of the problem.

3.6. Statistical treatment of data

The retrieved results were subjected to statistical analysis to have a quantitative answer to the problem. Below are the statistical tools used in answering the problems set forth in this study:

To determine the home and school gardening practices of pre-service teachers, percentage were used, while the mean and standard deviation were used to determine the level of attitudes and beliefs on home and school gardening of pre-service teacher's when taken as a whole and when grouped according to sex and type of community. On the other hand, a t-test of independent sample means and One-way ANOVA were used to determine the significant difference in the pre-service teacher's beliefs and attitudes towards home and school gardening in terms of sex and geographical location, respectively. Lastly, the Pearson r correlation was used to determine the association between the beliefs and attitudes of the pre-service teachers towards home and school gardening.

4. Result and discussion

This section presents the table of results and a discussion of the findings on the attitudes and beliefs of pre-service teachers towards home and school gardening.

4.1. Result

Table 1 shows the gardening practices of the pre-service teachers in terms of tending a garden. Results revealed that the common gardening practices of the pre-service teachers are watering the plant (91.3%), weeding (83.3%), cultivating the soil (80.0%), and spraying organic pesticides (75.3%). The results would mean that the participants are doing the right way of tending the plants in their garden similar to what they are doing in their farm.

On the other hand, the results also reveal that there are 63 (42.0%) of the participants apply inorganic fertilizer, and 21 (14.0) of them spray chemical pesticides. This result would mean that there are few participants who are still advocating the use of inorganic fertilizers and chemicals.

Table 1

Gardening practices of pre-service teachers in terms of tending a garden

Category	n(150)			
	YES	Percentage	NO	Percentage
1. Practice Composting	79	53%	71	47%
2. Using Compost as Fertilizer	86	57%	64	43%
3. Applying Inorganic Fertilizer	63	42%	87	58%
4. Checking for Pest	92	61%	58	39%
5. Spraying Chemical Pesticides	21	14%	129	86%
6. Spraying Organic Pesticides	113	75%	37	25%
7. Cultivating the Soil	120	80%	30	20%
8. Watering the Plant	137	91%	13	9%
9. Weeding	125	83%	25	17%
10. Providing Trellis for Plant	70	47%	80	53%
11. Providing Shed-nets	44	29%	106	71%
12. Performing Crop Rotation	46	31%	104	69%

Table 2 shows the attitudes of the pre-service teachers towards gardening.

Generally, the attitudes of the pre-service teachers toward gardening are high ($M = 3.95$; $SD = 0.72$). When each of the items in the category was rated, the pre-service teachers had very high attitudes towards seeing plants growing in their garden ($M = 4.42$; $SD = 0.80$) and seeing their schools surrounded by a garden ($M = 4.33$; $SD = 0.85$).

On the other hand, pre-service teachers responded that they are proud of their dirty hands because of gardening ($M = 4.13$, $SD = 0.89$), they love taking care of the plants ($M = 4.11$, $SD = 0.87$), they value the importance of gardening ($M = 4.05$, $SD = 0.83$), they feel good while planning vegetables and other plans in their garden ($M = 4.01$, $SD = 0.97$), the feel decompressed in the garden after classroom activities ($M = 3.33$, $SD = 0.92$), they also value gardening as it teaches them to be cooperative ($M = 3.87$, $SD = 0.86$), they are happy working in the garden ($M = 3.95$, $SD = 0.94$).

Table 2

Mean and standard deviation on the extent of agreement of pre-service teachers' attitudes toward gardening

Pre-service Teachers' Attitudes on School Gardening	M	SD
1. I enjoy doing school gardening	3.63	1.03
2. I enjoy cultivating the soil	3.59	0.99
3. I love taking care of the plants	4.11	0.87
4. I love gardening because it teaches me to become responsible	4.01	0.94
5. I feel good planting vegetables and other plants	4.01	0.97
6. I feel decompressed in the garden after my classroom lessons	3.33	0.92
7. I value the importance of gardening	4.05	0.83
8. I value gardening because it teaches me to cooperate	3.87	0.86
9. I am happy working with plants	3.95	0.94
10. I am proud of my dirty hands because of gardening	4.13	0.89
11. I like seeing my school surrounded by a garden	4.33	0.85
12. I like seeing plants grow in my garden	4.41	0.80
Total	3.95	0.72

Note: 4.20 - 5.00 Very High (Most inclined to gardening); 3.40 - 4.19 High (More inclined to gardening); 2.60 - 3.39 Moderate (Inclined to gardening); 1.80 - 2.59 Low (Less inclined to gardening); 1.00 - 1.79 Very Low (Least inclined to gardening)

Table 3 shows the beliefs of pre-service teachers on school gardening.

Generally, the pre-service teachers' beliefs on home and school gardening is very high ($M = 4.35$, $SD = 0.58$).

Pre-service teachers highly believe that pre-service teachers should learn how to manage school gardening ($M = 4.42$, $SD = 0.71$) and that teachers in education institutions should train pre-service teachers in gardening ($M = 4.28$, $SD = 0.71$). They also believed that school gardening helps in controlling global warming ($M = 4.61$, $SD = 0.65$); it is a healthy habit, ($M = 4.55$, $SD = 0.70$), it beautifies the school ($M = 4.65$, $SD = 0.63$), it offers another affordable solution to food cost ($M = 4.45$, $SD = 0.74$) it is a fun activity ($M = 4.27$, $SD = 0.82$) and it contributes to environmental conservation ($M = 4.53$, $SD = 0.75$).

On the other hand, they also believe that gardening is everyone's obligation ($M = 4.03$, $SD = 0.98$), working in the garden helps them feel better about themselves ($M = 4.09$, $SD = 0.87$) (Malik, 2020), it is spiritually and emotionally rewarding ($M = 4.16$, $SD = 0.84$), and it can be integrated into the content subjects in the basic education ($M = 4.14$, $SD = 0.92$).

It can be gleaned from the results that the pre-service teachers' that school and home gardening is essential to them, and to all other pre-service teachers. This is a manifestation that they do not only value academics but also skills for a sustainable future (Yahampath, 2023).

Table 3

Mean and standard deviation on the extent of pre-service teachers' beliefs on school gardening

Pre-service teachers' beliefs on school gardening		M	SD
1.	Pre-service teachers should learn how to manage school gardening	4.42	0.71
2.	Teacher Education Institutions should train the students about gardening	4.28	0.77
3.	School gardening helps in controlling global warming	4.61	0.65
4.	Gardening is a healthy habit	4.55	0.70
5.	Gardening beautifies the school	4.65	0.63
6.	Gardening is everyone's obligation	4.03	0.98
7.	Gardening offers another affordable solution to food costs	4.45	0.74
8.	Gardening is a fun activity	4.27	0.82
9.	Working in the garden helps me feel better about myself	4.09	0.87
10.	Gardening is spiritually and emotionally rewarding	4.16	0.84
11.	Gardening contributes to environmental conservation	4.53	0.75
12.	Gardening can be integrated into the content subjects	4.14	0.92
Total		4.35	0.58

Note: 4.20 - 5.00 Very High (Most inclined to gardening); 3.40 - 4.19 High (More inclined to gardening); 2.60 - 3.39 Moderate (Inclined to gardening); 1.80 - 2.59 Low (Less inclined to gardening); 1.00 - 1.79 Very Low (Least inclined to gardening)

Table 4 shows the Mean and Standard Deviation of the attitudes of pre-service teachers towards home and school gardening as a whole and when grouped according to sections.

Generally, the attitudes of the pre-service teachers towards home and school gardening is high ($M = 3.95$, $SD = 0.720$). This means that the pre-service teachers are more inclined to tending a garden both at school and at home.

When sex is considered, both male and female group have a high attitude towards gardening ($M = 4.16$, $SD = 0.667$), ($M = 3.89$, $SD = 0.741$). Results only proves that sex differences is not an issue among the pre-service teachers' attitudes towards school and home gardening, though males registered higher mean than females.

When the type of community is considered, respondents living in rural areas, have high attitudes towards gardening ($M = 4.03$, $SD = .0.667$). Also, respondents from urban community have high attitudes towards gardening ($M = 3.96$, $SD = 0.703$). Likewise, respondents living both in coastal rural and coastal urban display a high attitude towards gardening ($M = 3.49$, $SD = 1.055$), and ($M = 3.67$, $SD = 0.565$).

Respondents from rural areas registered higher mean than those in the urban may be because pre-service teachers in the rural have greater opportunity of having a garden considering the availability of space and type of soil where plants survive.

These results show that pre-service education pre-service teachers of Philippine Normal University Visayas have a positive attitude towards making and tending a garden both at home and in school.

Table 4

Mean and standard deviation on attitudes of pre-service teachers towards home and school gardening

Category	n	M	SD
Entire Category	150	3.95	0.720
Sex			
Male	33	4.16	0.603
Female	117	3.89	0.741
Types of Community			
Rural	79	4.03	0.667
Urban	56	3.96	0.703
Coastal rural	11	3.49	1.059
Coastal urban	4	3.67	0.565

*Note: 4.20 - 5.00 Very High (Most inclined to gardening); 3.40 - 4.19 High (More inclined to gardening); 2.60 - 3.39 Moderate (Inclined to gardening); 1.80 - 2.59 Low (Less inclined to gardening); 1.00 - 1.79 Very Low (Least inclined to gardening)

Table 5 shows the Mean and Standard Deviation of the beliefs of pre-service teachers toward home and school gardening.

Generally, the beliefs of the pre-service teachers towards gardening is very high ($M = 4.35$, $SD = 0.581$). This means that pre-service teachers looked home and school gardening is very important in their life and in the community.

When the sex of the respondents is considered, both groups, male and female, get very high belief in home and school gardening ($M = 4.21$, $SD = 0.786$), and ($M = 4.41$, $SD = 0.503$). Although female has a higher mean than males, these results show that both sexes display the same level of belief in home and school gardening.

When the type of community is considered, both rural and urban have a very high belief in gardening ($M = 4.38$, $SD = 0.630$) and ($M = 4.40$, $SD = 0.492$). Likewise, when coastal rural and urban are considered, respondents living in coastal urban have a very high belief in gardening ($M = 4.42$, $SD = 0.236$), while respondents living in coastal rural have only a high belief in gardening ($M = 3.84$, $SD = 0.568$). These results mean that regardless of the type of community, respondents believe so highly that gardening is important in their lives and in the community.

Table 5

Mean and standard deviation on beliefs of pre-service teachers towards home and school gardening

Category	n	M	SD
Entire Category	150	4.35	0.581
A. Sex			
Male	33	4.21	0.786
Female	117	4.39	0.509
B. Types of Community			

Category	n	M	SD
Rural	79	4.38	0.630
Urban	56	4.40	0.492
Coastal rural	11	3.84	0.568
Coastal urban	4	4.42	0.236

*Note: 4.20 - 5.00 Very High (Most inclined to gardening); 3.40 - 4.19 High (More inclined to gardening); 2.60 - 3.39 Moderate (Inclined to gardening); 1.80 - 2.59 Low (Less inclined to gardening); 1.00 - 1.79 Very Low (Least inclined to gardening)

Table 6 shows the t-test results of the home and school gardening attitudes of the pre-service teachers in terms of sex.

The results suggest that although males ($M = 4.16$, $SD = 0.603$) had a slightly higher mean score on attitudes towards home and school gardening than females ($M = 3.89$, $SD = 0.741$), this difference was not statistically significant at the 0.05 level $t(148) = 1.904$, $p = .059$. Thus, based on this data, it may be concluded that sex does not appear to be a significant factor in shaping the attitudes of pre-service teachers towards home and school gardening. Any observed difference could likely be due to random variation within the samples.

Table 6

t-test results on the home and school gardening attitudes of the pre-service teachers in terms of sex

Compared Groups	DF	Mean	SD	t-ratio	t-prob
Sex					
Male	148	4.16	0.603	1.904	.059
Female		3.89	0.741		

$P > .05$ Not Significant at .05 alpha

Table 7 shows the t-test results on the home and school gardening beliefs of the pre-service teachers in terms of sex.

Results reveal that the home and school gardening beliefs of male ($M = 4.21$, $SD = 0.786$) and female ($M = 4.39$, $SD = 0.509$) pre-service teachers do not statistically differ from each group $t(148) = -1.595$, $p = 0.113$. The t-test did not find enough evidence to reject the null hypothesis, which means that any observed difference in mean scores between the groups could be due to random chance rather than a true difference in beliefs related to gardening.

Table 7

t-test results on the home and school gardening beliefs of the pre-service teachers in terms of sex

Compared Groups	DF	Mean	SD	t-ratio	t-prob
Sex					
Male	148	4.21	0.786	-1.595	0.113
Female		4.39	0.509		

$P > .05$ Not Significant at .05 alpha

Table 8 shows the One-Way ANOVA results on the differences in the beliefs on gardening of preservice teachers in terms of their geographical locations.

Results reveal that there is a significant difference among the geographical locations of the pre-service teachers in their beliefs on gardening ($F(3,146) = 3.158, p = 0.27$). This means the geographical locations of the preservice teachers may have influenced their beliefs towards home and school gardening, as shown in Table 8.

Table 8

One-Way ANOVA results on the differences in the beliefs on gardening of pre-service teachers in terms of their geographical location

<i>Source of Variance</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>P.</i>
Between Groups	3	3.093	1.031	3.158	.027
Within Groups	146	47.653	.326		
Total	149	50.746			

$P > .05$ Not Significant at .05 alpha

On the other hand, a Post hoc analysis was performed using the scheffe post-test to identify exactly where significant difference exist. The analysis revealed that the practices of pre-service teachers living in rural and coastal-rural significantly differ $F(3,146) = 0.039$, as well as those living in urban and coastal-rural $F(3,146) = 0.034$.

The beliefs about home and school gardening among pre-service teachers do not significantly differ between the other location pairs (rural vs. urban, rural vs. coastal urban, urban vs. coastal-urban, coastal-rural vs. coastal-urban) as shown in Table 9.

These findings suggest that the geographical location (particularly the distinction between coastal rural and other areas) significantly affects the beliefs about home and school gardening among pre-service teachers. Further qualitative research may be required to explore why these differences exist.

Table 9

Post Hoc Tests (Scheffe) on the beliefs of the pre-service teachers in terms of home and school gardening

Dependent Variable	(I) Geographical Location	(J) Geographical Location	Mean Difference (I-J)	Std. Error	Sig.
Beliefs	rural	urban	-.02458	.09980	.996
		coastal rural	.53778*	.18386	.039
		coastal urban	-.03797	.29280	.999
	urban	coastal rural	.56236*	.18842	.034
		coastal urban	-.01339	.29568	1.000
		coastal rural	coastal urban	-.57576	.33357

*. The mean difference is significant at the 0.05 level

Table 9 presents the results of a One-Way Analysis of Variance (ANOVA) that examined whether there are any significant differences in the attitudes of pre-service teachers towards home and school gardening across different geographical locations. The results indicate no significant difference ($F(3,146) = 2.052, p = .109$).

The F-value of 2.052 is a ratio of the variance between the groups (different geographical locations) and the variance within the groups (individual differences in attitudes within each geographical location). A non-significant p-value of .109 means that the observed variance between the groups is not statistically significant, and it could have occurred by chance (Field, 2013).

These findings suggest that geographical location does not influence pre-service teachers' attitudes toward home and school gardening. This can have essential implications for educational policy and practice. It might suggest that a uniform approach to cultivating positive attitudes toward gardening could be effective across various regions, without the need for location-specific interventions (McMillen, Swick, Frazier, Bishop, & Goodell, 2019).

The result aligns with some studies that have shown that attitudes toward environmental practices may be more influenced by education, culture, or personal beliefs rather than geographical locations (Williams & Dixon, 2013). However, this contradicts others, suggesting that geographical location may influence attitudes toward specific environmental practices, like recycling (Jones, Comfort, & Hillier, 2011).

The study's non-significant finding could be due to various factors such as the limited variability in geographical locations, the scale used to measure attitudes, or other confounding variables that were not controlled. Future research might consider a broader range of geographical locations or investigate other demographic or contextual factors that could influence attitudes toward gardening (Williams & Dixon, 2013).

Table 10

One-Way ANOVA results on the differences in the attitudes on gardening of pre-service teachers in terms of their geographical location

<i>Source of Variance</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>P.</i>
Between Groups	3	3.124	1.041	2.052	.109
Within Groups	146	74.090	.507		
Total	149	77.214			

P > .05 Not Significant at .05 alpha

Table 10 presents the Pearson correlation coefficient (r) results of the relationship between the beliefs and attitudes of pre-service teachers towards home and school gardening, indicating a statistically significant correlation of $r = .602, p = .000$.

A Pearson correlation coefficient of $r = .602$ is a moderately strong positive correlation (Cohen, 1988). This value shows that as beliefs towards home and school gardening increase, attitudes towards them also tend to increase, and vice versa. The p-value of .000 indicates that this relationship is statistically significant, providing confidence that the correlation is not a result of random chance (Field, 2013).

The finding that beliefs and attitudes of pre-service teachers towards home and school gardening are significantly associated aligns with the broader literature. According to Bandura's (1986) Social Cognitive Theory from 1986, beliefs have a big impact on attitudes and behaviors. In this situation, pre-service teachers are more likely to have good attitudes regarding incorporating gardening into educational settings if they have positive opinions about it.

For the purpose of developing educational policies and curricula, understanding this association is crucial. According to research (McMillen et al., 2019), developing favorable ideas about home and school gardening among pre-service teachers can result in good attitudes toward implementing these practices in classrooms. In order to build an educational climate that prioritizes sustainability, environmental stewardship, and hands-on learning, education programs could incorporate gardening-related training (Williams & Dixon, 2013).

The study does have certain restrictions, though. Further investigation is required to see how these beliefs and attitudes translate into real teaching practices because the sample could not be representative of all pre-service teachers. A more sophisticated view may also result from taking into account other factors, such as individual gardening experiences or environmental beliefs (Childs, 2011).

Table 11

Pearson r Results on the relationships of the beliefs and attitudes of the pre-service teachers towards home and school gardening

Correlations		Beliefs about home and school gardening	Attitudes towards home and school gardening
Beliefs towards home and school gardening	Pearson Correlation	1	.602**
	Sig. (2-tailed)		.000
	N	150	150
Attitudes towards home and school gardening	Pearson Correlation	.602**	1
	Sig. (2-tailed)	.000	
	N	150	150

** . Correlation is significant at the 0.01 level (2-tailed)

4.2. Discussion

This section discusses the key findings of the study.

In the current study, pre-service teachers' habits, attitudes, and beliefs regarding gardening at home and in the classroom were examined. It also looked into how these variables were influenced by things like sex and geography. This discussion provides an overview of the key findings, situates them within the context of recent research, and sheds light on their instructional implications.

4.2.1. Practices in tending the garden

The research revealed that most pre-service teachers perform various horticultural duties, including watering, weeding, and soil cultivation. The outcomes also showed an intriguing fusion of organic and inorganic methods. In contrast to the majority of households that use organic

pesticides, 42% of households use inorganic fertilizers. This highlights the significance of educating people about sustainable gardening practices given the potential adverse impacts of synthetic chemicals on the ecosystem (WWF, 2019).

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4.2.3. Attitudes and beliefs towards gardening

Pre-service teachers were found to have primarily positive attitudes toward gardening, scoring highly in categories including enjoyment and respect for gardening skills and advantages (Williams & Dixon, 2013; Yahampath, 2023). This backs up an earlier study that emphasized the significance of adopting a positive outlook toward environmental actions, such as gardening (Hutchinson et al., 2015).

According to the study's findings, pre-service teachers understand the value of gardening in terms of curbing global warming, encouraging healthy lifestyles, and protecting the environment (Canaris, 1995). These results mirror a more general trend in society toward environmental consciousness and opine that pre-service teachers may be in a good position to further these ideals in their future pedagogical endeavors.

4.2.4. Influence of sex and geographical location

Examining how demographic characteristics might affect attitudes and perceptions toward gardening was one of the study's main goals. Although views did differ slightly depending on whether a person was male or female, these differences were not found to be statistically significant (Tables 6 and 7). This supports the claim made by Draper and Freedman (2010) that attitudes regarding home and school gardening may not be significantly influenced by sex.

However, there were also noticeable changes in pre-service teachers' perceptions of gardening depending on where they lived, particularly between coastal-rural and other places (Table 8). The Post hoc analysis highlighted the particularity of coastal-rural ideas about gardening by focusing on these distinctions further. Further qualitative investigation may be necessary to determine the precise causes of this disparity, maybe focusing on regional customs, shared values, or other environmental factors that may have an impact on beliefs.

In contrast, the attitudes towards gardening did not show any significant differences across geographical locations (Table 11). This is an important finding for educators and policy-makers, as it implies that standardized approaches to promoting gardening in educational settings might be equally effective across different regions. It aligns with certain studies (Williams & Dixon, 2013), but contradicts others (Jones et al., 2011), pointing to the complex interplay of factors influencing environmental attitudes.

4.2.5. Relationship between beliefs and attitudes

A significant correlation was found between beliefs and attitudes towards home and school gardening (Table 11). This finding has valuable implications for educational practice,

emphasizing that cultivating positive beliefs may lead to more positive attitudes and, hence, more effective integration of gardening into educational settings (McMillen, Swick, Frazier, Bishop, & Goodell, 2019).

4.2.6. *Limitations and future directions*

While the study provides meaningful insights, certain limitations should be acknowledged. The sample may not encompass the full diversity of pre-service teachers, and the translation of beliefs and attitudes into actual teaching practices remains unexplored. Future studies might consider broadening the geographical scope, exploring personal gardening experiences, or examining how these attitudes and beliefs are actually applied in the classroom.

5. **Conclusions & recommendations**

The purpose of the study is to determine the practices, attitudes, and beliefs of pre-service teachers towards home and school gardening. Based on the findings of the study, it can be concluded that pre-service teachers show interest in home and school gardening and they believe that gardening is important and that it has an imperative role in the environment and to humans. As a result, they exude a positive attitude towards it. This positive response of the pre-service teachers is an important indicator that they could be an effective agent for promoting home and school gardening. It shows that they care for plants and that they develop good values as humans. Their strong belief in the importance of gardening shows that they are aware of the role of gardening in their lives and in the environment and that it is their responsibility as pre-service teachers to develop skills in gardening. As future teachers, they can influence their students with their love for gardening and appreciate the value of gardening among them. With this positive attitudes and strong beliefs in home and school gardening and with actual practice in gardening, pre-service teachers can provide solutions to the emerging problems of limited food supply and environmental degradation.

The positive findings of the study provide good information for promoting home and school gardening. However, the positive attitude and beliefs of the pre-service teacher will be futile if Teacher Education Institutions do not include the value of gardening in the curriculum. There is a need to integrate gardening into teacher education courses, emphasizing the importance and role of gardening in the environment. Likewise, there is a need to intensify the practice of home and school gardening among pre-service teachers through the provision of school spaces as gardening areas and train pre-service teachers to educate young minds about the value and appreciation of home and school gardening.

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Philippine Normal University Pre-service Teachers.

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