Original Research Article

ACTION COMPETENCE TOWARDS ENVIRONMENTAL CITIZENSHIP OF COLLEGE OF TEACHER EDUCATION STUDENTS

ABSTRACT

This correlational study investigated the relationship between action competence and environmental citizenship in the context of teacher education. A sample of 324 teacher education students at the University of Mindanao, Philippines were selected as respondents, and they completed a modified survey instrument that collected data on their levels of action competence and environmental citizenship. The analysis of descriptive statistics using mean scores revealed high levels of both action competence and environmental citizenship. The results also determined teacher education students' willingness to act and sustainability as key indicators of their action competence and environmental citizenship, respectively. Pearson's r correlational analysis showed a significant positive relationship between the two variables indicating that students with higher levels of action competence were more likely to exhibit environmental citizenship behaviors. These findings suggest that action competence is an important factor in fostering environmental citizenship among teacher education students. The researchers described these results in relation to their implications for curriculum design, pedagogical approaches, and policy development, highlighting the importance of integrating sustainability education into teacher preparation programs to nurture action competence and empower future educators to contribute effectively to sustainable development efforts.

Keywords: sustainable development, environmental citizenship, action competence, willingness to act, teacher education students, Philippines

INTRODUCTION

The world faces an array of pressing environmental problems, each with far-reaching consequences for planetary health and future. Severe effects of climate change, resource depletion, and biodiversity loss will have far reaching implications, threatening human survival on Earth (Intergovernmental Panel on Climate Change, 2021). Changes in one part of the world can have irrevocable effects elsewhere, for these complex environmental challenges are linked to broader societal concerns such as poverty, inequality, and conflict (United Nations, 2019). The efforts towards achieving environmental goals have largely been failing around the world. Therefore,

the focus must shift to mitigation and adaptation (United Nations Environment Programme, 2022). Addressing these challenges requires a paradigm shift in how individuals and communities perceive and embrace environmental citizenship, which can play a crucial role in achieving sustainable development.

Raising environmental citizenship competences primarily happens in environmental education, a critical foundation for environmental skills and values. According to Mihail and Mihaila (2017), the focus on a new paradigm shift should be empowering citizens to make informed decisions and develop a valued personal responsibility for the sustainable use and protection of the environment. This can be achieved through targeted of educational and capacity-building literacy projects that improve citizens understanding of environmental issues and interconnectedness of human and natural values (Gan, 2021). Sustainable initiatives highlighting active citizenry consistently establishes environmental citizenship as a critical and foundational approach.

Consequently, Parra et al. (2020) reinforces the significance for environmental citizenship as a relevant indicator of pro-environmental behavior, serving as a transformative bridge between passive awareness and result-oriented engagement. However, the effectiveness of these programs in fostering environmental citizenship remains a significant concern. Bourn (2017) underscores the significance of several factors influencing the success of these programs in addressing contemporary environmental issues, including the quality of the programs and the adequacy of teacher training, along with the need for a paradigm shift towards sustainability. Therefore, understanding the current level of environmental citizenship among teacher education students and investigating how their general competences and action skills

related to social, civic, and environmental responsibility should be further developed for tangible outcomes to be measured (Činčera et al., 2020; Ardoin et al., 2020).

In looking for effective ways to integrate critical citizenship with environmental responsibility, the approach in environmental citizenship research focuses on action-based learning. Adombent, Hiller, and Fröhlich (2020) found evidence that implementing environmental projects intended at developing their environmental citizenship was an effective approach to bring about direct changes in their sustainable behavior. In Portugal, Baptista et al. (2018) were able to determine the skills, most prominently cooperation, problem solving, and causal reasoning, among students in seeking sustainable solutions after being exposed with environmental citizenship-oriented projects. Hence, providing opportunities for action and exhibiting a greater sense of interconnection and interdependence strongly deepens the connection to environmental values.

Through a combination of different methods, the dynamic interplay between education and hands-on involvement reinforces the connection between environmental responsibilities and active citizenship. According to Ariza et al. (2021), the most significant aspects of environmental citizenship that needs to be at the heart of the educational training is to teach curriculum in action, i.e., linking the school curricula with environmental goals and culminating goals into transferable outcomes. Likewise, Wals and Jickling (2019) emphasize the importance of participation in sustainability-related activities as a critical aspect of environmental citizenship. Therefore, establishing a reliable framework in evaluating action competences significantly contributes to the understanding of teacher ability to effectively demonstrate action in the context of citizenship.

Research has previously established a connection between action competence, environmental citizenship, and outcomes for pro-environmental behavior. One study discovered that university students who identified as environmental citizens were more inclined to democratic participation in conservation and sustainable practices, such as joining environmental organizations. Correspondingly, another study confirmed that individuals who possessed higher levels of action competence were more likely to demonstrate environmental citizenship, and this connection was explained in part by their degree of environmental experience. However, they also need more specific attention on developing practices for individual action in educational policies and frameworks (Thomas, Vasileiadou, & Ares, 2018; Chen & Wu, 2019).

More importantly, citizenship programs and action-oriented approaches must be designed to achieve specific and measurable goals that can be implemented. Husamah, Suwono, and Dharmawan (2022) highlighted many projects that emphasize people and communities implementing environmental action, such as natural renovation work, policy initiatives, and democratizing science education. In addition, environmental citizenship has helped to raise awareness about environmental issues and increase public engagement in the environmental decision-making process. Seery and Hassouna (2016) also confirmed that better environmental understanding, involvement, and maintained commitment have resulted in the development of active agents of change advocating environmental conservation within environmental education programs.

Another core dimension of environmental citizenship concerns the integration of a framework that focuses on the factors that influence individuals' willingness to engage in pro-environmental behavior. In particular, Stern, Dietz, Abel, Guagnano,

and Kalof (1999) developed the values-beliefs-norm theoretical framework to explain the motivational value related to the level of individual's openness to needed to resolve environmental problems from a citizenship perspective. When applied in the context of the present study, action values inherent in environmental citizenship have the potential to generate outcomes that foster empowering individuals to take an active role. Research from Homburg, Stolberg, and Wagner (2013) used such framework to investigate the relationship between environmental values, beliefs, and pro-environmental behavior among German adults and discovered relationships that support conservation and environmental action to concrete outcomes.

Specifically, a broad discourse on shaping the identity of a citizen and developing direct capacity to act as social change agents presents immense challenge for education. For Erlina (2021), there is evidence that warrants progressive improvement of action competences among teacher candidates, which can be measured through strategies directed to help realize their students' action-oriented outcomes. Additionally, Nugroho, Permanasari, and Firman (2021) recommends the development of evaluation models based on sustainable development to promote the spirit of collective action competence consistently and systematically in the educational context. This focus on the role of teacher candidates as catalysts of enabled action reflects the potential to establish a relational framework of citizenship using an action-oriented approach.

Moreover, existing research on environmental citizenship has never elaborated on any components of critical citizenship education, indicating the need for a more informed understanding to successfully integrate civic participation and collective action into environmental education practices. Besides that, environmental research highlights the ongoing discussion concerning the action results of environmental

citizenship, which might develop toward conflicting social action agendas. Significantly, stakeholders such as lawmakers, environmental groups, and educators have sought clear proof of meaningful, action-oriented environmental gains for over a decade. These gaps present a significant challenge for adopting solutions that effectively position action-project components in developing a citizenry equipped and motivated toward improved environmental outcomes (Hadjichambis, Reis, Paraskeva-Hadjichambi, Činčera, Pauw, Gericke, &Knippels, 2020; Schild, 2016; Ardoin, Bowers, & Gaillard, 2020).

To gain a thorough understanding of the motivators behind effective environmental action, research that successfully evaluates behaviors that might translate into components of environmental citizenship should be addressed. Environmental groups, in particular, can promote a feeling of environmental responsibility and agency in their members by infusing action competence and environmental citizenship into their messaging and programming. Most significantly, teacher candidates contribute to resolving environmental challenges by empowering future generations. Finally, practicing educators, policymakers, and environmental organizations can benefit from such research by providing evidence-based guidance on promoting sustainable behavior and civic engagement among individuals and communities.

Addressing the global call for a sustainable future requires acknowledging the factors that facilitate the development of environmental citizenship. The present research examined the correlation between action competence and environmental citizenship among teacher education students. The researchers hypothesized that no significant relationship exists between these variables. Furthermore, the results determined the level of action competence and environmental citizenship among

future teachers and, through data analysis, revealed important implications for environmental education. Henceforth, gaining a deeper understanding of the relationship between action competence and environmental citizenship can play a significant role in advancing sustainable practices and producing beneficial environmental outcomes by developing sustainability-oriented initiatives and programs that contribute to a sustainable future for our planet.

METHODS

Respondents

The present study involved a sample group of 324teacher education students, computed using a Raosoft calculator, from a total of 2,050 enrolled in the College of Teacher Education at the University of Mindanao-Main during the Second Semester of the Academic Year 2022-2023. To be included in the study, respondents had to be full-time students enrolled in any teacher education programs, while excluded in the sampling selection were non-education students who took education courses as unit earners. As resources for data collection were limited, and the study focused on a specific and accessible group, a convenience sampling approach was employed to select respondents. According to Hahn, DeWalt, Baker, and Schillinger (2017), convenience sampling can be a practical and viable approach for exploratory research, particularly when examining possible correlations between variables. However, the researchers acknowledge the limitations of convenience sampling concerning representativeness and generalizability for a more diverse population.

Research Instruments

The Environmental Citizenship Scale (Fatimah&Sarbaini, 2021) measured environmental citizenship in terms of participation, sustainability, and responsibility, whereas the Self Perceived Action Competence for Sustainability Questionnaire (Olsson, Gericke, Sass, &Pauw, 2019) measured action competence in terms of knowledge of action possibilities, confidence in own influence, and willingness to act.The researchers made minor modifications to these scales and consulted validators who confirmed approvalof the appropriateness and validity of the instrument. In addition, the researchers also redesigned the general layout of the instrument, adding a 5-point Likert scale descriptive equivalence for different responses, which provided more concrete responses. As one instrument, the survey questionnaire consisted of 34 items, with Cronbach Alpha's for the 17 SPACS-Q and 17 ECS scales were $\alpha = .97$ and $\alpha = .96$ found to be highly reliable. Through measures establishing instrument reliability and validity, the researchers ensured that the data gathered was accurate and precise, thereby increasing the credibility and rigor of the research findings.

The levels of action competence can be interpreted through a Likert scale interpretation method adopted from Gümrükçüolu, Sarimehmet, and Hintistan (2017). A score of 4.20-5.00 indicates consistent action competence at a very high level. Then, a score of 3.40-4.19 indicates frequent action competence at a high level. In the middle range, a score of 2.60-3.39 indicates fair action competence at a neutral level. A score of 1.80-2.59 indicates rare action competence at a low level. Lastly, a score of 1.00-1.79 indicates a complete lack of action competence at a very low level.

Similarly, the levels of environmental citizenship can be interpreted through a Likert scale interpretation method using the same value range allocation (Gümrükçüolu et al., 2017). In the upper end, a score of 4.20-5.00 suggests a very high level of consistent environmental citizenship. Next, a score of 3.40-4.19 suggests a high level of frequent

environmental citizenship. Then, a score of 2.60-3.39 suggests a neutral level of fair environmental citizenship. A score of 1.80-2.59 suggests a low level of rare environmental citizenship. Lastly, a score of 1.00-1.79 suggests a complete lack of environmental citizenship at a very low level.

The interpretation of Pearson's r correlation coefficient in this study follows the guidelines provided by Dancey and Reidy (2017). First, a correlation coefficient ranging from 0.00 to 0.19 reflects a very weak correlation, suggesting an almost negligible relationship between the two variables. Next, the coefficient ranging from 0.20 to 0.39 reflects a weak correlation, suggesting a slight relationship that lacks substantial significance. Then, the coefficient ranging from 0.40 to 0.59 reflects a moderate (positive or negative) correlation, suggesting a discernible relationship between the variables. A coefficient ranging from 0.60 to 0.79 reflects a strong correlation, suggesting a significant relationship between the variables. Lastly, a coefficient ranging from 0.80 to 1.00 indicates a strong correlation, suggesting ahighly significant relationship between the variables.

Design and Procedure

To satisfy the research objectives of determining whether a significant relationship exists between action competence and environmental citizenship, the researchers employed a descriptive-correlational research design. Correlational designs have been recognized as useful in environmental psychology research by Steg and E. van den Berg (2019), which employ a correlation coefficient to determine the strength and direction of the relationship between two variables.

Then, the correlation were determined using Pearson's r statistical measure and the hypothesis test at the 0.05 confidence level.Subsequently, descriptive statistics, mainly Mean and Standard Deviation, determined the level of each action competence and

environmental citizenship and their measures. Ultimately, these methods effectively yielded results relevant to the research objectives.

With permission from the Dean of the College of Teacher Education, University of Mindanao-Main, the researchers administered the data-gathering procedure within the school premises. Via in-person surveys, the researchers directly retrieved the responses for each form given to selected responses from the process. The researchers identified barriers in such a process, mainly about the willingness of the respondents once selected, but completed surveying the target sample size. More importantly, the researchers used extensive member checking to ensure the data collected were accurate and verified.

Following data collection, the researchers systematically organized and encoded the collected data per established procedures. The researchers then submitted a raw dataset to the statistician. The statistician used the software tool SPSS (Statistical Package for the Social Sciences) to compute the descriptive statistics for each variable and its measurements and the correlation coefficient between the variables.

After conducting the necessary statistical analyses, the research team examined the resulting output to identify any significant findings or trends in the data. The findings were then interpreted and included in the findings and discussion, from which the researchers have formed conclusions on the results regarding the research objectives. Finally, the researchers examined the practical implications of the study findings, namely how these results may help to guide policy choices or enhance practice in relevant domains.

RESULTS AND DISCUSSION

Level of Action Competence of Teacher Education Students

Table 1 presents the mean and standard deviation scores for the measures of action competence to determine the level of action competence among teacher education

students. Specifically, this study assessed the measure of action competence in terms of knowledge of action possibilities, confidence in their influence, and willingness to act. The results indicate that the overall mean score of action competence was very high (*M = 4.27, SD = 0.461*), indicating that teacher education students consistently perform a very high level of action competence. Among the indicators of action competence, the willingness to act had the highest mean score (*M = 4.42, SD = 0.584*), implying a very high level of consistent willingness to act. In contrast, confidence in own had the lowest mean score (*M = 4.10; SD = 0.576*), suggesting a high level of frequent confidence in own influence. These findings reveal that teacher education students perform action competence at consistently very high levels.

Table 1*Level of action competence among teacher education students*

Indicators	***Mean***	***SD***
Knowledge of Action Possibilities	4.32	0.511
Confidence in Own Influence	4.10	0.576
Willingness to Act	4.42	0.584
Overall	**4.27**	**0.461**

High levels of action competence indicate that future educators will be well-equipped to respond effectively and ethically to a wide range of circumstances in the classroom. Strong action competence bears particular importance in modern education, with a growing emphasis on minimizing environmental challenges. Indeed, high levels of action competence help ensure that people are well-informedabout initiativeson environmental concernsin the classroom and the broader community. Another found similar findings, highlighting the crucial impacts of effectively addressing complex sustainability challenges, focusing specifically on improving solutions to emerging issues. In other words, high levels

of action competence indicate that environmental issues, through working solutions, are only positively addressed through an action-oriented approach. By fostering a strong sense of action competence, we can equip individuals with the tools they need to make a positive impact on the world around them, both now and in the future (Ottesen & Skjelbred, 2019; Hsu & Sandberg, 2017)

Furthermore, the result of the study demonstrates that teacher education students have particular strengths for measures such as willingness to act and knowledge of action possibilities. A comparative study discovered results that support thesemeasuresof action competence at high levels, which indicates a potential for sustainable initiative. As such, these results underscore the importance of proactively addressing challenges and difficulties in the community and beyond. Notably, individuals with a high willingness to act are more likely to engage in civic activities and contribute positively to their communities. Such actions highlight the significance of a collective sense of responsibility and a shared commitment, which can contribute to developing concerned and engaged communities (Sikder & Das, 2019; Carley & Christie, 2017).

As role models and leaders in their schools and communities, teacher education students with solid foundations of action competence can fosterfuture generations to become engaged for individuals, communities, and the world towards environmental improvement. However, teacher education must also recognize the relevance of having confidence in their abilities. Teacher-education students who need more confidence in their abilities may be less likely to take on leadership roles in promoting environmental education. With only a high level of confidence in their influence, teacher-education students may need to improve their confidence to take on leadership roles in addressing environmental issues. When addressed effectively through proper intervention, teacher-education students who possess high levels of action competence and confidence in their

abilities serve as active participants in environmental initiatives (Nousheen, Zia, & Waseem, 2022; Wilhelm, Förster, & Zimmerman, 2019).

Level of Environmental Citizenship of Teacher Education Students

Table 2 shows the mean and standard deviation scores to determine the level of environmental citizenship among teacher education students. Specifically, the present research assessed the level of environmental citizenship among teacher education students regarding participation, sustainability, and responsibility. The overall mean score of environmental citizenship was high (*M = 4.14, SD = 0.531*), indicating that teacher education students frequently exhibit environmental citizenship at a high level. Among the indicators of environmental citizenship, sustainability had the highest mean score (*M = 4.23, SD = 0.609*), suggesting a very high level of consistent sustainability. Conversely, responsibility had the lowest mean score (*M = 3.97, SD = 0.700*), indicating a neutral level of fair responsibility. Overall, these findings indicate that teacher education students generally exhibit environmental citizenship exhibited at frequently high levels.

Table 2*Level of environmental citizenship among teacher education students*

Indicators	***Mean***	***SD***
Participation	4.18	0.601
Sustainability	4.23	0.609
Responsibility	3.97	0.700
Overall	**4.14**	**0.531**

The findings are consistent with other research that has found that environmental citizenship on high levels positively impacts the environment. One study determined that when environmental citizenship is high, individuals are genuinely engaged with

environmental concerns and are prepared to seek out and develop sustainable solutions to these challenges. These efforts include minimizing their carbon footprint and encouraging others to do the same. Environmental citizenship might well contribute to broader campaigns that foster sustainable development and increase general well-being for everyone. Thus, consistent engagement among teacher education students through environmental citizenship can significantly influence environmental damage, which is reassuring considering that the need to resolve environmental challenges is now more urgent than before (Song, Zhang, &Jiang, 2021; Zhang & Zhao, 2019).

More crucially, the finding that sustainability and participation are strong indicators of environmental citizenship has significant implications.Environmental concerns are demanding and multidimensional and need comprehensive remedies from individuals, communities, and governments worldwide. Hurlimann and Wallace's (2017) similar findings emphasize that highlighting that the connections between people and their local environment in decision-making processes create a more environmentally conscious society.In other words, the potential impact on sustainability and participation through environmental citizenship reflects a comprehensive approach to dealing with environmental concerns.Consequently, these findings emphasize the significance of transparentenvironmental policies and practices that include all stakeholders in the decision-making process to achieve a more sustainable future.

Nonetheless, the indicator of responsibility obtained a lower mean score implies that there may be opportunities to cultivate further a sense of ownership and obligation among teacher education students. Begum (2020) affirms such particular implication, in which students exhibited a high degree of environmental consciousness but were less inclined to take personal responsibility for addressing problems. The authors further pointed out several reasons, including a lack of perceived personal influence or a sense of

powerlessness in the face of large-scale environmental challenges. In other words, believing that one's actions have no meaningful influence on environmental concerns might hinder taking action. Therefore, the findings emphasize the need to develop foundations for empowerment and personal agencywhere individuals have the information and resourcesto embrace actions that mightbring aboutbeneficial and improved change.

In summary, teacher education students exhibit high levels of environmental citizenship, particularly in measures of sustainability and participation. The findings indicate several beneficial environmental effects, including increased environmental awareness, collective decision-making, local-to-global collaborative efforts, and active individual contributions to environmental conservation. Nevertheless, given the need to foster a more profound sense of responsibility, the findings suggest that making personal responsibility a habit in making changes can significantly influence the environment. The findings ultimately point to the potential of initiatives that enhance teacher education training by including curriculum or pedagogical methodologies which address responsibility and accountability, along with modeling responsible environmental actions in the classroom and beyond.

Correlation between Action Competence and Environmental Citizenship

Table 3 presents the results of correlation analysis to determine the relationship between action competence and environmental citizenship. The objective of the study was to ascertain the presence of a statistically significant correlation between the variables. The Pearson r correlation analysis revealed a significant positive relationship between the two variables, $r(324) = .688$, $p = .000$.As per coefficient guidelines, this value represents a strong correlation strength between action competence and environmental citizenship.The p-value of *.000* indicates that the null hypothesis can be rejected at the 0.05 significance level.

Therefore, a statistically significant relationshipexists between action competence and environmental citizenship among teacher education students.

The findings suggest that a greater degree of environmental citizenship correlates with a greater degree of action competence on a positive level. Numerous research confirmed and found that persons capable of action competence are more inclined and participative in pro-environmental behaviors (Kalpić& Milković, 2018; Haddock, Zimmerman, & Griffith, 2018; Gracia-Lázaro, Hernández, Allós, Burillo, Cuesta, Fernández-Gracia, & Sánchez, 2020).

Action Competence	**Environmental Citizenship**			
	Participation	Sustainability	Responsibility	**Overall**
Knowledge of Action Possibilities	.496*	.447*	.314*	.501*
Confidence in Own Influence	.604*	.495*	.540*	.652*
Willingness to Act	.523*	.510*	.346*	.550*
Overall	.655*	.852*	.489*	**.688***

Table 3 :Correlations between action competence and environmental citizenship

**p<0.05*

Meanwhile, the current research examined the connection between the two variables among teacher education students, revealing that future educators build action competence and actively participate in environmental citizenship. These results supported Diaz, Ribeiro, and Alvez's (2018) research on environmental education, which suggests that greater action competence through education and training can equip educators to become extensive environmental citizens. Hence nurturing action competence in teacher education

students, who will be future educators, can foster environmental citizenship in classrooms and communities.

While research has indicated that a similar degree of environmental citizenship connects with action and beneficial environmental outcomes, other research also reports contrasting findings.For example, Tiefenbeck, Staake, and Ares (2019) found that individuals who identified as environmentally conscious and engaged in pro-environmental behaviors had a higher carbon footprint than those who were not as conscious. This lack of environmental consciousness could relate to a sense of moral licensing, in which individuals who engage in pro-environmental actions feel justified in engaging in environmentally harmful behaviors.Those who participate in pro-environmental actions may believe they have "earned" the right to engage in harmful behaviors because they have previously and consistentlyconducted something beneficial to the environment.

Furthermore, the findings also revealed correlations that warrant additional investigation. Correlations between indicators of action competence and environmental citizenship showed that for knowledge of action possibilities, $r(324) = .501$, $p = .000$; for confidence in own influence, $r(324) = .652$, $p = .000$; and for willingness to act, $r(324) = .550$, $p = .000$. These findings showthat confidence in own influence, $r(324) = .652$ has the strongest correlation with environmental citizenship among teacher education students, followed by a willingness to act $r(324) = .550$ and knowledge of action possibilities $r(324) = .501$, which has a moderate correlation strength with environmental citizenship. In combining these results for significance, each measure had $p = .000$, indicative of correlations at the significant level with $p < 0.05$.

These correlations between measures of action competence and environmental citizenship are outside the scope of the research. However, confidence in own influence, found to have a strong correlation with environmental citizenship, offers a crucial

investigative focus. Research findings from Ojala and Bengtsson (2018) note that the positive association between self-efficacy and environmental conduct corroborates this finding, showing the potential importance of programs encouraging confidence toward higher sustainable behavior.Future teachers can inspire more widespread adoption of exemplary role models for long-term improvement. However, further research remains necessary to explore the underlying processes and relevant modifiers of environmental citizenship.

The Values-Beliefs-Norm Theory (Stern et al., 1999), which served as the theoretical basis for the research, predicted foundational environmental values and beliefs as predisposed and related to pro-environmental action. The findings of the present research supported this theoretical base by indicating that action competence positively correlates with environmental citizenship. In other words, merely holding environmental ideals and ideas is not enough; individuals must also feel confident and capable of action to engage in pro-environmental actions. Ultimately, outcomes that cultivate action competence and encourage environmental citizenship among future educators speak to the potential for developing a generation of action-oriented individuals who make a difference in rebuilding our environment.

In summary, the findings of the study highlighted the crucial role of action competence in fostering environmental citizenship among future educators. The findings further emphasized that more is needed for individuals to hold environmental ideals and beliefs; they must also possess the confidence and capability to translate those ideals into tangible pro-environmental actions.While the results align with previous studies emphasizing the role of education in fostering environmental citizenship, contrasting findingshighlight the complexity of human behavior and the need for a comprehensive

understanding of the underlying mechanisms behind environmental citizenship and action competence.

CONCLUSION AND RECOMMENDATIONS

Conclusions

The present research found evidence that illustrate a significant relationship between action competence and environmental citizenship among teacher education students. The research also investigated the level of the two variables and found that both were at significantly high levels. In particular, the evidence points out that teacher candidates demonstrate consistent action competence in terms of willingness to act, knowledge of action possibilities, and confidence in their influence own influence. Correspondingly, the findings also show that teacher education students have a strong inclination towards environmental citizenship in terms of sustainability and participation; their responsibility, however, needed improvement. Based on these results, the researchers determined that teacher candidates who have a high level of action competence have the knowledge, skills, and attitudes necessary to be effective environmental citizens.

The findings of the study suggest that a number of important qualities are essential for teacher education in the context of environmental citizenship. First, combining action competence with environmental citizenship show that teacher education students have the quality to teach their students about environmental issues and how to take action to address them. Teacher education students are likely to be knowledgeable about

environmental solutions, so they see themselves as having a responsibility to take action. Second, action competence is a key factor to tackle challenges, enabling future teachers to find creative solutions and take advantage of new opportunities in addressing sustainable development. Finally, teacher education students who strongly consider themselves as environmental citizens have a deeper sense of connection with the environment, but the opportunities to demonstrate their responsibility should be a primary concern. Overall, having environmentally responsible teacher education students presents a chance to build a society that is aware of and cares about the environment and they are willing to take action in protectingthe planet and future generations.

To determine that action competence correlates strongly with environmental citizenship concurrently validates the values-beliefs-norm theory (Stern et al., 1999), which explain the motivation of people who value and believe that their action can contribute to environmental improvement are reflect their citizen action towards socially responsible behaviors. The alignment of the theory and evidence contributes to the present understanding of environmental citizenship and the relational aspects of pro-sustainable behavior with more applied competences such as action competence in the context of teacher education. When applied in teaching, the theoretical findings underscores the significance of integrating action competence and environmental citizenship principles into teacher training programs and curricula to empower educators with the knowledge and skills necessary to inspire the next generation of environmental stewards.

Recommendations

The recommendations are based on the findings of the study that give potential on a number of programs and targeted interventions, specifically for teacher education programs, to further enhance environmental citizenship and action competence levels

among teacher education students. Considering the significant correlation between action competence and environmental citizenship among teacher education students, the researchers recommend integrating environmental education and action competence training into teacher education programs and curricula.Environmental education programs can take on numerous shapes in practice, and the researchers recommend those that emphasize action-oriented methods for direct connection with the environment.

Despite the high action competence scores among teacher education students, there is still a crucial aspect to consider in enhancing their confidence in their influence. In this regard, the researchers recommend building self-efficacy through education and training, which could be a practical approach to boost teacher education students' confidence in their ability to promote environmental action. Their confidence could improve through programs such as field trips and outdoor education that can augment teacher education students' confidence in their ability to teach environmental education. Hence, the significance of providing practical experiences and opportunities for teacher-education students to practice and apply their knowledge in real-world settings.

To further enhance the level of environmental citizenship among teacher education students, the researchers recommend targeted programs and training on active and engaged citizenship. These initiatives could equip teacher education students with the knowledge, skills, and attitudes necessary to promote environmental citizenship among their students and their communities. Examples of such programs include nature-based education and sustainability education. By implementing these programs, teacher education students can become better positioned to contribute towards sustainable development and the preservation of the environment. The researchers also recommend collaboration among other relevant organizations, such as environmental advocacy groups and government

agencies, to provide further opportunities for teacher education students to enhance their environmental citizenship.

Similarly, although there is a high commitment to environmental citizenship among teacher education students, there remains space for enhancement, especially in responsibility. Related to that effort, the researchers suggest schools establish chances for students to participate in environmental protection activities and promote a sense of obligation for environmental protection. With collective responsibility as a focus, collaborations can provide teacher education students with more significant exposure to environmental issues and opportunities for practical engagement.The researchers ultimately recommend embedding environmental education into tangible initiatives and having an action-oriented approach to environmental concerns.

Finally, the researchers encourage further research to investigate the impact of action competence on the pro-environmental behaviors of future educators in their classrooms and communities. In addition, the limitations set in this study, such as a non-random sampling method, encourage further research in other educational settings and among other demographic groups. More importantly, future research in this area can provide further insights into the pedagogical methods and the long-term impacts of incorporating environmental citizenship into teacher training programs on student learning outcomes and overall environmental consciousness. Future environmental research could support continued efforts to develop interventions and programs for creating a brighter and more hopeful environment for current and future generations.

REFERENCES

Adombent, M., Hiller, A., & Fröhlich, G. (2020). Environmental citizenship education for sustainable consumption: Empirical findings and implications for educational practice. *Sustainability, 12*(9), 3716. https://doi.org/10.3390/su12093716

Ardoin, N. M., Bowers, A. W., & Gaillard, E. (2020). Environmental education outcomes for conservation: A systematic review. *Biological Conservation, 241*, 108224. https://doi.org/10.1016/j.biocon.2019.108224

Baptista, M., Reis, P., & de Andrade, V. (2018). Let's save the bees! An environmental activism initiative in elementary school. Visions for Sustainability, 9(1), 41–48. http://dx.doi.org/10.13135/2384-8677/2772

Begum, D. (2020). A Study on Environmental Awareness Among Undergraduate Students. *Ilkogretim Online - Elementary Education Online, 19*(3), 4844-4850. https://doi.org/10.17051/ilkonline.2020.03.735637

Bourn, D. (2017) A review of Education for Sustainable Development and Global Citizenship Education in Teacher Education. *Global Education Monitoring Report, United Nations Educational, Scientific and Cultural Organization*.https://unesdoc.unesco.org/in/document

Carley, S., & Christie, M. (2017). The environmental and social impacts of community-based environmental initiatives: A review of the evidence. *Local Environment, 22*(6), 666-683. https://doi.org/10.1080/13549839.2016.1232639

Chen, Y.-H., & Wu, W.-C. V. (2019). The relationships among environmental attitude, environmental knowledge, and environmental citizenship behavior of elementary school students in Taiwan: An application of the theory of planned behavior. *Sustainability, 11*(7), 2106. https://doi.org/10.3390/su11072106

Diaz, C. D., Ribeiro, D. M., & Alves, M. A. (2018). Education for sustainability: a look at the development of action competence in teachers of basic education. *Research, Society and Development, 7*(4), e1741834. doi: 10.33448/rsd-v7i4.1834

Dancey, C. P., & Reidy, J. (2017). *Statistics and Mathematics for Psychology* (7th ed.). Pearson. https://www.pearson.com/uk/educators/higher-education-educators/program/Dancey-Statistics-Without-Maths-for-Psychology-7th-Edition/PGM2772161.html

Environmental Protection Agency (EPA). (2019). *The benefits and costs of the Clean Air Act from 1990 to 2020* (Final report). United States Environmental Protection Agency. https://www.epa.gov/sites/default/files/2019-06/documents/bc-caa-2015-summary-tables.pdf

Erlina, N. (2021). Readiness of prospective science teachers in developing learning plans based on education for sustainable development.*Indonesian Journal of Science Education and Learning, 4*(2), 142-150. http://dx.doi.org/10.17478/jegys.1055967

Fatimah, F., &Sarbaini, S. (2021). Evaluation of environmental citizenship levels and their implications against ecological values and practices: How about prospective teacher students? *Advances in Social Science, Education and Humanities Research, 2*(1), 228-231. http://creativecommons.org/licenses/by-nc/4.0/

Gan, D. (2021). Perspectives on environmental education, citizenship, and assessment: A case study of elementary school teachers and principals in Israel. *Education Policy Analysis Archives, 29*(127). https://doi.org/10.14507/epaa.29.5308

Gracia-Lázaro, C., Hernández, L., Allós, V., Burillo, D., Cuesta, J. A., Fernández-Gracia, J. & Sánchez, A. (2020). Higher order ecology and evolution: A novel tool to build ecological scenarios. *Ecological Modelling, 428*, 109096. doi: 10.1016/j.ecolmodel.2020.109096

Gümrükçüoğlu, N., Sarimehmet, D., &Hintistan, S. (2017). Environmental awareness and knowledge level of higher education students. The Turkish Online Journal of *Educational Technology, 16*(4), 97-108. http://www.tojet.net/articles/v16i4/16410.pdf

Haddock, S. A., Zimmerman, T. S., & Griffith, J. A. (2018). Conceptualizing and measuring action competence for environmental education and sustainability. *Journal of Environmental Education, 49*(4), 290-301. https://doi.org/10.1080/00958964.2018.1463357

Hadjichambis, A. C., Paraskeva-Hadjichambi, D., Mihail, D. M., & Mihaila, R. G. (2020). Investigating environmental citizenship in formal and informal learning settings: A systematic review. *Sustainability, 12*(16), 6608. https://doi.org/10.3390/su12166608

Hadjichambis, A., Reis, P., Paraskeva-Hadjichambi, D., Činčera, J., Pauw, J., Gericke, N., &Knippels, M. (2020). *Conceptualizing Environmental Citizenship for 21st Century Education*. Springer. https://doi.org/10.1007/978-3-030-20249-1

Hahn, E. A., DeWalt, D. A., Baker, D. W., & Schillinger, D. (2017). Creating a meaningful participant burden metric for survey research. *American Journal of Preventive Medicine, 52*(6), 862-865. https://doi.org/10.1016/j.amepre.2016.12.005

Homburg, A., Stolberg, A., & Wagner, M. (2013). The socio-ecological model revisited: A review of the evidence on the link between environmental attitudes and behaviour. *Journal of Environmental Psychology*, 34, 109–120. https://doi.org/10.1016/j.jenvp.2013.01.004

Hurlimann, A., & Wallace, M. (2017). Exploring the relationship between sense of place, environmental stewardship, and pro-environmental behaviours among Australian coastal communities. *Journal of Environmental Psychology, 53*, 73-82. https://doi.org/10.1016/j.jenvp.2017.07.00

Husamah, H., Suwono, H., Nur, H., &Dharmawan, A. (2022). Action competencies for sustainability and its implications to environmental education for prospective science teachers: A systematic literature review. *Eurasia Journal of Mathematics, Science and Technology Education, 18*(8), 1-22. https://doi.org/10.29333/ejmste/12235

Hsu, S. H., & Sandberg, J. (2017). The role of action competence in addressing complex sustainability challenges: A case study in sustainable agriculture. *Journal of Cleaner Production, 166*, 1298-1309. https://doi.org/10.1016/j.jclepro.2017.07.175

Intergovernmental Panel on Climate Change. (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. https://www.ipcc.ch/report/ar6/wg1/

Kalpić, D., & Milković, M. (2018). Fostering students' ecological behavior in primary school through participation in environmental action projects. *International Journal of*

Environmental and Science Education, 13(5), 353-368. https://doi.org/10.12973/ijese.2018.457a

Mihaila, R. G., & Mihaila, D. (2017). Social responsibility for environmental protection. *Journal of Environmental Protection and Ecology, 18*(4), 1655-1661. https://doi.org/10.2298/JEPE170406005M

Nugroho, O. F., Permanasari, A., &Firman, H. (2021). Perceptions and practices of sustainability education in Indonesia for education for sustainability development (ESD) during the COVID-19 pandemic. *Eduscience: Journal of Educational Science, 7*(1), 45-51. doi: 10.47007/eduv7i01.4642

Nousheen, A., Zia, M. A., & Waseem, M. (2022). Exploring pre-service teachers' self-efficacy, content knowledge, and pedagogical knowledge concerning education for sustainable development. *Environmental Education Research*. Advance online publication.https://doi.org/10.1080/13504622.2022.2128055

Ojala, M., & Bengtsson, M. (2018). Pro-environmental self-efficacy fosters pro-environmental behavior: An analysis of single-use plastic bags reduction. *Sustainability, 10*(2), 403. https://doi.org/10.3390/su10020403

Olsson, D., Gericke, N., Sass, W., & Pauw, J. (2019). Self-perceived action competence for sustainability: The theoretical grounding and empirical validation of a novel research instrument. *Environmental Education Research, 26*(5), 665-684. https://doi.org/10.1080/13504622.2020.1736991

Ottesen, M. E., & Skjelbred, S. S. (2019). Action competence and teacher education: A multi-method study of novice teachers' perceptions. *European Journal of Teacher Education, 42*(4), 449-465. https://doi.org/10.1080/02619768.2019.1632277

Parra, G., Hansmann, R., Hadjichambis, A. C., Goldman, D., Paraskeva-Hadjichambi, D., Sund, P., Sund, L., Gericke, N., & Conti, D. (2020). Education forenvironmental citizenship and education for sustainability. In Conceptualizing environmental citizenship for 21st century education(pp. 149-160). Springer.

Reis, F., Pereira, A., Nogueira, C., & Gomes, C. (2018). Action competence and environmental education in nature-based programs. *Sustainability, 10*(12), 4516. https://doi.org/10.3390/su10124516

Rogayan, D., &Nebrida, E. (2019). Environmental awareness and practices of science students: Input for ecological management plan. *International Electronic Journal of Environmental Education, 9*(2), 106-119. https://doi.org/10.29333/iejee/5819

Sarid, A., & Goldman, D. (2021). A value-based framework connecting environmental citizenship and change agents for sustainability—Implications for education for environmental citizenship. *Sustainability, 13*(8), 4338. https://doi.org/10.3390/su13084338

Seery, N., &Hassouna, I. (2016). Developing active agents of change in environmental education: The role of social identity and cognition in citizenship education. *The Journal of Environmental Education, 47*(3), 163-170. https://doi.org/10.1080/00958964.2016.1161866

Schild, L. (2016). Environmental citizenship between participation and activism: Current research perspectives. *Journal of Environmental Policy & Planning, 18*(4), 441-455. https://doi.org/10.1080/1523908X.2015.1078035

Sikder, M. T., & Das, A. K. (2019). Action competence of university students in Bangladesh: A study exploring willingness to act, knowledge of action possibilities, and self-efficacy. *Journal of Social Sciences Research, 5*(3), 792-802. https://doi.org/10.32861/jssr.53.792.802

Song, J., Zhang, X., & Jiang, X. (2021). Environmental citizenship and pro-environmental behavior among university students in China. *International Journal of Sustainability in Higher Education, 22*(2), 361-375. https://doi.org/10.1108/IJSHE-11-2019-0329

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., &Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review, 6*(2), 81-97. https://www.jstor.org/stable/24707595

Steg, L., & Van den Berg, A. E. (2019). *Environmental psychology: An introduction*. John Wiley & Sons. https://doi.org/10.1002/9781119142474

Tiefenbeck, V., Staake, T., Roth, K., & Sachs, O. (2019). Moral licensing: Another driver of the rebound effect?*Energy Efficiency, 12*(6), 1433-1446. doi: 10.1007/s12053-019-09771-1

Thomas, G. O., Vasileiadou, E., & Ares, N. (2018). From environmental citizenship to sustainable communities: Understanding and promoting community-based social innovation for sustainability. *Journal of Cleaner Production, 172*, 4028-4040. https://doi.org/10.1016/j.jclepro.2017.10.012

United Nations. (2019). *Climate change and poverty*. Retrieved from https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2019/06/Climate-Change-and-Poverty.pdf

United Nations Development Programme. (2019). *Climate change and inequality*. Retrieved from http://hdr.undp.org/en/content/climate-change-and-inequality

United Nations Environment Programme. (2022). Global Environment Outlook 6: Healthy Planet, Healthy People. https://www.unep.org/resources/global-environment-outlook-6

Wals, A. E. J., & Jickling, B. (2019). Sustainability in higher education in North America: An integrative review and future directions. *Sustainability: Science, Practice, and Policy, 15*(1), 52-68. https://doi.org/10.1080/15487733.2019.1579866

Wilhelm, S., Förster, R., & Zimmermann, A. B. (2019). Implementing competence orientation: Towards constructively aligned Education for Sustainable Development in university-level teaching-and-learning. *Sustainability, 11*(7), 1891. https://doi.org/10.3390/su11071891