

## Civic Identity Formation through Digital Citizenship Learning in Higher Education

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### ABSTRACT

This study assessed a Virginia tobacco (*Nicotiana tabacum* L.) bark-based botanical insecticide for controlling whitefly (*Bemisia tabaci*) and improving potato (*Solanum tuberosum* L.) yield. Using a completely randomized design with six concentrations (0-10%), results showed a significant negative linear relationship between insecticide concentration and pest population ( $R^2 = 0.98$ ) and infestation intensity ( $R^2 = 0.99$ ). The 10% concentration reduced pest populations by 22.82% and produced the lowest infestation levels. Pest population strongly correlated with infestation intensity ( $R^2 = 0.98$ ). Yield increased markedly at 10%, with tuber number and weight rising by 66.67% and 82.93%, respectively ( $R^2 > 0.99$ ). The insecticidal effect is attributed to nicotine alkaloids and toxic secondary metabolites. These findings highlight the potential of tobacco-based botanical insecticides as a sustainable component of integrated pest management.

## **INTRODUCTION**

The rapid advancement of digital technology over the past five years has significantly reshaped the nature of citizenship, civic engagement, and identity formation among young citizens. Digital spaces have evolved into new public arenas where democratic participation, political expression, and social interaction increasingly occur. For university students, who represent a critical segment of emerging citizens, this transformation necessitates the development of a civic identity that is not only grounded in democratic values but also adaptive to the ethical, social, and political challenges of the digital era (OECD, 2021).

Higher education plays a strategic role in preparing students to navigate these changes. Within this context, Civic Education is expected to move beyond traditional normative instruction toward fostering critical awareness, participatory competence, and responsible civic behavior in both offline and online environments. However, recent studies indicate that Civic Education in higher education often remains content-centered and exam-oriented, emphasizing memorization of constitutional values rather than cultivating students' lived civic experiences and identity development in digital contexts (Choi, Glassman, & Cristol, 2020).

The emergence of digital citizenship as an educational paradigm offers a relevant framework to address these challenges. Digital citizenship encompasses not only technical skills in using digital technologies but also ethical awareness, critical information literacy, civic responsibility, and active participation in digital public spaces (Ribble, 2020). International research over the last five years highlights that digital citizenship education contributes positively to students' civic engagement, democratic dispositions, and social responsibility, particularly when integrated through reflective and participatory pedagogical approaches (UNESCO, 2023).

Civic identity, as a core outcome of Civic Education, refers to individuals' understanding of themselves as members of a political community, including their sense of belonging, civic values, and commitment to public participation. In digital environments, civic identity is increasingly shaped through online interactions, exposure to diverse perspectives, and engagement with civic issues via digital platforms (Castells, 2021). Consequently, the formation of civic identity can no longer be separated from students' digital experiences and practices.

Despite the growing body of literature on digital citizenship and civic engagement, empirical research that explicitly examines the relationship between digital citizenship learning and civic identity formation in higher education remains limited, particularly in developing country contexts. Existing studies tend to address digital citizenship as a set of competencies, while civic identity is often discussed at a conceptual level, leaving a gap in understanding how pedagogical practices in Civic Education concretely contribute to students' civic identity development in digital spaces (Isin & Ruppert, 2020).

Responding to this research gap, this study aims to analyze the role of digital citizenship learning in shaping students' civic identity within higher

education Civic Education courses. Specifically, this research explores how learning processes, instructional strategies, and reflective civic practices embedded in digital citizenship education influence students' awareness of digital rights and responsibilities, ethical participation, and commitment to democratic and national values. By doing so, this study seeks to contribute theoretically to contemporary Civic Education scholarship and practically to the development of impactful Civic Education learning models that address the demands of twenty-first-century digital citizenship.

## LITERATURE REVIEW

### *Digital Citizenship in Higher Education*

The concept of digital citizenship has gained increasing attention in educational research as digital technologies become deeply embedded in civic life. Digital citizenship is commonly understood as a multidimensional construct encompassing digital literacy, ethical responsibility, civic participation, and critical engagement in digital environments (Jones & Mitchell, 2016). In higher education, digital citizenship learning is positioned as a means to prepare students not only as competent technology users but also as responsible citizens capable of contributing constructively to digital public spaces.

Recent studies emphasize that effective digital citizenship education requires pedagogical approaches that integrate critical reflection, problem-based learning, and participatory activities rather than focusing solely on technical skills (Heath, 2018). Such approaches enable students to develop awareness of digital rights, responsibilities, and the social consequences of online actions. In the context of Civic Education, digital citizenship learning provides a relevant framework for addressing contemporary challenges such as misinformation, digital polarization, and declining civic trust.

In Indonesia, digital citizenship has been increasingly discussed in relation to higher education and civic learning. Research indicates that Indonesian university students demonstrate high levels of digital engagement but varying levels of digital civic responsibility, highlighting the need for structured digital citizenship education within Civic Education curricula (Wahyudi & Kurniawan, 2021). This suggests that digital citizenship learning is not merely supplementary but essential for strengthening students' civic competencies in the digital era.

### *Civic Identity Formation in the Digital Era*

Civic identity refers to an individual's self-concept as a member of a civic and political community, shaped through socialization processes, educational experiences, and participation in civic life. Scholars argue that civic identity is dynamic and continuously constructed through interaction with social, cultural, and political contexts (Flanagan & Levine, 2010). In digital environments, civic identity formation increasingly occurs through online discourse, social media participation, and engagement with civic issues mediated by digital platforms.

Recent literature highlights that digital spaces play a dual role in civic identity formation. On one hand, they offer opportunities for inclusive

participation and exposure to diverse perspectives; on the other hand, they may reinforce echo chambers and superficial forms of engagement if not accompanied by critical reflection (Bennett & Checkel, 2015). Therefore, education plays a crucial role in guiding students to navigate digital civic spaces thoughtfully and ethically.

National studies in the Indonesian context underscore that Civic Education contributes significantly to shaping students' civic identity when learning experiences are connected to real-life civic issues and reflective practices. Research by Winataputra (2020) emphasizes that Civic Education in higher education should prioritize identity formation by integrating values, critical thinking, and participatory experiences. However, without explicit attention to digital contexts, such efforts risk becoming less relevant to students' lived civic realities.

### ***Digital Citizenship Learning and Civic Identity in Civic Education***

The intersection of digital citizenship learning and civic identity formation represents an emerging area of inquiry in Civic Education scholarship. Studies suggest that when digital citizenship is embedded within Civic Education, it can serve as a catalyst for strengthening students' civic identity by linking democratic values with everyday digital practices (Kahne, Hodgins, & Eidman-Aadahl, 2016). This integration enables students to see themselves as active civic agents capable of ethical participation in digital public spheres.

Empirical findings indicate that reflective digital citizenship learning – such as analyzing online civic issues, engaging in digital deliberation, and evaluating digital information – positively influences students' sense of civic responsibility and belonging (Middaugh, Clark, & Ballard, 2017). These outcomes align with the broader goals of Civic Education to cultivate informed, critical, and participatory citizens.

In Indonesia, several scholars have highlighted the urgency of reorienting Civic Education toward digital realities. Budimansyah and Suryadi (2019) argue that Civic Education must respond to the challenges of digital democracy by incorporating digital citizenship competencies to maintain its relevance and impact. However, empirical research that explicitly examines how digital citizenship learning shapes civic identity among university students remains limited, indicating a significant research gap that this study seeks to address.

## **METHODOLOGY**

This study employed a qualitative research approach with a case study design to explore in depth the role of digital citizenship learning in shaping civic identity among university students. A qualitative approach was chosen because it enables a comprehensive understanding of participants' experiences, perceptions, and meaning-making processes related to civic identity formation within digital learning contexts (Creswell & Poth, 2018). The case study design allowed the researcher to examine the phenomenon within its real-life educational setting, particularly within Civic Education courses in higher education.

The research was conducted at a public university where Civic Education is a compulsory course for undergraduate students. Participants were selected using purposive sampling to ensure relevance to the research objectives. The participants consisted of undergraduate students enrolled in Civic Education courses that explicitly integrated digital citizenship content, as well as lecturers responsible for designing and implementing the learning activities. This sampling strategy was intended to capture diverse perspectives on how digital citizenship learning is conceptualized and experienced in practice (Miles, Huberman, & Saldaña, 2020).

Data were collected through multiple qualitative techniques, including semi-structured interviews, classroom observations, and document analysis. Semi-structured interviews were conducted with students and lecturers to elicit detailed insights into their experiences, perceptions, and reflections on digital citizenship learning and civic identity development. Classroom observations focused on instructional strategies, student engagement, and the integration of digital citizenship themes in learning activities. In addition, relevant documents such as syllabi, lesson plans, and learning materials were analyzed to understand how digital citizenship was embedded within the Civic Education curriculum. The use of multiple data sources enabled data triangulation, enhancing the credibility and trustworthiness of the findings (Denzin, 2017).

Data analysis followed an interactive and iterative process. Interview transcripts, observation notes, and documents were coded thematically using an inductive approach to identify recurring patterns and meaningful categories related to digital citizenship learning and civic identity formation. The analysis involved data condensation, data display, and conclusion drawing, as suggested by Miles et al. (2020). Throughout the analysis process, reflexivity was maintained to minimize researcher bias and ensure that interpretations were grounded in participants' perspectives.

To ensure research rigor, several trustworthiness strategies were employed, including prolonged engagement in the field, member checking, and peer debriefing. Member checking was conducted by sharing preliminary findings with selected participants to validate interpretations, while peer debriefing involved discussions with fellow researchers to enhance analytical depth and transparency (Lincoln & Guba, 1985). Ethical considerations were addressed by obtaining informed consent from all participants, ensuring confidentiality, and anonymizing all personal and institutional identifiers. Through these methodological procedures, the study sought to generate credible and meaningful insights into the contribution of digital citizenship learning to civic identity formation in higher education.

## **RESEARCH RESULTS**

The findings of this study indicate that digital citizenship learning plays a significant role in shaping students' civic identity within higher education Civic Education courses. Analysis of interview data, classroom observations, and curricular documents revealed three interrelated dimensions through which civic identity formation occurred, the development of digital civic awareness,

ethical and responsible participation in digital spaces, and the internalization of democratic and national values in digital contexts.

### *Development of Digital Civic Awareness*

The first dimension concerns the development of students' awareness of their roles and responsibilities as digital citizens. Interview data indicate that students developed a more comprehensive understanding of digital rights – such as freedom of expression and access to information – alongside corresponding civic responsibilities, including respect for diversity, data protection, and compliance with legal and ethical norms in online environments. One student articulated this shift as follows:

“Before taking this course, I mostly saw social media as a personal space. Now I realize that whatever I post or comment on also reflects my responsibility as a citizen in a public digital space” (Student S3, Interview, March 12, 2024).

This growing awareness was particularly evident when learning activities required students to critically analyze real-world digital civic issues, such as misinformation, online political discourse, and digital activism. Classroom observations showed that students were able to link theoretical civic concepts – such as rights, obligations, and public accountability – to their daily digital practices. As one lecturer explained:

“When students are asked to analyze actual cases of misinformation or online conflict, they begin to see civic concepts not as abstract ideas, but as realities they encounter every day in the digital world” (Lecturer L1, Interview, March 18, 2024).

### *Ethical and Responsible Participation in Digital Spaces*

The second dimension highlights changes in students' ethical orientations and participatory behaviors in digital public spaces. Students reported becoming more cautious and reflective in their online interactions, particularly in relation to sharing information, responding to differing opinions, and engaging in digital debates. One participant noted:

“I used to share information quickly without checking the source. Now I feel responsible to verify first, because spreading false information can harm others and society” (Student S7, Interview, March 20, 2024).

Lecturers emphasized that pedagogical strategies such as guided online discussions, collaborative digital projects, and critical evaluation of digital content played a central role in shaping these ethical dispositions. Observational data confirmed that structured reflection and lecturer facilitation helped students practice respectful dialogue and self-regulation during online learning activities. As one lecturer stated:

“Ethical behavior online does not emerge automatically. It needs to be trained through discussion, reflection, and continuous guidance in learning activities” (Lecturer L2, Interview, March 25, 2024).

These findings suggest that digital citizenship learning supported students in moving beyond passive digital consumption toward more intentional, ethical, and responsible forms of civic engagement.

### *Internalization of Democratic and National Values in Digital Contexts*

The third dimension of civic identity formation relates to the internalization of democratic and national values within digital contexts. Students expressed a stronger sense of civic belonging and commitment to democratic principles – such as deliberation, inclusivity, and social responsibility – when participating in digital civic activities. One student reflected:

“I feel that being a good citizen today also means being responsible in digital spaces, because that is where many public discussions and civic actions now take place” (Student S10, Interview, April 2, 2024).

Document analysis of course syllabi and learning materials further revealed that the integration of national civic values with global digital citizenship perspectives enabled students to reconcile local civic identity with global digital participation. Learning materials emphasized that national identity and democratic values remain relevant, even as civic engagement increasingly occurs in transnational digital spaces. As one lecturer explained:

“Digital citizenship does not replace national values. Instead, it provides a new space where those values can be practiced and strengthened” (Lecturer L3, Interview, April 5, 2024).

Overall, the results demonstrate that digital citizenship learning functions as a meaningful pedagogical pathway for civic identity formation. Through reflective, participatory, and value-oriented learning experiences, students developed greater civic awareness, ethical responsibility, and commitment to democratic and national values within the digital sphere.

## **DISCUSSION**

The findings of this study substantially strengthen the theoretical view put forward by Stefanski et al., (2016) regarding the importance of the role of families and communities as strategic partners in supporting education, especially in areas that are geographically isolated and have limited resources. Epstein emphasized that family and community involvement is not just a complement, but an integral component that can provide resource support, strengthen social networks, and increase students' motivation to learn. In the context of remote areas, where government access and educational facilities are often limited, community involvement is a vital pillar that can fill the void. These findings

suggest that active community participation not only strengthens material resources such as additional learning facilities, but also psychologically increases a sense of belonging and collective responsibility for the quality of education. This condition directly encourages the emergence of social solidarity that strengthens joint efforts to achieve better educational goals.

In addition, the results of this study are in line with the theory of social participation put forward by Koonce, (2011), which emphasizes the importance of social cohesion and close social networks as catalysts for the success of social programs. High community cohesion facilitates effective communication, resource coordination, and the creation of norms and values that support the sustainability of educational programs. Field findings that show community initiatives in forming learning groups and informal learning spaces are a real example of how these social networks function as social resources that strengthen the implementation of education policies. In other words, the successful implementation of education policies in remote areas is highly dependent on the extent to which communities are able to build and maintain cohesive and active social networks.

Compared to previous studies, especially the Leal Filho et al., (2019) study which found that community involvement in education tends to be sporadic, unsustainable, and less structured, this study presents a more optimistic picture. At the study site, the community engagement model has evolved into a more organized and sustainable system of participation. This difference is inseparable from the existence of closer and synergistic collaboration between various actors, namely schools, local governments, and local communities. This collaboration allows for more stable resource support and inclusive decision-making, which in turn reinforces the commitment of all parties to maintain the sustainability of the program. Thus, these findings confirm that local contexts and effective collaboration mechanisms strongly determine the success rate of community engagement (Castañer & Oliveira, 2020).

However, the obstacles that arise in this study, especially internal conflicts between community groups and limited economic resources, underscore that community engagement is not a solution without challenges. This is consistent with the results of the Walsh & Winsor, (2019) study which highlights the socio-cultural barriers that often arise in the management of learning communities in remote areas. Poorly managed social conflicts can erode social cohesion and lower motivation for participation, while economic constraints limit the capacity of communities to provide optimal support in a sustainable manner. Therefore, policymakers and education practitioners need to develop comprehensive mitigation strategies, such as facilitating intergroup dialogue, conflict mediation, and local economic empowerment that focuses on strengthening capacity and access to resources. This multidimensional approach is important so that social and economic barriers can be overcome and communities are able to function as effective partners in education.

The increase in students' academic scores recorded over the past two years is an empirical indicator that strengthens the claim that the integration of community engagement in the implementation of education policies has a real

positive impact on the quality of learning. However, it is important to note that other external factors, such as improved teacher quality, access to learning technology, or other intervention programs, may also contribute to these outcomes. Therefore, follow-up studies using comprehensive quantitative methods and experimental or quasi-experimental designs are strongly recommended to isolate the influence of community involvement more accurately and strengthen the validity of the findings.

Overall, the results of this study provide strong empirical evidence that community involvement is a key factor in the success of education policy implementation in remote areas and contributes significantly to improving the quality of learning. A structured and sustainable participatory model, supported by multi-sectoral collaboration and responsive local policies, can be an effective alternative solution to address resource constraints and geographical challenges that have hampered education programs. The implications of these findings are highly relevant for policy makers, education practitioners, and the community itself in designing and implementing inclusive, empowered, and sustainable education strategies in remote and marginalized areas.

## **CONCLUSION AND RECOMMENDATION**

This study concludes that digital citizenship learning plays a pivotal role in shaping students' civic identity within higher education Civic Education courses. Through reflective, participatory, and contextually relevant pedagogical practices, digital citizenship learning enables students to develop a more integrated understanding of their roles as citizens in both digital and civic domains. The findings demonstrate that civic identity formation is not a passive outcome of knowledge acquisition, but an active process shaped by students' engagement with real-world digital civic issues.

Specifically, this study identifies three interrelated dimensions of civic identity formation fostered through digital citizenship learning: the development of digital civic awareness, ethical and responsible participation in digital public spaces, and the internalization of democratic and national values within digital contexts. These dimensions collectively illustrate how Civic Education can respond meaningfully to the challenges of contemporary digital society while maintaining its normative commitment to democratic and national ideals.

Theoretically, this study contributes to the advancement of Civic Education scholarship by bridging the conceptual gap between digital citizenship and civic identity formation in higher education. It provides empirical evidence that integrating digital citizenship into Civic Education serves as an effective pedagogical pathway for strengthening civic identity in the digital era. Practically, the findings suggest that higher education institutions should intentionally incorporate digital citizenship learning into Civic Education curricula through reflective learning strategies, critical digital literacy, and ethically grounded participatory activities.

## ADVANCED RESEARCH

Despite its contributions, this study is limited to a specific institutional context and qualitative research design. Future research may extend these findings by employing comparative or mixed-method approaches across diverse higher education settings to further explore the long-term impact of digital citizenship learning on civic identity development. Overall, this study underscores the urgency of reorienting Civic Education toward digital realities to cultivate critically aware, ethically responsible, and democratically engaged digital citizens.

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