

**Exploring the Impact of Digital Citizenship on Civic Participation in Digital Environments
among University Students**

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ABSTRACT

Digital environments are becoming a major site for the socialization and advocacy of youth, and in order to ensure responsible civic engagement, these competencies must go beyond technical skills. The understanding of the impact of multidimensional digital citizenship competencies on actual online civic behaviors of higher education students is still lacking. The purpose of this study is to understand the influence of digital citizenship on civic involvement in the digital environment among university students. The study was conducted using a non-experimental quantitative survey method, and the sampling technique was convenience sampling, where the number of samples was 400 students in the university, and the data collection tool used was a validated multidimensional questionnaire. Using structural equation modeling and multiple regression analyses, relationships among different digital citizenship constructs (digital fluency, digital ethics, and socio-cultural engagement) and civic participation outcomes were examined. The findings revealed that pupils have moderately high digital citizenship skills but are not actively participating in online discussions and expression. Overall digital citizenship significantly and positively predicted total civic participation. It is worth highlighting that only responsible activity and socio-cultural engagement became relevant as factors that can catalyze digital activism and advocacy, while basic technical fluency, perception of self-identity, and awareness of one's own digital ethics were not enough to motivate digital active cyber-mobilization. The findings provide a theoretical endorsement of a multi-dimensional concept of digital citizenship, which goes beyond mere digital literacy. From a practical perspective, this study shows that a shift is needed for higher educational institutions and policymakers to move from a mere emphasis on technical competencies to promoting responsible conduct and cultural engagement to enable youth to become true digital citizens.

Keywords: Digital citizenship, Civic participation, Digital environment, Student engagement, Digital ethics, Digital activism, Social media, Higher education

INTRODUCTION

In the last ten years, digital connectivity has rapidly changed the way people access information, communicate and access public services, with digital technology playing a fundamental role in these changes (Bach et al., 2018). Over the years, the internet and social media have emerged as the primary mode of communication and socialization, entertainment and education for the youth and specifically for the university students (Pandya & Lodha, 2021). Digital literacy and digital citizenship skills are now essential to safe, effective and responsible engagement in society in this hyperconnected, technologically-mediated world (Fraillon et al., 2019). In this context, digital citizenship is a general term for the skills, attitudes, and engagement of young adults in online communities that integrates key aspects of internet political engagement, critical thinking, local and global awareness, and networking agency (Choi et al., 2017).

The intersection of digital technology use and social engagement has since garnered a good amount of research interest because hyperconnectivity has opened up new and dynamic civic opportunities for youth. Social media has gained increasing prominence as a virtual space and a community, where cybermobilization, advocacy and viral dissemination of information about issues of social interest occurs (Cabalin-Quijada, 2014). This means that modern-day youth activism is taking place in blended applications, combining traditional offline activism with on-line campaigning for social transformation and wellbeing in the community (Torres-Harding et al., 2018). The connection between Internet usage and civic involvement is, however, very complicated. For example, longitudinal panel studies that compared civic involvement in the pre- and post-Internet era revealed that while civic involvement tended to rise among older adults, it did not rise among younger users who did not engage in any of the activities examined through use of the Internet (Jennings & Zeitner, 2003).

A critical analysis of literature reveals some inconsistencies and methodological limitations of the literature as well as some areas for further research, such as the importance of online participation is recognized. Firstly, there is no unifying opinion on the meaning of the 21st-century concept of student engagement with digital technologies where studies' concepts on student engagement are vague, and there are multiple sometimes conflicting methods of measuring student engagement (Kahu, 2013; Nkomo et al., 2021). Second, empirical studies examining student engagement online often lack methodological rigor, with many studies using self-reported perception data instead of actual trace data of student activity or their performance measures (Choi et al., 2023). In addition, a plethora of learning analytics research equates engagement with some simple, measurable metrics of engagement, e.g., the number of clicks or duration spent in a login, overlooking the significant cognitive, affective, and social aspects of engagement (Bergdahl et al., 2024; Johar et al., 2023). Lastly, although a few well-documented surveys, such as the Digital Citizenship Scale (Choi et al., 2017), exist to measure general digital citizenship dimensions like technical proficiency and political involvement, there are a lack of empirical research which can link such dimensions to the actual behaviours of internet-based political and social activism.

There is a major research gap because there is a lack of empirical knowledge about the impact of the multidimensional competencies of digital citizenship (digital ethics, digital fluency, self-identity, and responsible activity) on the extent and type of actual civic engagement among university students. Using this as a backdrop, the present study seeks to make a contribution to the studies in this area by systematically exploring the effect of the various aspects of digital citizenship on civic involvement of the university students in the digital world. Though not a new one in the field of digital citizenship, this study joins the literature, where digital citizenship is examined through the lens of multidimensional models of student engagement, expanding the study of digital citizenship beyond a single lens of digital citizenship as technology or as a tool. The study is designed both practically and empirically with an extensive tool to measure the relationship between ethical awareness, social/cultural engagement, and digital fluency

leading to active civic participation in civic information seeking, civic conversation in the digital realm, and civic engagement in digital advocacy. This study provides light on these relationships and by providing empirical and evidence-informed insights for higher education institutions and policy makers will inform specific interventions for increasing digital literacy, setting healthy boundaries for social media, and building authentic civic responsibility.

The main purpose of this study is to examine the role of different aspects of digital citizenship on university students' online civic involvement. The matrix of research objectives and research hypothesis as follow;

1. To assess the current level of digital citizenship competencies and civic participation among university students
2. To examine the relationship between individual dimensions of digital citizenship and overall online civic participation among university students
3. To determine which specific components of digital citizenship significantly predict digital activism and advocacy among university students
4. To evaluate the structural model illustrating the overall impact of digital citizenship as a core construct on multidimensional civic participation in digital environment.

Research Hypotheses

H_{1a}: Higher levels of *Digital Fluency* are positively associated with *Civic Participation*.

H_{1b}: Higher levels of *Digital Ethics* are positively associated with *Civic Participation*.

H_{1c}: Higher levels of *Social and Cultural Engagement* are positively associated with *Civic Participation*.

H_{2a}: *Digital Fluency* significantly predicts *Digital Activism and Advocacy*.

H_{2b}: *Social and Cultural Engagement* significantly predicts *Digital Activism and Advocacy*.

H_{2c} : *Digital Ethics* significantly predicts *Digital Activism and Advocacy*.

H₃: Overall *Digital Citizenship* has a significant direct positive impact on total *Civic Participation* among university students

REVIEW OF RELATED LITERATURE

Higher education has been radically changed with the rapid growth of digital technologies, and digital environments have emerged as places for learning, socializing and engaging in communities. The digital citizenship and online civic participation has become an important academic field of study with the increased civic participation of university students online. This review brings together the latest understanding about digital student engagement. The literature is analyzed, categorized, and structured in the following three themes: (1) conceptualization of digital citizenship and digital literacy, (2) ambivalent nature of social media as a tool for social capital and psychological distress and (3) methodological approaches and limitations for measuring digital student engagement. This review has checked the past

study and found that there are some gaps in methods and inconsistencies in the findings which is the basis of the present study.

In order to be digitally literate and to participate in the twenty-first century, students are expected to be digitally literate with strong twenty-first century digital skills through two lenses, Digital literacy and Digital citizenship. Digital literacy encompasses a variety of cognitive, technical and socio-emotional competencies required to access, evaluate and create content in a digital environment (Bhawra et al., 2024; Buchan, Bhawra & Katapally, 2024; Ng, 2012). It is the stepping stone to digital citizenship, which is more than just operational knowledge, but also the ethical, responsible and participatory behaviors of young adults in an internet-based community. Digital citizenship has been identified as having multiple aspects such as digital fluency, data privacy, ethics and empathy, consumer awareness and networking agency (Buchan et al., 2024; Choi, Glassman, & Cristol, 2017). While these skills are essential, the literature also demonstrates that there is a 'digital divide' and a digital skills divide as well as a digital access divide, on the basis of a number of socio-economic and cultural groups. (Laufer et al., 2021) In addition, many schools have digital literacy programs in place but often focus on foundational technical skills and literacy (e.g., coding) while neglecting the social and ethical aspects most relevant to civic engagement (e.g., data sovereignty, cyberbullying, digital identity management) (Buchan et al., 2024).

The literature on social media and participation and civic engagement is complicated and in-conflict. Digital platforms, however, serve as "expanded public spaces" that are "social learning, cybermobilization and advocacy" spaces, connecting users with other issues within the community and public affairs (Nkomo, Daniel, & Butson, 2021). Social media has been demonstrated to help students learn together and build social capital bonding and bridging which helps them to facilitate students' synchronous and asynchronous interactions, knowledge sharing and belongingness (Al-Rahmi et al., 2022; Cao et al., 2013). Research has also shown that Internet use boosts civic involvement, when this technology is used to monitor public affairs and when using it to engage in social movements (Jennings & Zeitner, 2003).

But another paradigm in the literature considers social media as a technostress cause, a distraction and a social comparison source (Carmichael, Archibald & Lund, 2015). In some instances, students' engagement with digital platforms may cause over-intrusion into academic work and meaningful relationship with digital platforms, which could have an impact on their emotional well-being and cognitive freedom (Twenge & Campbell, 2019). There is potential for learning on platforms, but the cultural perfectionism and online reputation can increase the psychological strain and thus hinder genuine civic involvement. This dichotomy implies that student outcomes are more related to how students cognitively appraise digital environments, their digital ethics and their autonomous motivation for use (Ryan & Deci, 2017).

The methodological approaches and conceptual ambiguities in the current literature, as revealed by a critical evaluation, result in a lack of full understanding of online civic participation. Firstly, there is no agreement on the definition of "student engagement" concerning digital technologies and researchers use contradictory and at times fuzzy dimensions of student engagement (Bergdahl et al., 2024; Nkomo et al., 2021). The majority of literature sources rely primarily on perception data given by the participants, rather than trace data of their behaviors or actual performance results (Choi et al., 2023).

Furthermore, the research with Learning Analytics (LA) most consistently utilizes simple observable behaviors to define engagement, such as number of clicks, logins, or task times, while neglecting the cognitive, emotional, and social aspects of engagement (Henrie, Halverson, & Graham, 2015; Bergdahl et al., 2024). A superficial analytics or self-report only can yield a fragmented picture of students' ethical and critical responses to digital content. In addition, most empirical studies used small, local samples of students from different disciplines, and the findings from these studies may not necessarily be generalized

to the general relationship between the attributes of digital citizenship and other civic behaviors among different populations of students (Nkomo et al., 2021).

Based on the literature review process and the synthesis of the literature, it was found that the theoretical intersections of digital literacy, civic participation, and impacts of digital media have been well documented, but there is a clear need for more empirical evidence to explore the multidimensional construct of digital citizenship and its relationship to civic participation in digital environments. The current frameworks are tends to evaluate technical competence of skill or the overall level of academic involvement, but not the particular ethical and cultural as well as identity based aspects of skill that can drive alternative political and social engagement via the internet, and that can hinder it. Many of the current measures only capture technical skills or general academic engagement and fail to account for how particular technical, ethical, cultural and identity-based skills enable or preclude political and social engagement by university students online.

The present study focuses on this important gap by systematically examining the relationship between selected dimensions of digital citizenship and online civic involvement among university students. This research extends beyond the one-dimensional perspective of technical literacy or click rates, and uses a holistic approach to analyzing specific aspects of digital citizenship, including identity, responsible use, social and cultural involvement and ethical practice. This research, with this unique set of skills and the specifics of civic engagement among youth in digital media, in communities and by digital advocacy, provides a much-needed empirical connection between the ethical dimensions of digital literacy and what is happening in civic cyber-mobilization among youth in today's world. This research contributes in theory and practice by offering a foundation for higher education institutions and policy makers to create interventions that will enable students to become truly and responsibly civic in hyper connected digital space.

RESEARCH METHODOLOGY

Unique to quantitative research is the use of numeric data and statistical analysis to explain phenomena, predict phenomena and describe trends across populations (Plano Clark & Creswell, 2014). The study was conducted as a correlational survey to examine the theoretical relations between pre-designed independent latent variables (dimensions of digital citizenship) and dependent variables (outcomes of civic participation). This design allows the researchers to take into account the interaction of these variables and how they covary with one another without manipulation of the participants' natural environment, which allows the research findings to be generalized to a larger population (Leedy & Ormrod, 2015; Neuman, 2013).

The study area was higher education institutions and the population studied was the University students in the institutions. Non-probability convenience sampling technique was used to recruit the participants. In this study, a sampling technique was used in such a way that the number of samples can be considered large so that the results obtained are strong and can be generalized. The sample included all participants from the university environment, and as part of the study aimed to obtain an overall perspective of the level of digital skills and civic involvement of the entire student population, the participants differed in their academic majors.

The research instrument (data sources) was created based on existing Digital Citizenship and Online Civic Engagement frameworks. The Digital Citizenship consisted of the constructs i.e. Self-Identity, Responsible Activity, Social and Cultural Engagement, Digital Fluency and Digital Ethics as suggested by Kim and Choi (2018). Online Civic Engagement was divided into Civic Information Seeking, Online Discussion and Expression, Community Participation and Digital Activism and Advocacy. There were 41

items on a five-point Likert scale that ranged from Strongly Disagree = 1 to Strongly Agree = 5 on the instrument. The researchers personally visited the universities and collected data. The quantitative data collected were processed for missing and unengaged responses, and entered into statistical software for detailed analysis.

Inferential statistics of a higher order was used. EFA was first used to identify the factor structure of constructs as defined in the instrument development phase, thus minimizing the number of items to separate factors that did not co-relate with each other (Cohen et al., 2007). Structural Equation Modelling (SEM) which included Confirmatory Factor Analysis (CFA) was then selected to test the hypothesized effects and relationships among the multidimensional digital citizenship constructs and measures of civic participation outcomes. For this reason, SEM was chosen as the main inferential technique as it has been found to be highly robust for predicting models, has the capacity to analyze complex structural relationships simultaneously, and efficiently deals with multiple latent constructs measured by a number of indicators, even in the presence of measurement error (Al-Rahmi et al., 2022). The internal consistency reliability of the questionnaire constructs was examined using the Cronbach alpha and an alpha coefficient value greater than 0.70 means that the constructs of the questionnaire have high reliability and stability (Al-Rahmi et al., 2022; Plano Clark & Creswell, 2014). No personally identifiable data was collected, but participant identification numbers were used for data organization, and to ensure strict data confidentiality (Leedy & Ormrod, 2015).

DATA ANALYSIS

Table 1: Descriptive Statistics and Reliability Analysis (ROI)

Construct	Mean	SD	Cronbach's α
Self Identity	3.44	1.00	0.888
Responsible Activity	3.42	1.04	0.900
Socio-Cultural Engagement	3.44	1.01	0.898
Digital Fluency	3.44	1.01	0.897
Digital Ethics	3.43	1.03	0.905
Civic Information Seeking	3.40	1.03	0.876
Online Discussion and Expression	3.37	1.05	0.879
Community Participation	3.41	1.03	0.871
Digital Activism and Advocacy	3.40	1.08	0.881

Table 1 shows the descriptive statistics and reliability estimates for the dimensions of digital citizenship that were covered in this study (nine dimensions). The mean scores give an overview of the respondent's perception of the various aspects of digital citizenship, with the Standard Deviation (SD) reflecting the variation in the responses. The internal consistency reliability of each construct is measured by Cronbach's alpha (α) values.

Results indicate that the respondents somewhat agree with the mean score of 3.37 to 3.44 for all the constructs. A commonly accepted interpretation of the meanings of the means of the Likert scales is that a mean above 3.00 is indicative of generally positive perception of the construct measured, while a mean closer to 4.00 is indicative of stronger endorsement. Thus, the results indicate that respondents have a fairly positive level of digital citizenship on all dimensions.

Among the constructs, Self Identity (M = 3.44, SD = 1.00), Socio-Cultural Engagement (M = 3.44, SD = 1.01), and Digital Fluency (M = 3.44, SD = 1.01) recorded the highest mean scores. The results from

these items show that respondents have a relatively high level of awareness of their own digital identity, interact with various cultural perspectives online and have sufficient skills to use digital technologies. The dimensions with high mean value indicate that they are the most prominent aspects of digital citizenship that exist among the sampled respondents.

The mean scores for Digital Ethics ($M = 3.43$, $SD = 1.03$) and Responsible Activity ($M = 3.42$, $SD = 1.04$) were also relatively high. This data shows that the majority of the respondents have a responsible Internet use and awareness of ethical issues while using online platforms. These findings suggest that the participants are aware of the need for responsible and ethical digital behavior and the use of online platforms.

Likewise, Community Participation ($M = 3.41$, $SD = 1.03$) and Civic Information Seeking ($M = 3.40$, $SD = 1.03$) and Digital Activism and Advocacy ($M = 3.40$, $SD = 1.08$) were moderately agreed upon. These findings indicate that respondents do things like get civic information online, take part in community based digital projects and help social causes online. The slightly lower means in comparison to other constructs do suggest that these practices may not be as robustly practiced as those aspects of digital citizenship related to personal and skill.

The lowest mean score was for Online Discussion and Expression ($M = 3.37$, $SD = 1.05$). While it still falls above the middle of the scale, it indicates that respondents are marginally less inclined to express opinions, comment online or discuss publicly electronically. This discovery can signify some reluctance or not so high level of engagement in online civic discussions.

As for variability, standard deviation scores vary from 1.00-1.08, which signifies moderate variability in answers. The SD values are quite consistent, indicating a consistent pattern of responses across all constructs. Digital Activism and Advocacy showed the largest standard deviation ($SD = 1.08$), indicating that there were more discrepancies among the respondents in participating in advocacy-related activities. Self Identity ($SD = 1.00$) on the other hand, showed the lowest variability suggesting relatively stronger consensus among the participants.

Reliability was acceptable with all constructs having a Cronbach's alpha greater than 0.70. The reliability coefficients over 0.70 are acceptable, over 0.80 are good reliability, and over 0.90 are excellent reliability, according to the criteria suggested by Nunnally and Bernstein (1994). The alpha value in this study is between 0.871 and 0.905, which shows that all measurement scales have strong reliability.

The highest reliability coefficient was 0.905, which is the measurement item of Digital Ethics and shows that there is excellent internal consistency between the measurement items. Responsible Activity ($\alpha = 0.900$) also obtained the high reliability level. The other constructs showed the reliability ranges between 0.871 and 0.898, which demonstrates good internal consistency. Overall, these findings indicate that items on the survey are measuring what they are intended to measure and that the instrument is reliable to be used to evaluate multiple aspects of digital citizenship.

Overall, the descriptive analysis shows that the respondents have a generally positive score on the Digital Citizenship All Dimensions. Personal competencies and individual digital capabilities (including self-identity, digital fluency, socio-cultural engagement) were rated highest, with participatory behaviors (including online discussion, online expression) rated lower, in comparison. Moreover, all the constructs demonstrated good to excellent internal consistency in the reliability analysis, which validates and ensures the dependability of the measurement instrument to be used for the correlation and regression analysis. These results offer a solid base on which to explore the relationship between digital citizenship dimensions and civic involvement in the later stages of hypotheses testing.

Table 2: Pearson Correlation Analysis (RO2 / H1)

Hypothesis	Relationship	Pearson's r	p-value	Decision
H1	Self Identity → Civic Participation	0.459	0.0000	Supported
H1	Responsible Activity → Civic Participation	0.544	0.0000	Supported
H1	Socio-Cultural Engagement → Civic Participation	0.533	0.0000	Supported
H1	Digital Fluency → Civic Participation	0.491	0.0000	Supported
H1	Digital Ethics → Civic Participation	0.485	0.0000	Supported

The results of this Pearson correlation analysis of the relationships between the digital citizenship dimensions and civic participation are listed in Table 2. As is the convention in social science studies, correlation coefficients of 0.30 to 0.49 are deemed as a moderate positive correlation, and those of 0.50 to 0.69 are considered as a moderately strong positive correlation. The results show that all the dimensions of digital citizenship examined are positively and significantly associated with civic participation with all associated p-values < 0.001, thus supporting Hypothesis 1.

Responsible Activity was moderately positively related to civic participation, with the highest correlation between the five dimensions ($r = 0.544$, $p < 0.001$). This discovery indicates that people who engage in responsible online behaviors are more likely to engage in civic and community activities. Likewise, Socio-Cultural Engagement demonstrated a moderate positive correlation with civic engagement ($r = 0.533$, $p < 0.001$), underscoring the role of digital engagement and connecting with different groups in fostering civic engagement.

Digital Fluency was also highly correlated with civic participation ($r = .491$, $p < .001$), suggesting that those with higher digital skills and competencies have a greater tendency to participate civically. Similarly, Digital Ethics showed moderate positive correlation ($r = 0.485$, $p < 0.001$), indicating that the awareness of ethics and using digital technology responsibly are positively associated with civic engagement.

The least but still significant correlation was found between Self Identity and civic participation ($r = 0.459$, $p < 0.001$). This finding suggests that higher levels of digital self-awareness are correlated with civic engagement, and that this effect is weaker than the other dimensions.

In general, the results showed that there are significant positive relationships among all dimensions of digital citizenship and civic participation, supporting H1 and highlighting the relevance of the competencies of digital citizenship in promoting active civic participation.

Table 3: Multiple Regression Analysis for Digital Activism and Advocacy (RO3 / H2)

Hypothesis	Independent Variable	β (Coefficient)	t-value	p-value	Decision
H2a	Digital Fluency → Digital Activism and Advocacy	0.060	0.791	0.430	Not Supported
H2b	Digital Ethics → Digital Activism and Advocacy	0.103	1.458	0.146	Not Supported
H2c	Socio-Cultural Engagement → Digital Activism and	0.236	3.102	0.002	Supported

	Advocacy				
H2d	Self Identity → Digital Activism and Advocacy	0.006	0.082	0.935	Not Supported
H2e	Responsible Activity → Digital Activism and Advocacy	0.248	3.284	0.001	Supported
Model Summary					
Statistic		Value			
Dependent Variable		Digital Activism and Advocacy			
R ²		0.309			
Adjusted R ²		0.301			
F-statistic		35.28			
p-value (F-statistic)		8.09×10^{-30}			
Sample Size (N)		400			

The results of the multiple regression analysis that tested the effect of five dimensions of digital citizenship on digital activism and advocacy are presented in Table 3. The overall regression model was significant ($F = 35.28$, $p < 0.001$), which means that the predictors as a whole explain a significant amount of variance in digital activism and advocacy. The R^2 value of the model was 0.309 while the adjusted R^2 value of the model was 0.301, indicating that around 30.9% of the variance in digital activism and advocacy is accounted for by digital fluency, digital ethics, socio-cultural engagement, self-identity, and responsible activity. This is considered moderate explanatory power in Social science research, which means that the proposed model can explain something about the factors affecting the digital activism and advocacy.

The most significant independent variable that predicted digital activism and advocacy ($\beta = 0.248$, t value = 3.284, p value = 0.001) was Responsible Activity. This positive and significant coefficient means that those with responsible online behavior are more likely to do digital activism and advocacy activities. Likewise, Socio-Cultural Engagement positively and significantly influenced digital activism and advocacy ($\beta = 0.236$, $t = 3.102$, $p = 0.002$), meaning that those who actively engage with various groups of people and social issues online are more likely to engage in advocacy-related digital activities.

In contrast, Digital Fluency ($\beta = 0.060$, $p = 0.430$), Digital Ethics ($\beta = 0.103$, $p = 0.146$) and Self Identity ($\beta = 0.006$, $p = 0.935$) did not show statistically significant effects on digital activism and advocacy. The results indicated that the p -values of these variables were greater than the usual significance level of 0.05 and the results were not significant, so hypotheses H2a, H2b, and H2d were rejected.

The results are mixed for H2: The factors that are significant in predicting digital activism and advocacy are Responsible Activity and Socio-Cultural Engagement. The findings suggest that there are four factors that are more significant in determining the readiness to be a digital activist – those of behavioral and social engagement dimensions of digital citizenship – than the other three factors of personal identity, ethical awareness and technological competence.

Table 4: Structural Impact of Digital Citizenship on Civic Participation (RO4 / H3)

Hypothesis	Relationship	β (Coefficient)	t-value	P-value	R ²	Decision
H3	Digital Citizenship →	0.592	13.995	0.000	0.330	Supported

	Civic Participation				
Model Summary					
Statistic			Value		
Dependent Variable			Civic Participation		
R ²			0.330		
Adjusted R ²			0.328		
F-statistic			195.90		
Model Significance (p-value)			1.80×10^{-36}		
Sample Size (N)			400		

The regression analysis results of the overall effect of digital citizenship on civic participation is shown in Table 4. Results show that digital citizenship positively and significantly affects civic participation ($\beta = 0.592$, $t = 13.995$, $p < 0.001$). The p-value is considerably smaller than the 0.05 level of significance and the relationship is statistically significant, hence good empirical support for Hypothesis H3. A positive beta coefficient indicates that as the level of digital citizenship increases, the level of civic involvement among the respondents increases, too.

The value of the standardized regression coefficient ($\beta = 0.592$) suggests a moderately strong positive effect. The discovery implies that fostering digital citizenship skills will likely help significantly in promoting civic and community involvement. The high t value ($t = 13.995$) also indicates the strength of the relationship and that digital citizenship is a significant predictor of civic involvement.

The model summary shows that R² is 0.330 and adjusted R² is 0.328. This means that the digital citizenship variable explains about 33.0% of the variance in civic participation. Based on commonly used criteria in the social and behavioral sciences, an R² of above 0.25 is considered a moderate explanatory effect which, in this literature, indicates that digital citizenship is an important determinant of civic engagement. But the other 67.0% variation could be attributed to other social, psychological, educational and/or contextual factors not considered in the current model.

In addition, the regression model is highly significant ($F = 195.90$, $p = 1.80 \times 10^{-36}$), suggesting that the overall regression model is a good fit for the observed data. The R² and adjusted R² values are also very close together, indicating that the model is stable and not overfitting the data.

The results, overall, support that digital citizenship is a powerful predictor of civic involvement. The uptake of H3 suggests that people who have more digital citizenship skills are more likely to be civically active, thereby lending weight to the concept that Responsible, Informed and Effective participation in digital environments have a positive effect on active citizenship in today's society.

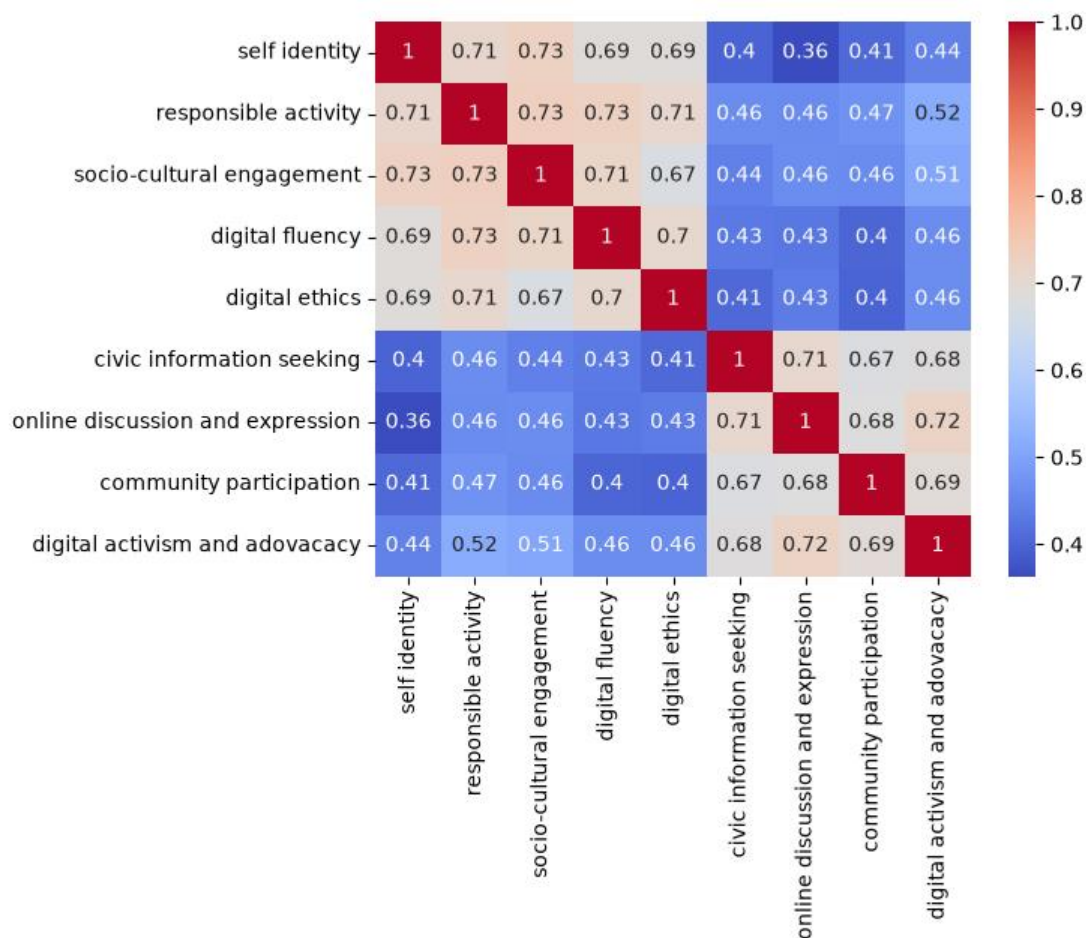


Figure 1 Correlation Heatmap of Study Variables

The relationships between the study variables are shown in Fig. 1 and that all variables are positively correlated. Relationships exist between the digital citizenship dimensions, namely between self-identity and socio-cultural engagement ($r = 0.73$), responsible activity and socio-cultural engagement ($r = 0.73$), and responsible activity and digital fluency ($r = 0.73$). Of the civic engagement dimensions, online discussion/expression shows the highest correlation with digital activism/advocacy ($r = 0.72$).

There are also moderate positive correlations between the dimensions of digital citizenship and civic engagement outcomes with values of 0.40–0.52. The highest correlation between the dimensions is between responsible activity and digital activism and advocacy ($r = 0.52$). Overall, the heatmap reveals a fairly consistent pattern of positive relationships, suggesting that robust digital citizenship competencies are linked to civic involvement and participation in digital society.

DISCUSSION

The main objective of this study was to examine the effects of digital citizenship on civic involvement of college students in digital spaces. This study explores the multidimensional nature of digital citizenship (self-identity, responsible activity, socio-cultural engagement, digital fluency, and digital ethics) and its potential to influence or impel the actual civic engagement of young people in the digital realm. The

empirical results have strong support for the overall theory that digital citizenship is a critical enabling factor for digital civic engagement, and have yielded highly nuanced findings concerning which digital citizenship competencies predict digital civic engagement.

For the first research objective (RO1), descriptive statistics showed that there is a moderately high level of digital citizenship competencies among the university students. It is worth highlighting that the students' proficiencies were the highest in the areas of Self-Identity, Socio-Cultural Engagement, and Digital Fluency. On the other hand, the lowest mean score was seen for Online Discussion and Expression. This relative reluctance to interactively participate in the online civic discourse is consistent with the conflict in paradigms discussed in the literature. Digital platforms provide "expanded public spaces" to mobilise socially (Cabalin-Quijada, 2014; Nkomo, Daniel, & Butson, 2021), but they can also push people to engage in social comparison and curated perfectionism (Twenge & Campbell, 2019). The overall lower level of participation in online expression indicates that the need to maintain a positive digital image might have a downside in lowering students' willingness to discuss openly public issues.

The Pearson correlation analysis was used to answer the second objective and first set of hypotheses (H1) and revealed that there is a positive and significant relationship between all dimensions of digital citizenship and civic participation. This offers an empirical confirmation of the theoretical assertion that this kind of safe, effective and responsible engagement in society is inextricably connected to students' digital citizenship competencies (Fraillon et al., 2019). The most significant relationships were identified in Responsible Activity, and in Socio-Cultural Engagement, mirroring the notion that online civic involvement is closely tied to ethical and social issues and not just operational functions.

The most telling results came out from the multiple regression analysis used in the third objective (H2) to identify the particular factors influencing digital activism and advocacy. Only Responsible Activity and Socio-Cultural Engagement were found to be significant predictors of digital activism, which supports H2c and H2e. Digital Fluency (H2a), Digital Ethics (H2b) and Self-Identity (H2d) surprisingly were not found to affect statistically. The emerging finding is a stark counterpoint to the traditional beliefs of many higher education institutions that often value just the basic technical expertise, neglecting the socio-emotional concepts (Buchan, Bhawra, & Katapally, 2024). The data clearly show that the mere acquisition of technical skills and internal moral awareness (digital fluency and digital ethics) is not enough to make a real difference in terms of cybermobilization. Rather, it is the engaged and outward-directed actions (socio-cultural engagement and responsible online behavior) that motivate university students to advocate for social change.

Ultimately, the assessment of the structural model (RO4 / H3) supported that overall digital citizenship significantly and directly affects the variance of total civic participation at 33%. This validates the longitudinal research showing that the use of the internet and digital connectivity can have a measurable impact on civic involvement, but only if the time is used effectively in relation to civic issues (Jennings & Zeitner, 2003).

The results of this study support, conceptually, the multi-dimensionality of the concept of digital citizenship and its scope that goes beyond mere digital literacy as proposed by Ng (2012). This research fills a methodological gap in the literature as it combines the S.A.F.E. model (Kim & Choi, 2018) and multidimensional civic outcomes. Many previous studies used superficial learning analytics, for example, click-rate or login time, as a measure of engagement (Bergdahl et al., 2024). This study is successful in operationalizing student engagement and utilizes discrete competencies within the ethical and cultural spheres that are directly tied to the behavioral aspects of activism in the Internet.

Realistically, these findings provide a clear directive to higher education administrators and policymakers. As Buchan et al. (2024) have noted and Nkomo et al. (2021) have argued, it is crucial for educational institutions to make a transition. Programs that focus on technology or the computer itself are unlikely to lead to civic responsibility. Curriculum design and the use of educational technologies in universities should make a clear focus on responsible behavior and cultural involvement. Teachers can help students transcend the passive consumption of information on the internet to responsible, meaningful civic advocacy by establishing safe, structured learning spaces online, engaging them with various social perspectives, and encouraging them to use the internet as a forum for learning and discussion.

CONCLUSION

The purpose of the current study was to investigate the effect of digital citizenship on civic engagement in digital spaces among university students. The results have shown that students have moderately high Digital Citizenship competency but their actual involvement in discussion and expression in online environment is comparatively weak which has addressed the core research objectives and hypotheses. The study found that the overall dimension of digital citizenship has a significant positive effect on the total civic participation and explains a huge proportion of the variance in students' online behaviors. The dimensions of responsible activity and socio-cultural engagement, however, were the only ones which proved to be significant catalysts in predicting specific digital activism and advocacy behaviors. In contrast to the institutionalized presuppositions, neither the basic technical abilities (digital fluency) nor the subjective moral awareness (digital ethics) were enough to energize active cybermobilization.

These results have a significant contribution to the current knowledge as it confirmed a multidimensional model of digital citizenship which goes far beyond simply digital literacy (Ng, 2012). This is because the S.A.F.E. model (Kim & Choi, 2018) is used as a basis for combining with multidimensional civic outcomes, which is a theoretical gap between digital ethics and social advocacy activities. It is a good step in taking the discourse of learning analytics research and educational technology beyond the superficial behavioral measures (e.g., click-rates or log-in durations) that have often constrained previous research in this field (Bergdahl et al., 2024).

From a practical point of view, the value of this study is that it explicitly calls out recommendations for higher education institutions and higher education policy makers. Across university campuses, digital technologies are becoming a growing part of the learning environment, and, accordingly, it is essential that the leaders of these institutions move away from a narrow focus on digital literacy towards technical skills. To truly empower young people to be civic responsible, educational technologies and curricula must be designed with this in mind to ensure responsible behaviors, cultural engagement and safe interactive discourse (Buchan, Bhawra, & Katapally, 2024; Nkomo, Daniel, & Butson, 2021).

The findings of this study should be understood in the light of the methodology limitations. First, because the sample was not probability, it limits generalizing the results to other, more diverse, demographic groups, youth, or non-university settings. Second, the cross sectional correlational research design provides meaningful relationships but does not allow for determining causal relationships over time. Lastly, since the survey results were obtained through self-report, there is a risk of social desirability bias and perception differences because participants might overestimate their ethical positions and their responsible online behaviors (Choi et al., 2023).

Future research is suggested to use a longitudinal and mixed methodology approach as a way to overcome these limitations and to get a better sense of the developmental path of digital citizenship and civic engagement over time. Future research should aim to validate self-reported data with objective and real data on student behavior, such as system log data from university learning management systems or social

media platforms, to better understand students' online engagement (Bergdahl et al., 2024; Choi et al., 2023). In addition, qualitative studies, such as focus group and in-depth interviews are strongly advised as this will give more explanatory aspects of the cognitive and psychological obstacles affecting the active involvement of technically proficient students in digital activism.

Finally, given that digital platforms are becoming more and more the place where socialization, public discourse, and learning are taking place, it is an education imperative to prepare university students with the highest level of digital citizenship skills. This study supports the idea that digital citizenship in the 21st century is not only measured by digital fluency, but also by the ability to use digital tools responsibly, ethically, and cooperatively in order to be a voice for social change. Focusing on the socio-cultural aspects of digital literacy can help Higher Education Institutions equip students with the skills and knowledge to make their digital world a platform for real, inclusive and meaningful civic engagement.

RECOMMENDATIONS

From the evidence and limitations expressed, future studies should move beyond just mixed methods and longitudinal studies to gain a more complete understanding of student engagement. In the future, quantitative studies should try to replicate these with a random or nationwide or cross-cultural samples, to increase generalizability. Additionally, researchers should include actual behaviour rather than self-reported measures of civic involvement (Bergdahl et al., 2024; Choi et al., 2023). Finally, qualitative investigations (focus groups, interviews, etc.) are strongly recommended to delve deeper into the questions of why digital fluency and digital ethics did not predict activism in this cohort and to gain deeper explanation of the cognitive barriers which prevent technically adept students from engaging in online civic spaces.

LIMITATIONS

This study adds its voice to the field of educational technology, but there are some methodological limitations to consider. First, the study was self reported survey data only. Self-reported data can be susceptible to perception differences and social desirability bias, which could have resulted in an overestimation by participants of their responsible online behaviour or moral positions by Choi et al. (2023). Secondly, a convenience sample of 400 university students was used. The sample size was sufficiently large to ensure that the statistical power of the sample was adequate, but it does not allow for extending the results of the study to larger and more diverse demographic groups or to non-university settings. Lastly, the cross-sectional correlational research design gives associations but does not allow for making any definitive cause and effect statements about the development of digital citizenship competencies over time.

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