

Digital literacy and its effect on learners' civic engagement in adult and vocational education in Nigeria

Literasi digital dan pengaruhnya terhadap keterlibatan kewarganegaraan peserta didik pada pendidikan dewasa dan kejuruan di Nigeria

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Abstract

Several works on the benefits of Information and Communication Technology (ICT) in society's survival have been recognised by experts. However, in reality, the use of ICT in developing countries like Nigeria is still in its infancy due to their lack of knowledge about it. This study examines the effect of digital literacy on the civic engagement of learners in adult and vocational education in Nigeria. It adopted a non-equivalent control type of quasi-experimental research design involving the experimental and control groups. The sample size was 140 learners drawn from public adult and vocational education centers across Nigeria. The data-collecting instrument was the "Civic Engagement Test" (CET). Data were analysed using mean, standard deviation and analysis of covariance. Findings show that learners exposed to digital literacy had a higher positive effect on civic engagement than basic literacy. Furthermore, cooperative learning style adopted as a moderating variable had a higher civic engagement mean score than solitary. On interaction effect, the study concluded that basic literacy had a more positive effect than digital literacy, hence the need for the provision of necessary facilities to promote digital literacy skills among learners.

Keywords: adult and vocational education; civic engagement; digital literacy

Abstrak

Beberapa karya tentang manfaat Teknologi Informasi dan Komunikasi (TIK) dalam keberlangsungan masyarakat telah diakui oleh para ahli. Namun, pada kenyataannya, penggunaan TIK di negara-negara berkembang seperti Nigeria masih dalam tahap awal karena kurangnya pengetahuan tentangnya. Penelitian ini mengkaji pengaruh literasi digital terhadap partisipasi kewarganegaraan peserta didik dalam pendidikan orang dewasa dan kejuruan di Nigeria. Penelitian ini menggunakan desain penelitian kuasi-eksperimental tipe kontrol tidak setara, yang melibatkan kelompok eksperimen dan kontrol. Ukuran sampel terdiri dari 140 peserta didik yang diambil dari pusat pendidikan orang dewasa dan kejuruan publik di seluruh Nigeria. Instrumen pengumpulan data adalah "Tes Partisipasi Kewarganegaraan" (Civic Engagement Test - CET). Data dianalisis menggunakan rata-rata, simpangan baku, dan analisis kovarian. Temuan menunjukkan bahwa peserta didik yang diberikan literasi digital memiliki efek positif yang lebih tinggi pada partisipasi kewarganegaraan dibandingkan dengan literasi dasar. Selain itu, gaya pembelajaran kooperatif yang digunakan sebagai variabel moderasi memiliki skor rata-rata partisipasi kewarganegaraan yang lebih tinggi dibandingkan dengan gaya pembelajaran soliter. Dalam hal efek interaksi, studi ini menyimpulkan bahwa literasi dasar memiliki efek yang lebih positif dibandingkan dengan literasi digital, sehingga diperlukan penyediaan fasilitas yang memadai untuk meningkatkan keterampilan literasi digital di kalangan peserta didik.

Kata kunci: pendidikan orang dewasa dan kejuruan; keterlibatan masyarakat; literasi digital

Introduction

Scholars have acknowledged a good number of works on the benefits of Information Communication and Technologies (ICTs) in the survival of every society. These benefits appear to remain at the infant stage in developing nations such as Nigeria owing to their poor knowledge of the use of it, hence the need for the present study. Furthermore, while ICT has provided opportunities for a paradigm shift in an online community, Perez (2013) asserts that social ties, political discussion, and information exchange characterize an online community. Thus, an understanding of the online environment requires the knowledge of digital literacy.

A person's degree of digital literacy indicates how well they can do tasks in a digital environment (Jones & Flannigan 2006). Digital literacy is a social activity that emphasizes not just how people read texts but also how they discuss, use, and encode attitudes and ideas about them. Additionally, it examines how these texts foster interpersonal connections across a range of settings (Yue et al. 2019). A digitally literate person can understand and use digital information effectively and efficiently in a range of circumstances, as demonstrated by the existence of social content in digital literacy (Chotimah & Sutarman 2020, Nurhayati & Falah 2020, Winarti et al. 2022). Suffice it to say that the participation of individuals in political activities is premised on the knowledge of online communities achieved through the internet. Research demonstrates a direct correlation between the positive civic attitudes and behaviors of youth and young adults and their usage of the internet for information (Shan et al. 2001, Pasek et al. 2006). In addition, online media use is positively associated with higher political participation (Willnat et al. 2013). The significance of digital literacy for students' civic engagement is demonstrated by these studies. However, many young people are using the Internet to find new ways to practice citizenship, while others report fewer opportunities and reduced satisfaction in more formal forms of civic activity (Harris et al. 2010, Rahim et al. 2011). This makes the current study crucial.

Online citizenship necessitates mastering certain competencies related to information access in a digital setting, information management and interpretation using ICT tools, information representation, and information evaluation and transmission (Covello & Lei 2010, & Walsh et al. 2022). Accordingly, digital literacy acts as a link between technological and informational skills (Imran 2010). It goes beyond the fundamentals of using a digital gadget. The ability to use digital devices, cognitive skills like reading, comprehending, and evaluating digital content, critical thinking about the information provided by digital media, creating new content and exchanging ideas on digital media, and the capacity to collaborate and communicate online are all included in the concept of digital literacy (Yunrong & Gang 2022). Digital literacy and civic participation are directly related, according to the skills and capacities in using information in digital content for a variety of objectives (Kenski & Stroud 2006, Moeller et al. 2014). Notably, internet use and online networks have a big influence on civic engagement and political participation (Yunrong & Gang 2022). Hence, it is believed that digital literacy enables people to publicly express their views or to gather to discuss and provide commentary on social issues, such as the political participation of Nigerian youth especially during the 2023 presidential election where a digital platform was created to promote an Obedient Movement, in favor of Peter Obi who was one of the aspirants.

Participating in online political discourse among youth requires good digital literacy knowledge, including technological and other skills. Research indicates that while creating digital products in a range of formats and types, young people do not possess a high degree of digital literacy (Setiadi et al. 2023). The authors, therefore, advocate the continuous training of youth to increase their digital literacy. In a similar work, there was a moderate knowledge of digital literacy skills (Hamid et al. 2020); the authors suggest more digital programs to enhance youth participation in politics. This is because digital literacy skills encompass useful and functional skills, effective communication (Suarez & Gonzalez Arguello 2020), information curation, e-safety (Kateryna et al. 2020), critical thinking, creativity, and intercultural awareness (Churchill 2020).

Agreeably, while using internet platforms for persons with minimal technological skills could be obstructive, Santini & Carvallo (2019) remark that the platform's design should be shaped to accommodate users' abilities to be effective. The restructuring to align with the people's abilities essentially requires the rudimentarily basic literacy knowledge of the people. Hence, its relevance to the civic engagement of youth, especially in developing nations such as Nigeria.

Research attests that basic literacy in the context of arts, media, and digital skills is crucial for youth civic engagement (Rogers 2014, Marten & Hobbs 2015, Kim & Yang 2016). These literacies enable young people to express their identities, engage in social critique, and challenge socio-political injustices. These studies highlight how basic literacy in the twenty-first century has expanded beyond the traditional definition of learning to read, write, and do math's to include identification, comprehension, interpretation, creation, and communication in an increasingly digital, text-mediated, information-rich, and rapidly evolving world (UNESCO 2019). The idea of basic literacy is broad and can be characterized as any educational opportunity that gives learners the skills and information they need to overcome daily challenges in their endeavors. According to research, adolescents who can critically comprehend and properly analyze online material are more likely to become active civic participants than those who do not. This suggests a connection between literacy and civic participation (Kahne et al. 2012). The active participation of the adolescent is likely associated with using an appropriate learning style.

A person's learning style suggests how they concentrate, absorb, internalize, and remember new, challenging information or academic skills. According to research, the educational interventions that help kids succeed academically also affect their learning preferences (Dunn et al. 2001). The choice of appropriate learning style is of interest to the present study, considering that digital literacy came into existence when reading and writing abilities were no longer sufficient for participating as full citizens in the technological and communicative era. To enable people (both individuals and groups) to engage and communicate effectively in society, digital literacy becomes a concept of contextual numerous integrated abilities and practices (conceptual, attitudinal, procedural, and ethical) (Marin & Castaneda 2023). The cognitive, affective, and psychological components that affect how a person engages with and provides feedback on the learning environment are thus included in adopting a learning style (Duff 2000). It reflects how thought is processed (Kolb 1984). Although several studies have established the place of learning styles on the student's performance, the present study tends to limit the styles to solitary and cooperative. These styles are used because of the peculiarities of the youth within the study areas.

Given the wealth of information and data available, the solitary learning style gives students the freedom to decide for themselves what they want to learn, how they want to learn it, and where they want to learn it (Sood & Sarin 2021). However, while this style may foster independence, scholars submit that it may not necessarily lead to developing interpersonal skills and self-efficacy crucial for civic engagement. Hence, its relationship is influenced by a range of socio-psychological factors. For instance, research shows that highly engaged adolescents often benefit from adult support and are personally transformed by demanding experiences (Price-Mitchell 2010). Furthermore, the importance of trust in institutional sources and values of openness to change in fostering civic engagement may be influenced by the individual's socio-political forms of activity (Östling 2011). These studies suggest that while the learning style could benefit the individual, it may not be sufficient in fostering the interpersonal skills, self-efficacy and trust in institutions essential for civic engagement. Hence, there is a need for a more holistic learning style.

The cooperative learning style involves the instructional use of several groups working together to maximize their learning to achieve the desired goal. The style fosters a positive attitude in the learners (Ning & Hornby 2010, Er & Aksu Ataç 2014). While promoting collaboration and shared responsibility among learners, cooperative learning has been found to positively impact the civic engagement of youth. For instance, the promotion of social justice and transformative experiences in civic learning have been facilitated through cooperative learning (Llewellyn et al. 2010, Price-Mitchell 2010). Additional research demonstrates how the learning style might enhance students' efficacy and cognitive abilities in civic education (Hawk & Shah 2007). These studies underscore the significant role of cooperative learning in fostering civic engagement among youth. Consequently, with the existence of a direct relationship between cooperative learning style and civic engagement, it is believed that quality teamwork over a given societal issue, as in the case of political participation of youth in Nigeria, could be promoted.

Literature, on the other hand, confirms the tremendous advantages of literacy in a variety of endeavors. For instance, education (List 2019), politics (LaRose & Detlor 2021), public service (Evans & Gomes 2017), social (Podgorny & Volokhova, 2022), economics (Gautam & Kanoujiya 2022), religion (Susilawati et al. 2021), and lifestyle (Oh et al. 2021). The current study adds to the body of literature by conducting an empirical investigation into the impact of digital literacy on the civic engagement of students in adult and vocational education in Nigeria.

The rapid growth of technology in recent times has given rise to a pragmatic shift in how knowledge is acquired and information and communication disseminated. Adjusting to this change requires an understanding of digital literacy. Hence, digital literacy constitutes a set of habits through which individuals use technologies for various purposes. The ability to access, evaluate, and organize information throughout learning processes is intimately related to this literacy (Gilster 1997). The competencies needed to engage in a digitally enabled society are referred to as digital literacy. Participating in such a society takes various forms, such as online campaigns and forms. Scholars affirm that online forums have made the gathering of youth more accessible for discussing and stimulating political knowledge through digital technologies (Östling 2011). So political participation is an aspect that requires citizen involvement in it.

Three leading indicators have been identified to influence online opinion: aggregated depictions of user-content interactions, user-generated comments and opinions, and mainstream media or proprietary content (Neubaum & Kramer 2017). A cursory look at these indicators suggests the need to acquire digital literacy owing to its various components. These components include, among other things, searching for and acquiring digital information and material, using digital technologies for collaboration and communication, creating digital content, and protecting personal privacy (European Commission 2018). Therefore, developing digital literacy encourages people to access a variety of information, evaluate it critically, and manage it so that others will accept it easily (Ningsih et al. 2019a). The article claims that literacy includes the skills necessary to live, learn, and work in a society where access to information and communication is typified by a growing number of digital devices.

Although digital literacy encompasses a wide range of knowledge, skills and values (Calvani et al. 2008), the concept has been debated. For instance, it is thought to integrate cognitive, emotional-social, and technical-procedural skills (Aviram & Eshet-Alkalai 2006). Martin (2008) added that it comprises digital competence, digital usage and digital transformation. The author further classifies digital competence as level I, denoted by situation embedding. Digital usage is classified under level II, conceived as applying digital competence within specific professional content. This level is also termed embedded and involved. Digital transformation is classified under level III, contributing digital usage with innovation and creativity to the knowledge domain.

While scholars acknowledge that digital literacy is a 21st-century competency required, most studies limit this benefit to primary, secondary and higher education (Koltay 2011). The non-recognition of informal learning systems such as adult and vocational education is believed to restrain the generality of its usefulness in the 21st century, particularly in developing nations such as Nigeria. The present study tends to add to the existing literature on the veracity of digital literacy across various categories of learners, especially in the informal learning environment.

Scholars have acknowledged that one of the benefits of digital literacy is the civic engagement of individuals. The idea of civic engagement is complex and layered, encompassing a variety of social and political actions and behaviors. As noted by Adler & Goggin (2015), it is a multifaceted occurrence that can manifest in numerous ways, including volunteering at a shelter for the homeless, fundraising for charity, notifying a government representative about a local concern, participating in a political party or campaign, casting a vote, and boycotting specific products or services. This engagement reflects certain characteristics, such as voluntarism, which pertains to actions that are not obligatory; it is also unpaid, indicating that there is no direct financial benefit or profit involved. It primarily operates in the public sphere, which is generally characterized by cooperation and collective efforts. This involves behavior and actions, rather than merely attitudes or thoughts. Importantly, it also involves acting in ways that benefit others out of altruism or concern for the welfare of society. Additionally, it emphasizes activity and action above merely attitudes or thoughts; it heavily involves behaving in the best interests of

others out of selflessness or care for the welfare of society; and lastly, it operates mainly in the public sphere, which is usually collective and cooperative. From these features, civic engagement could be seen as organized voluntary activity directed at problem-solving and helping others (Zukin et al. 2006). Research has also acknowledged that civic engagement exhibits three core frameworks: civic activities, electoral activities and political voice (Keeter et al. 2002).

Through civic involvement framework, an individual acquires digital citizenship. This means utilizing digital media technology to its fullest potential through economic success, political engagement, civic engagement, and artistic expression (Mossberger et al. 2003). Digital citizenship encapsulates the ability to participate online. This definition underscores digital literacy's place in learners' civic engagement. The relationship between the two variables is believed to have led to some empirical investigations to ascertain its impact on the recipients. For instance, research shows that the digital literacy of students in economic education study programs was still limited in influencing the intention of entrepreneurship, especially regarding entrepreneurial behaviors (Islami 2019), another indicates that improvement in three aspects of digital skills, namely, digital competence, digital use and digital transformation of three students regardless of their prior knowledge and level of digital literacy (Chan et al. 2017). In implementing digital literacy to achieve 21st-century skills in the 2013 curriculum, it was revealed that three students can access a variety of material, evaluate it critically, and transform it into information that other students can readily accept (Ningsih et al. 2019b).

Furthermore, other studies reveal that although respondents knew the internet, they were said to have had moderate digital literacy skills (Hamid et al. 2020), while the protest experience and political efficacy were found to significantly increase students' intention to join politics more than social media (Uwalaka 2021). In addition, students are more likely to continue participating in politics if they have a sense of community and connectedness. Research also shows that developing civic and public communication as a part of societal development is less of a focus for policy experts than strengthening digital economic capabilities (Churk 2022), and the vibrant and noteworthy impact of digital literacy on online political engagement (Yunrong & Gang 2022). The study concluded that one of the main obstacles to Chinese citizens' participation in online political activities is their lack of digital literacy. Empirical evidence on the efficacy of digital literacy in learning further indicates that it significantly improves the quality of learning chemistry (Latip et al. 2022), while youth digital literacy in computer operation and ICT abilities were strong (Setiadi et al. 2023). On organization performance, it was found that youth digital literacy in computer operation and ICT abilities were strong (Setiadi et al. 2023), but significantly influenced the form performance of SES (Elvira & Yusuf 2023).

The above empirical studies affirm that digital literacy is a concept that has attracted several concerns from scholars regarding its potency in various societal issues. Most of these studies focused on perceptual analysis of its contributions using secondary data and in the formal school system. The determination of the efficacy of digital literacy using contact groups in an informal learning system seems not to have been given sufficient attention by scholars, hence, the need for the present study. The present study is significant because it draws the attention of researchers to this salient issue and provides an avenue for comprehensive evaluation of the effect of digital literacy on the civic engagement of learners in an informal learning system within the context of a developing nation such as Nigeria whose competency in the use of digital devices is still at the infant stage. Consequently, the following questions were raised: (1) How does the civil engagement of learners trained using digital literacy differ from learners trained in basic literacy? (2) What is the influence of learning styles of learners on civic engagement? (3) What is the interaction effect of the training programme (digital and basic literacy programs) and learning styles on learners' civic engagement?

Research Method

The following hypotheses were formulated in the study: (1) The mean civic engagement scores of learners trained using digital literacy differ significantly from learners trained in basic literacy; (2) the mean civic engagement scores of learners trained using cooperative learning style differ significantly from participants trained using solitary learning styles; and (3) the mean civic engagement scores of learners differ significantly from the interaction effect of training programme and learning styles.

The quasi-experimental research design study was adopted using the non-equivalent control group type. In using this design, the researchers were able to manipulate the assignment to the treatment condition. Thus, two groups are involved in the study namely, the experimental which is exposed to treatment and the control which is not. The choice of non-equivalent is because the groups were not randomly assigned. The design is denoted by:

Experimental Group	$O_1 \times O_2$
Control Group	$O_1 \dots O_2$

Where O_1 – Pre-tests
 x – Treatment for group 1
 O_2 – Post tests.

The sample of 140 learners consisting of 57 females and 93 males was drawn from two adult and vocational education centers that are run by the government using the convenience sampling technique. The choice of the learners was based on their readiness and availability in the centers. Hence, to produce representative data, the technique employs a statistical process that chooses units based on their accessibility, availability, or ease of volunteering (Lavrakas 2008). Out of this sample, 70 learners were assigned to the control and experimental groups. The control group was exposed to basic literacy training using both moderating variables (solitary and cooperative learning styles). The training approach adopted in this programme was the conventional method, where learners are exposed to the knowledge of civic engagement. Areas covered were the most relatively recommended framework of civic engagement by Keeter et al. (2002). The authors identified three core indicators namely civic activities, electoral activities and activities of political voice.

The civic covered such areas as community problem solving; active membership in a group or association; regular volunteering for a non-electoral organization; participation in fundraising/run/walk/ride and other fundraising for charity. Electoral activities delved into regular voting; persuading others; displaying buttons, signs, and stickers; campaign contributions; and volunteering for candidates or political organizations, while activities focused on contacting officials; Reaching out to print media, reaching out to broadcast media, demonstrating, sending emails or written petitions, boycotting, and canvassing. The conventional method assumes that having been provided with the needed information about civic engagement, learners were allowed to study at their own pace for independent growth. On the other hand, the experimental group was exposed to digital literacy, referred to as the treatment accompanied by both learning styles using the personalized instruction method which encourages the application of blended learning and the promotion of teamwork.

The training lasted for 20 weeks, from February 1, 2023, to May 30, 2023. This duration is believed to provide learners with appreciable knowledge on civic engagement, having spent 108 hours in 18 weeks, with the other two weeks designated for training the facilitators in the use of the treatment and administering a mock on the learners to ascertain their knowledge level.

Before the commencement of the study, the researchers received ethical approval from the University of Nigeria Nsukka Ethical Committee. The researchers trained the facilitators of the two selected adult and vocational education centers for two weeks as they served as research assistants to minimize experimental errors. With this training, the research assistants administered a pre-test on the control and experimental groups to ascertain learners' general knowledge of civic engagement. The pre-test was chosen to ascertain the level of homogeneity among the groups before the treatment. After this test, the experimental group was exposed to civic engagement training using the personalized instruction method.

The content overview of the training was centered on the three core areas of civic engagement, namely civic, electoral and activities of political voice. The following contents were covered: under civic activities, solving problems in the community; being involved in a group or organization; volunteering frequently for a non-electoral organization; and taking part in charity fund-raising events such as runs, walks, and rides were treated in seven weeks at six hours per week resulting to 42 hours. Week 8-13 featured electoral activities classified under regular voting; persuading others; displaying buttons, signs,

stickers; campaign contributions; and volunteering for candidates or political organizations (36 hours), while the last indicator which is political lasted for four weeks (weeks 14-17). Topics covered under this section were contacting officials; contacting the print media; contacting the broadcast; protesting; e-mail/written petitions; boycotting, boycotting and canvassing (24 hours). Revision and practicals were held for week 18. After these trainings, a post-test was conducted using the facilitators to ascertain the effect of the treatment. In doing this, learners in both experimental and control were not informed about the research process to exhibit their natural behavior. This step was taken to minimize treatment bias. Meanwhile, a reliability coefficient of 0.79 was obtained using the Kuder Richardson Formula 21 (Kr-21). Data analysis was done using mean, standard deviation and analysis of covariance.

Results and Discussion

The sub-heading presents the results obtained from the pre-test and post-test in tables for analysis and subsequent discussion based on the questions. Over 90 percent of the learners exhibit the following civic engagement characteristics: they are actively involved in local governance, understand political issues affecting their locality; collaborate in working with peers to solve problems collectively, and they are willing to speak out about injustices of bad governance using digital platform.

Civic engagement mean scores of learners trained using digital literacy and those trained using basic literacy

Table 1 shows that learners taught digital literacy had mean scores of 28.13 and 33.61 on the pre-and post-tests for civic engagement with a 5.48 mean difference. On the contrary, learners receiving basic literacy training had a mean civic engagement score of 27.60 pre-test and 31.59 post-test, with a mean difference of 3.99. Given this outcome, it was discovered that adult learners taught digital literacy had higher mean scores in civic engagement than those taught basic literacy.

Table 1.
Pre-test and post-test civic engagement mean scores of learners taught using digital and basic literacy

Groups	N	Pre-test		Post-test		Mean Difference
		\bar{x}	SD	\bar{x}	SD	
Experimental (Digital)	70	28.13	2.73	33.61	2.90	5.48
Control (Basic)	70	27.60	3.00	31.59	2.89	3.99

Source: Processed test results

Table 2 shows that at the pre-test stage, digital literacy was not significantly different from basic literacy (control group) on civic engagement (t -cal = -1.09; p -value = .28). Furthermore, at the post-test stage, the result shows that both programs were significantly different with the rejection of the null hypothesis. This shows a significant difference between the civic engagement scores of learners taught using digital literacy and basic literacy.

Table 2.
T-test comparison of the pre-test and post-test civic engagement of learners in digital and basic literacy

Group	N	Mean (\bar{x})	SD	Df	tvalue	pvalue	Decision
Digital (pre-test)	70	28.13	2.73				
Basic (pre-test)	70	27.60	3.00	138	-1.09	.28	ns
Digital (post-test)	70	33.61	2.90				
Basic (post-test)	70	31.59	2.89	138	-4.14	.00	S

s – significant, significant at $p < 0.05$

Source: Processed test results

Consequently, the study reports that while learners exposed to digital literacy had higher mean scores on civic engagement at both pre and post-test stages, a significant difference was not found in the hypothesis at the pre-test stage, unlike the post-test stage where the hypothesis was rejected. Hence, the acceptance of the null hypothesis at the pre-test stage is likely associated with the common notion that the acquisition of digital literacy skills is pivotal to the promotion of online civic engagement. The perception is in tandem with the findings that the knowledge of digital literacy skills is believed to promote online political participation of youth (Yunrong & Gang 2022, Setiadi et al. 2023). The study while adding to existing literature on the efficacy of digital literacy, submits that the acquisition of digital skills beyond the formal learning system involves integrating the skills across various aspects of learning. One such area is on civic engagement of learners. Thus, describing the place of digital literacy is premised on a person's capacity to accomplish tasks efficiently in the digital environment (Jones & Flannigan 2006). On the contrary, the establishment of significant differences at the post-test stage explains the complexities in the conceptualization of digital literacy. Research shows that a moderate knowledge of digital literacy skills is believed to influence studies on the effect of digital literacy irrespective of learners' knowledge of the internet (Hamid et al. 2020). The study, therefore, advocates the need for the incorporation of digital literacy in the curriculum for improved learning (Latip et al 2022).

Influence of learning styles of learners on civic engagement

Table 3 shows that learners who adopted a cooperative learning style had mean scores of 27.89 for civic engagement on the pre-test and 32.80 on the post-test, with a mean difference of 4.91. On the other hand, learners with a solitary learning style had a mean civic engagement score of 27.84 on the pre-test and 32.40 on the post-test, with a mean difference of 4.56. This finding showed that learners who adopted a cooperative learning style had a higher civic engagement mean score than learners with a solitary learning style.

Table 3.
Pre-test and post-test civic engagement mean scores of learners on cooperative and solitary learning styles

Groups	N	Pre-test		Post-test		Mean Difference
		\bar{x}	SD	\bar{x}	SD	
Cooperative	70	27.89	2.82	32.80	2.74	4.91
Solitary	70	27.84	2.95	32.40	3.36	4.56

Source: Processed test results

Table 4 indicates a significant difference ($t\text{-cal} = -.88$, $p\text{-value} = .93$) was not found at the pre-test stage between the influence of cooperative and solitary learning styles. Furthermore, at the post-test stage, a significant difference ($t\text{-cal} = -.77$, $p\text{-value} = .44$) was not found between both learning styles. This implies that both learning styles at the pre- and post-test stages have similar attributes of civic engagement.

Table 4.
T-test comparison of the pre-test and post-test civic engagement mean scores of learners using cooperative and solitary learning styles

Group	N	Mean (\bar{x})	SD	Df	t value	pvalue	Decision
Cooperative(pre-test)	70	27.89	2.82				
Solitary (pre-test)	70	27.84	2.95	138	-.88	.93	Ns
Cooperative(post-test)	70	32.80	2.74				
Solitary (post-test)	70	32.40	3.36	138	-.77	.44	Ns

ns – not significant, s – significant, significant at $p < 0.05$

Source: Processed test results

Conclusively, the study shows that learners who adopted a cooperative learning style as a moderating variable had a higher civic engagement mean score than those with a solitary learning style. The finding may not be surprising considering that a cooperative learning style fosters a positive attitude in the learners (Ning & Hornby 2010, Er & Aksu Ataç 2014). This attitude is evident in the promotion of social justice and transformative experiences in civic learning (Llewellyn et al. 2010, Price-Mitchell 2010). The study holds that with the application of appropriate learning styles such as cooperative learning styles, the acquisition of digital literacy skills by learners especially in an informal learning environment would be significant. The present study therefore provides the basis through empirical evidence on the need for the integration of such learning styles in the promotion of civic engagement among learners in adult and vocational education. In addition, the acceptance of the null hypothesis at both the pre-test and post-stages attests to the effectiveness of the adoption of a cooperative learning style in the acquisition of digital literacy skills for civic engagement (Hawk & Shah 2007).

Interaction effect of the training programs and learning styles of learners on civic engagement

Table 5 shows that learners in digital literacy who adopted a cooperative learning style had a civic engagement mean score of 27.80 in the pre-test and 32.77 in the post-test, resulting in an adjusted mean of 4.97. On the other hand, learners with a solitary learning style had a mean score of 28.46 on the pre-test and 34.46 on the post-test, leading to an adjusted mean of 6.00. Similarly, learners in basic literacy who adopted a cooperative learning style had a mean score of 27.97 on the pre-test, 32.83 on the post-test, and 4.86 as the adjusted mean. In adopting the solitary learning style, the learners had a mean score of 27.23 on the pre-test and 30.34 on the post-test, while the adjusted mean was 3.11. The result further shows that the mean difference in digital literacy was 1.03, while the basic literacy was 1.75. Consequently, the result shows that basic literacy had a more positive effect on the civic engagement of learners than digital literacy.

Table 5.
Mean interaction effect of training programs and learning styles on civic engagement of learners

Treatment	Learning styles	N	Pre-test		Post-test		Mean Gain	Mean difference
			\bar{x}	SD	\bar{x}	SD		
Digital	Cooperative	35	27.80	2.59	32.77	2.92	4.97	1.03
	Solitary	35	28.46	2.86	34.46	2.66	6.00	
Basic	Cooperative	35	27.97	3.06	32.83	2.60	4.86	1.75
	Solitary	35	27.23	2.94	30.34	2.66	3.11	

Source: Processed test results

Table 6 shows that an f-ratio of 2.084 obtained with a significant value of 0.151 was greater than the 0.05 significance level, hence the acceptance of the null hypothesis. This implies no significant difference in learners' civic engagement mean scores on the interaction effect between training programs and learning styles.

Table 6.
Analysis of covariance (ANCOVA) on the interaction effect of training programs and learning styles on civic engagement

Source	Type III sum of squares	Df	Mean scores	F	Sig	Decision
Corrected model	26.993a	3	8.998	1.093	.354	Ns
Intercept	108698.579	1	108698.579		.000	
Programme	9.779	1	9.779	1.188	.278	
Styles	.064	1	.064	.008	.930	
Programme* styles	17.150	1	17.150	2.084	.151	
Error	1119.429	136	8.231			
Total	109845.000	140				
Corrected Total	1146.421	139				

Source: Processed test results

Additionally, the study reports that the interaction effect of training programs (digital literacy and basic literacy) and learning styles on learners' civic engagement in adult and vocational education was positive. However, this positive effect was higher in basic literacy compared to digital in informal learning settings. This accounts for its flexibility in meaning as any learning opportunity that empowers learners with the necessary skills and expertise to cope with daily challenges and difficulties in their respective endeavors (Hasanni et al. 2019). It is also possible that the complexities in digital literacy as a range of abilities and skills (Yunrong & Gang 2022) may have prompted the outcome. Thus, a similar idea on its scope was shared by the respondents following the acceptance of the null hypothesis. This presupposes that despite the low competence level in the use of digital literacy skills in Nigeria in the informal learning system, its relevance is commended by learners in politics. The view is in tandem with the findings that protest experience and political efficacy significantly increased students' intention to join politics (Uwalaka 2021). The study advocates that with adequate orientation and provision of necessary facilities on digital literacy in the informal learning environment, learners are likely to be equipped with skills needed to acquire digital citizenship, thus, participating in an online political discourse (Mossberger et al. 2003).

Conclusion

The study provides valuable insights into the effect of digital literacy on the civic engagement of learners in adult and vocational education. The study adds to existing empirical evidence that affirms the contribution of digital literacy to promoting civic engagement across all learners in formal and informal learning environments. In addition, available data show that most of the studies on the contributions of digital were carried out in formal learning settings without considering the informal learning environment, the present study adds to existing literature on the need to integrate digital literacy into informal learning settings. This will help in the generalization of the efficacy of digital literacy on youth civic engagement especially in Nigeria where advocacy on the acquisition of its skills is still at the infant stage. The study is believed to bridge the prevailing digital divide between students in formal school systems and those in informal learning environments, thus, reducing the disparities in accessing the benefits from digital resources while fostering inclusive civic engagement. In addition, the incorporation of digital skills training in the curriculum will help to generate insights into other parameters outside civic engagement, especially in developing countries whose digital literacy level is at the tender stage.

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