# Self-Efficacy as a Mediator between Digital Literacy and Academic Resilience among Senior High School Students

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## ABSTRACT

The increasing use of digital technology in Philippine schools highlights the need to understand how digital skills are associated with students' capacity to manage academic challenges, particularly in rural contexts. This study examined the mediating role of academic self-efficacy in the relationship between digital literacy and academic resilience among 255 senior high school students from four public secondary schools in Claveria, Misamis Oriental, Philippines. A cross-sectional, non-experimental quantitative design was employed, using adapted self-report questionnaires and key informant interviews with eight teacher-advisers. Students reported high levels of digital literacy (M = 2.95, SD = 0.36), academic self-efficacy (M = 3.01, SD = 0.35), and academic resilience (M = 3.06, SD = 0.37). Female students and students who owned personal digital devices demonstrated higher resilience, whereas no significant difference was found by grade level. Bootstrapped mediation analysis using 1,000 resamples indicated a significant indirect association between digital literacy and academic resilience through self-efficacy (B = 0.381, SE = 0.044, $p < .001$), alongside a significant direct association (B = 0.204, $p < .001$), consistent with partial mediation. Because data were collected at one time point and the constructs were measured through self-report, the findings should be interpreted as associations rather than evidence of causal effects. The study highlights the value of integrating digital skills development with confidence-building and equitable technology access in rural schools.

**Keywords:** Mediation Analysis, Rural Secondary Schools, Academic Confidence, Digital Competence, Academic Challenges

## INTRODUCTION

Education increasingly relies on digital technologies to support teaching and learning. Students are expected not only to develop digital skills but also to use them to handle academic challenges. In rural areas of the Philippines, however, students face obstacles such as unstable internet, limited school ICT resources, and socioeconomic barriers that affect their engagement and persistence.

Academic resilience, the ability to adapt, persist, and succeed despite challenges, helps students stay motivated, manage emotions, and continue learning even with limited resources or other constraints. Resilient students show higher persistence, motivation, and engagement (Tiangco et al., 2024). In rural communities, factors like low household income, farming duties, geographic isolation, and transportation difficulties can reduce attendance and participation, making resilience especially important (Basaluddin, 2021; Lluz, 2020).

Digital literacy—the ability to access, evaluate, and use digital information—has been linked to resilience. It allows students to explore resources, collaborate, and develop problem-solving skills, and is considered a core competency alongside reading and numeracy (Li & Zhou, 2025). Digital literacy may not directly improve resilience—it can depend on students' beliefs in their abilities, or academic self-efficacy, which reflects confidence in completing tasks successfully (Bandura, 1977). Higher self-efficacy is linked to greater motivation, persistence, and effective coping (Zheng, 2024; Tus, 2020). Research shows self-efficacy can mediate the effect of digital literacy on resilience (Solahudin et al., 2022), but most studies focus on university or urban students with stable digital access.

There is limited research on rural secondary students in the Philippines, who face challenges like shared devices, unstable connectivity, and limited ICT infrastructure that affect both digital skills and academic confidence. This study examines how academic self-efficacy mediates the relationship between digital literacy and academic resilience among rural senior high school students in Claveria, Misamis Oriental, providing insights for interventions that strengthen both digital competence and confidence in handling academic challenges.

Academic resilience refers to the ability of students to succeed academically despite experiencing adversity or challenges (Kalaivani, 2021). Resilient learners maintain motivation, regulate their emotions, and adapt to academic pressures effectively (Romano et al., 2021). Several studies have examined resilience in the Philippine context. Talikan (2024) reported that senior high school students in rural areas demonstrate varying levels of resilience in mathematics learning. Similarly, Gaylo et al. (2022) observed that students in Bukidnon maintained learning engagement during pandemic lockdowns through social support and resourcefulness.

Instructional environments also influence resilience. Honra and Monterola (2024) found that design-thinking-based instruction enhanced students' resilience by promoting creativity and problem-solving skills. Perez et al. (2023) likewise emphasized the importance of growth mindset in sustaining resilience among learners. Family relationships and social support further contribute to students' capacity to cope with academic stress. Kong (2020) noted that strong parent-child relationships positively influence resilience, particularly among students from low-income households.

Digital literacy also influences academic performance. Buque (2022) found that digital literacy enhances students' metacognitive reading skills, while Delima et al. (2023) reported that digital competence improves students' ability to evaluate online information critically. However, rural schools often face infrastructure limitations that affect digital learning opportunities (Mangarin & Climaco, 2024). These barriers highlight the importance of strengthening digital literacy among learners to ensure equitable access to educational resources.

Further, academic self-efficacy refers to students' belief in their ability to accomplish academic tasks and achieve learning goals (Bandura, 1997). Self-efficacy influences motivation, learning strategies, and academic persistence (Greco et al., 2022). Research indicates that students with high self-efficacy demonstrate stronger academic engagement and improved academic outcomes (Zheng, 2024). In the Philippines, Campos and Madrigal (2020) found that self-efficacy significantly predicts academic motivation among senior high school students. During the pandemic, Regalado (2024) observed that academic stress reduced students' coping self-efficacy in distance learning environments. These findings suggest that self-efficacy plays a critical role in helping students manage academic challenges.

Valentin et al. (2023) reported a strong positive correlation between self-efficacy and academic resilience among senior high school students in the Philippines. These findings suggest that strengthening students' confidence in their abilities can improve their capacity to cope with academic challenges.

Moreover, self-efficacy partially mediates the effect of digital literacy on academic resilience. Confident students leverage digital skills more effectively, improving performance and persistence (Solahudin et al., 2022). In rural settings, limited internet access and outdated devices can hinder both digital competence and self-efficacy, reducing resilience (Danao et al., 2025; Mangarin & Climaco, 2024).

# METHODOLOGY

The study employed a cross-sectional, non-experimental quantitative design with mediation analysis to examine the associations among digital literacy, academic self-efficacy, and academic resilience. The design measured naturally occurring characteristics without manipulating the learning environment; consequently, the results describe statistical relationships and do not establish temporal order or causation. Key informant interviews (KIIs) with teacher-advisers were conducted to provide contextual information about students' academic behaviors, use of digital tools, and coping strategies. The interviews complemented the student survey data but did not constitute interviews or focus groups with student participants.

The student respondents were 255 officially enrolled Grade 11 and Grade 12 learners from four public secondary schools in Claveria, Misamis Oriental, during the first semester of School Year 2025–2026. The sampling frame comprised 629 senior high school students. Proportionate stratified random sampling was used, with each participating school treated as a stratum. The sample was distributed according to each school's enrolment: School A, 83 of 205; School B, 78 of 192; School C, 68 of 167; and School D, 26 of 65. Within each school, eligible students were randomly selected until the allocated number was reached. The dissertation records that an online sample-size calculator was used at a 95% confidence level and a 3% margin of error to obtain the target of 255. The final sample represented approximately 40.5% of the population. Eight teacher-advisers, two from each school, were purposively selected as key informants based on their current advisory roles and direct knowledge of students' academic experiences.

The student questionnaire gathered sex, grade level, and personal device ownership. The participating institutions were all public secondary schools. The survey did not collect strand, family income, prior grades, or a detailed participant-level measure of internet availability, quality, or frequency of access; these variables therefore could not be described or statistically controlled. The three constructs were measured using adapted self-report scales: the Digital Literacy Measurement adapted from Kim et al. (2023), covering technology, data, content, and community literacy; the MRRF–Academic Resilience Scale (MRRF-ARS) adapted from Angeles et al. (2022), covering motivation, emotional regulation, and goal orientation; and the Academic Self-Efficacy Scale for Filipino Junior High School Students (ASES-FJHS) adapted from Dullas (2018), covering perceived control, competence, persistence, and self-regulated learning. Content validity was assessed by three experts. The scale-level content validity index average (S-CVI/Ave) was 0.96, and the universal agreement index (S-CVI/UA) was 0.89; ten items were revised following expert feedback. A pilot test involving 30 students who were not included in the main sample yielded Cronbach's alpha coefficients of .800 for digital literacy, .865 for academic resilience, and .923 for academic self-efficacy. These coefficients indicate acceptable to high internal consistency in the pilot sample. Confirmatory factor analysis and discriminant-validity testing were not reported in the original analysis; accordingly, the present study does not claim that these analyses were conducted.

Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize the responses. The Shapiro–Wilk test indicated non-normal distributions; therefore, the Mann–Whitney U test was used to compare academic resilience by sex, grade level, and device ownership. Regression analyses examined the associations between digital literacy and academic resilience, digital literacy and self-efficacy, and self-efficacy and academic resilience. Mediation was tested using observed composite scores and a bootstrapping procedure with 1,000 resamples.

Ethical safeguards followed the Capitol University Ethics Review Committee (CUREC) and Department of Education procedures. Written permission was secured through the Schools Division Superintendent and participating school heads. For student participants, parental or guardian informed consent and the student's own assent were required before inclusion. Participation was voluntary, and students could decline or withdraw without penalty or effect on their academic standing. Surveys were administered by the researcher or a neutral facilitator rather than the students' subject teachers to reduce possible pressure. Responses were coded, identifying information was excluded from reports, and completed forms and electronic records were stored securely. Teacher-advisers also provided informed consent before participating in the KIIs.

## RESULTS AND DISCUSSION

### Demographic profile of the respondents

**Table 1**

*Frequency and Percentage Distribution of the Profile of the Respondents*

| Profile | Category | | Frequency | Percentage |
|---|---|---|---|---|
| Sex | Male | | 122 | 48% |
| | Female | | 133 | 52% |

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| | | | | |
|---|---|---|---|---|
| | | TOTAL | 255 | 100% |
| Grade Level | Grade 11 | | 129 | 51% |
| | Grade 12 | | 126 | 49% |
| | | TOTAL | 255 | 100% |
| Device Ownership | Yes | | 234 | 92% |
| | No | | 21 | 8% |
| | | TOTAL | 255 | 100% |

Table 1 presents the profile information collected from the 255 student respondents. There were 133 female students (52%) and 122 male students (48%). Grade 11 students accounted for 129 (51%) of the sample, while 126 (49%) were in Grade 12. Most respondents reported owning a personal digital device (n = 234, 92%); 21 (8%) did not. All four participating schools were public secondary schools. Although the broader study context describes reliance on mobile data, shared Wi-Fi, and unstable connectivity, the questionnaire recorded device ownership only and did not quantify each participant's internet access. The study also did not collect strand, household income, or prior academic grades. These unmeasured characteristics should not be inferred from the profile data and represent important gaps for interpreting differences in students' digital learning opportunities.

Most students primarily rely on smartphones for school-related tasks, although some share devices with family members and face limitations due to internet connectivity and device capability. For those without personal devices, school computer laboratories and borrowed devices serve as alternative resources. The findings indicate that while students in Claveria generally have access to basic digital tools, socioeconomic conditions and technological limitations may still influence their digital literacy, academic self-efficacy, and academic resilience, highlighting the importance of school-based support and technology-responsive learning strategies.

**Perceived digital literacy in terms of Technology Literacy, Data Literacy, Content Literacy, and Community Literacy**

Table 2 presents the *Mean and Standard Deviation of Respondents' Digital Literacy Per Dimensions.*

**Table 2**

*Mean and Standard Deviation of Respondents' Digital Literacy Per Dimensions*

| **Dimension** | **Mean** | **SD** | **Description** |
|---|---|---|---|
| Technology Literacy | 2.87 | 0.43 | High |
| Data Literacy | 2.89 | 0.43 | High |
| Content Literacy | 2.79 | 0.48 | High |
| Community Literacy | 3.26 | 0.52 | Very High |
| **Overall** | **2.95** | **0.36** | **High** |

*Legend:1.00 – 1.74 Very Low; 1.75 – 2.49 Low; 2.50 – 3.24 High; 3.25 – 4.00 Very High*

Among the four digital literacy subdomains, Community Literacy obtained the highest mean score (M = 3.26, SD = 0.52), interpreted as very high, indicating that students are generally confident in communicating, collaborating, and interacting with peers through digital platforms. This strong performance may be attributed to the Media and Information Literacy (MIL) subject in Senior High School, which emphasizes responsible online communication, digital ethics, and collaboration (DepEd, 2019). The finding also supports the Connectivism Theory of Learning, which views knowledge as constructed through digital networks and interactions (Siemens, 2005). Recent studies further highlight that digital technologies create networked learning environments where learners exchange information and collaborate online (Peter & Ogulande, 2024).

In contrast, Content Literacy recorded the lowest mean (M = 2.79, SD = 0.48), although it remained within the high range, suggesting that while students can access and share digital information, they encounter greater difficulty producing original, credible, and well-structured digital content. Studies indicate that learners in rural

or resource-constrained schools often have fewer opportunities for digital content creation due to limitations in infrastructure, instructional support, and teacher readiness (Danao et al., 2025). Content creation also requires sustained instructional scaffolding and higher-order digital skills that may not be fully developed when technology use is limited to communication and information access (Degner et al., 2022). From the perspective of the DigComp Framework and early digital literacy concepts, content creation is a key competency that requires learners to actively construct and share knowledge in digital spaces (Vuorikari et al., 2016; Gilster & Glister, 1997).

**Perceived academic resilience in terms of motivation, emotional regulation, and goal orientation**

Table 3 reveals the *mean and standard deviation of respondents' academic resilience per dimensions.*

*A*mong the academic resilience sub-variables, Motivation obtained the highest mean (M = 3.20, SD = 0.45), indicating that students are strongly driven to achieve academic success and persist despite challenges.

**Table 3**

*Mean and Standard Deviation of Respondents' Academic Resilience Per Dimensions*

| **Dimension** | **Mean** | **SD** | **Description** |
|---|---|---|---|
| Motivation | 3.2 | 0.45 | High |
| Emotional Regulation | 2.98 | 0.37 | High |
| Goal Orientation | 3.01 | 0.43 | High |
| **Overall** | **3.06** | **0.37** | **High** |

*Legend:1.00 – 1.74 Very Low; 1.75 – 2.49 Low; 2.50 – 3.24 High; 3.25 – 4.00 Very High*

The low standard deviation suggests consistent motivation among learners, reflecting both intrinsic factors such as curiosity and personal growth, and extrinsic influences including recognition, grades, and social support (Romano et al., 2021).

In the Filipino context, motivation is also shaped by cultural values such as *pakikipagkapwa*, family responsibility, and community support (Co Shu Ming, 2021; Ganotice et al., 2020). Goal Orientation recorded the lowest mean (M = 3.01, SD = 0.43), while Emotional Regulation showed a similar level (M = 2.98, SD = 0.37), indicating that students are generally capable of managing stress, recovering from setbacks, and pursuing academic goals, though some may still benefit from additional guidance in planning and monitoring their progress. Academic resilience refers to students' capacity to remain engaged and committed to learning despite difficulties and includes motivation, emotional regulation, and goal orientation as core components (Dio & Bolaños, 2025; Perez et al., 2023).

**Perceived academic self-efficacy in terms of perceived control, competence, persistence and self-regulated learning**

Among the academic self-efficacy sub-variables, persistence obtained the highest mean (M = 3.12, SD = 0.39), indicating that students demonstrate strong determination to continue working toward academic goals despite difficulties or setbacks.

**Table 4**

*Mean and Standard Deviation of Respondents' Self-Efficacy Per Dimensions*

| **Dimension** | **Mean** | **SD** | **Description** |
|---|---|---|---|
| Perceived Control | 3.07 | 0.39 | High |
| Competence | 2.8 | 0.44 | High |
| Persistence | 3.12 | 0.39 | High |

| | | | |
|---|---|---|---|
| Self-Regulated Learning | 3.05 | 0.42 | High |
| **Overall** | **3.01** | **0.35** | **High** |

*Legend:1.00 – 1.74 Very Low; 1.75 – 2.49 Low; 2.50 – 3.24 High; 3.25 – 4.00 Very High*

The low standard deviation suggests consistent levels of persistence among respondents. In contrast, Competence recorded the lowest mean (M = 2.80, SD = 0.44), implying that while students generally feel capable of handling academic tasks, some may have lower confidence in certain subjects or skills. Academic self-efficacy refers to students' beliefs in their ability to plan, manage, and accomplish academic tasks (Bandura, 1977; Liu et al., 2020). Research shows that students with higher self-efficacy tend to demonstrate stronger motivation, better academic performance, and greater ability to cope with academic stress (Zheng, 2024). Perceived control allows learners to take responsibility for their learning, while competence supports focus, persistence, and the ability to overcome challenges (Scholes et al., 2022). Persistence is closely associated with academic resilience and achievement, enabling students to continue striving toward goals even after experiencing setbacks (Widjaja et al., 2021). In addition, self-regulated learning, which involves planning, monitoring, and reflecting on learning strategies, helps students improve performance and adapt to academic demands (Llacuna & Mason, 2022).

**Significant difference in the respondents' academic resilience when grouped according to profile**

Table 5 depicts the significant difference of academic resilience when grouped according to profile.

**Table 5**

*Significant Difference of Academic Resilience When Grouped According to Profile*

| Profile | Category | Median | Mean Rank | U | p | Decision | Interpretation |
|---|---|---|---|---|---|---|---|
| Sex | Male | 2.979 | 113.3 | 9,909 | 0.002 | Reject $H_{01a}$ | Significant |
| | Female | 3.144 | 141.5 | | | | |
| Grade Level | Grade 11 | 3.067 | 127.3 | 8,301 | 0.87 | Do Not Reject $H_{01b}$ | Not Significant |
| | Grade 12 | 3.067 | 128.8 | | | | |
| Device Ownership | Yes | 3.067 | 131.1 | 1,729 | 0.024 | Reject $H_{01c}$ | Significant |
| | No | 2.9 | 93.31 | | | | |

*Note: Mann-Whitney U test, significant at p<.05*

The results showed mixed findings regarding differences in academic resilience when respondents were grouped by sex, grade level, and device ownership. A significant difference was found between male (Md = 2.979, MR = 113.3) and female students (Md = 3.144, MR = 141.5), U = 9,909, p = .002, indicating that female students demonstrated higher academic resilience, leading to the rejection of the null hypothesis. This finding is consistent with studies showing that female learners may demonstrate stronger coping strategies, emotional regulation, and help-seeking behaviors when facing academic challenges (Kumari, 2025; Amoadu, 2024).

The study also found a significant difference based on device ownership, where students with personal devices (Md = 3.067, MR = 131.1) demonstrated higher resilience than those without devices (Md = 2.900, MR = 93.31), U = 1,729, p = .024. This supports previous research highlighting that access to digital devices enhances engagement with learning resources, digital literacy, and academic self-efficacy, which contribute to resilience (Biney & Adade, 2024; Gao et al., 2024).

In contrast, no significant difference in academic resilience was found between Grade 11 (Md = 3.067, MR =

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127.3) and Grade 12 students (Md = 3.067, MR = 128.8), U = 8,301, p = .870, indicating comparable resilience levels across grade levels. Similar findings were reported by Amoadu et al. (2025) and Chan et al. (2022), although other studies suggest that resilience may increase with academic experience and exposure to complex learning tasks (Kim et al., 2023; Talikan, 2024).

**Digital literacy significantly influences academic resilience**

The regression analysis (Model 1) shows that digital literacy significantly predicts academic resilience among senior high school students. The model explains 33.5% of the variance in academic resilience ($R^2 = 0.335$, Adjusted $R^2 = 0.332$) and is statistically significant ($F = 127.5$, $p < .001$), indicating that digital literacy is a meaningful factor influencing students' resilience.

**Table 6**

*Test on the Significant Influence of Digital Literacy on Academic Resilience*

| Predictor | Unstandardized Coefficients (B) | Standard Coefficients (β) | t-value | p-value | Decision | Interpretation |
|---|---|---|---|---|---|---|
| (Constant) | 1.328 | ----- | 8.661 | <.001 | ----- | ----- |
| Digital Literacy | 0.588 | 0.579 | 11.291 | <.001 | Reject $H_{02}$ | Significant |

**Model Summary:**

$R^2$ = 0.335; *Adjusted* $R^2$=0.332; $F$ = 127.5; $p$ = <.001; *Interpretation*=Significant

The results show a positive association between digital literacy and academic resilience (B = 0.588, β = 0.579, t = 11.291, p < .001). Students reporting higher digital literacy also tended to report higher academic resilience. The regression model explained 33.5% of the variance in academic resilience ($R^2 = 0.335$; adjusted $R^2 = 0.332$; $F = 127.5$, $p < .001$). Because the study was cross-sectional and non-experimental, this statistical prediction should not be interpreted as proof that digital literacy causes resilience.

The regression equation (Academic Resilience = 1.328 + 0.588[Digital Literacy]) describes the observed statistical relationship in this sample. The remaining 66.5% of variance may be associated with other personal, family, instructional, and school-context factors that were not included in the model (Supervía et al., 2022; Martin & Marsh, 2019).

These findings support Educational Resilience Theory, which views resilience as a dynamic process shaped by individual and contextual factors (Rachmad, 2022), and Bandura's Self-Efficacy Theory, which emphasizes that perceived competence strengthens persistence and coping with academic challenges (Bandura, 1977). Previous studies similarly report that students with stronger digital skills demonstrate higher self-efficacy, better adaptability, and improved coping with academic stress (Solahudin et al., 2022; Saidi et al., 2022). Digital literacy also enhances learning adaptability, self-regulated learning, and persistence, which contribute to improved academic performance and resilience (Li & Zhou, 2025; Budianto et al., 2024).

**Digital literacy significantly influences academic self-efficacy**

The regression analysis in Table 7 showed a significant positive association between digital literacy and academic self-efficacy. The model explained 35.7% of the variance in self-efficacy ($R^2 = 0.357$; adjusted $R^2 = 0.349$; $F = 140.6$, $p < .001$). The coefficient was B = 0.585, β = 0.598, $p < .001$. These findings indicate that students with higher reported digital literacy also tended to report stronger academic self-efficacy; they do not establish a causal direction.

**Table 7**

*Test on the Significant Influence of Digital Literacy on Self-Efficacy*

| Predictor | Unstandardized Coefficients (B) | Standard Coefficients (β) | t-value | p-value | Decision | Interpretation |
|---|---|---|---|---|---|---|
| (Constant) | 1.289 | ----- | 8.767 | <.001 | ----- | ----- |
| Digital Literacy | 0.585 | 0.598 | 11.858 | <.001 | Reject $H_{03}$ | Significant |

**Model Summary:**

$R^2$ = 0.357; *Adjusted* $R^2$=0.349; *F* = 140.6; *p* = <.001; *Interpretation*=Significant

The regression equation (Self-Efficacy = 1.289 + 0.585 × Digital Literacy) summarizes the association observed in the sample. Other factors, including prior achievement, family resources, instructional support, and opportunities to practice digital skills, may also be relevant but were not included as control variables in this analysis. Teacher observations and prior studies (Zakir et al., 2025; Baylon, 2025) support that digital literacy fosters self-directed learning, problem-solving, and persistence.

**Academic self-efficacy significantly influences academic resilience**

The regression analysis in Table 8 showed a significant positive association between academic self-efficacy and academic resilience, explaining 56.5% of the variance in resilience ($R^2 = 0.565$; adjusted $R^2 = 0.561$; $F = 328.3$, $p < .001$). The coefficient was B = 0.772, β = 0.752, $p < .001$. Students who reported stronger academic self-efficacy also tended to report greater academic resilience. The cross-sectional design does not establish that self-efficacy temporally precedes or causes resilience.

**Table 8**

*Test on the Significant Influence of Self-Efficacy on Academic Resilience*

| Predictor | Unstandardized Coefficients (B) | Standard Coefficients (β) | t-value | p-value | Decision | Interpretation |
|---|---|---|---|---|---|---|
| (Constant) | 0.715 | ----- | 5.565 | <.001 | ----- | ----- |
| Self-Efficacy | 0.772 | 0.752 | 18.12 | <.001 | Reject $H_{04}$ | Significant |

**Model Summary:**

$R^2$ = 0.565; *Adjusted* $R^2$=0.561; *F* = 328.3; *p* = <.001; *Interpretation*=Significant

The regression equation (Academic Resilience = 0.715 + 0.772 × Self-Efficacy) indicates that a one-unit increase in self-efficacy corresponds to a 0.772-unit increase in academic resilience, highlighting the strong role of students' confidence in overcoming challenges and persisting in academic tasks. Although 43.5% of the variance remains unexplained and may be influenced by factors such as motivation, emotional regulation, and social support (Supervía et al., 2022), the findings strongly support Bandura's Self-Efficacy Theory (1977), which posits that beliefs in one's capabilities shape motivation, persistence, and adaptive coping.

**Self-efficacy significantly mediates the relationship between digital literacy and academic resilience**

The mediation analysis in Table 9 indicated that digital literacy was positively associated with academic self-efficacy (path a; B = 0.584, z = 8.807, $p < .001$), and academic self-efficacy was positively associated with academic resilience when digital literacy was included in the model (path b; B = 0.652, z = 8.818, $p < .001$). The direct association between digital literacy and academic resilience remained significant (B = 0.204, z =

3.354, p < .001). The total effect was B = 0.585 (SE = 0.052, z = 11.34, p < .001), while the bootstrapped indirect effect was B = 0.381 (SE = 0.044, z = 8.663, p < .001). The indirect effect was estimated using 1,000 bootstrap resamples. The reported statistics are consistent with partial mediation, although the lower and upper bootstrap confidence limits are not reproduced in the available summary table and should be added from the original software output. These findings describe an indirect statistical association and should not be interpreted as evidence of a causal mechanism.

**Table 9**

*Test on the Mediating Effect of Self-Efficacy in the Influence of Digital Literacy on Academic Resilience*

| Effect | Estimate (B) | z-value | p-value | Decision | Interpretation |
|---|---|---|---|---|---|
| Indirect (a × b) | 0.381 | 8.663 | < .001 | Reject $H_{05}$ | Significant |
| Total (c + a × b) | 0.585 | 11.34 | < .001 | ----- | Significant |
| DL→AR direct (c) | 0.204 | 3.354 | < .001 | ----- | Significant |
| DL→SE (a) | 0.584 | 8.807 | < .001 | ----- | Significant |
| SE→AR (b) | 0.652 | 8.818 | < .001 | ----- | Significant |

*Note:* DL – Digital Literacy; SE – Self-Efficacy; AR – Academic Resilience

This means that while digital literacy directly enhances students' resilience by enabling them to manage resources and adapt to learning demands, it also strengthens resilience indirectly by increasing students' academic self-efficacy. These findings support previous studies showing that self-efficacy mediates the relationship between digital literacy and resilience (Solahudin et al., 2022; Santosa, 2023), and that digital competence strengthens students' confidence and task management in challenging learning contexts (Valentin et al., 2023; Chitra & Binuraj, 2022). Overall, the results highlight that fostering both digital literacy and students' confidence in using digital tools is essential for strengthening academic resilience, particularly in rural or resource-limited learning environments. However, because all three constructs were measured through self-report questionnaires at one time point, the direction of the relationships cannot be established. Shared measurement method and unmeasured contextual factors may also have contributed to the observed associations.

**Life-skills program developed to improve students' academic resilience through digital literacy and self-efficacy**

In light of the findings, a student life-skills program titled "DIGI-RESILIENT: Developing Digital Life Skills for Academic Resilience" is proposed to strengthen students' academic resilience through digital literacy and self-efficacy. The program targets areas identified as needing improvement, particularly digital content creation, digital community literacy, and key aspects of academic self-efficacy. It will be conducted during the summer break for two weeks with daily 2–3 hour sessions in participating schools in Claveria, Misamis Oriental to avoid disruption of regular classes. Building on existing initiatives such as the DepEd Computerization Program and the Digital Rise Program (DepEd, 2016; DepEd, 2022), the program shifts the focus from basic ICT skills to higher-order competencies including content creation, critical thinking, collaborative online learning, and responsible digital participation.

Through project-based tasks, peer collaboration, goal-setting, reflection, and emotional regulation activities, the program aims to enhance students' confidence, persistence, and problem-solving skills, thereby strengthening academic self-efficacy and resilience. To ensure equitable participation, shared school devices and internet resources will be provided for students without personal access, with trained teachers facilitating sessions and monitoring progress. Overall, DIGI-RESILIENT seeks to develop advanced digital competencies and reinforce self-efficacy, enabling students to adapt, persist, and succeed in future academic challenges.

## CONCLUSION

The study found that senior high school students in the four participating public secondary schools reported high levels of digital literacy, academic self-efficacy, and academic resilience. Female students and students who owned personal digital devices reported significantly higher academic resilience, while no significant difference was found between Grade 11 and Grade 12 students. Digital literacy was positively associated with academic resilience, both directly and indirectly through academic self-efficacy. The significant indirect effect is consistent with partial mediation. These findings suggest that digital competence and academic confidence are relevant correlates of resilience among the participating rural learners. Because the study used a cross-sectional, non-experimental design, the results do not establish causal effects or temporal ordering.

## LIMITATIONS AND RECOMMENDATIONS

Several limitations should be considered when interpreting the findings. First, the study was conducted in four public secondary schools in one rural municipality, which limits the transferability of the results to private schools, urban settings, and other regions. Second, the cross-sectional design and one-time administration of self-report questionnaires do not establish temporal order or causality. Third, all three main constructs were measured using self-report scales, creating the possibility of social-desirability and common-method bias. Harman's single-factor test or another formal common-method assessment was not reported. Fourth, although the instruments underwent expert content review and pilot reliability testing, confirmatory factor analysis and discriminant-validity checks were not conducted or reported. The study therefore cannot demonstrate through factor-analytic evidence that the three constructs are empirically distinct in this sample. Fifth, the available participant profile was limited to sex, grade level, and device ownership. Strand, family income, prior grades, and individual internet access were not collected and could not be controlled statistically. Sixth, the study did not include performance-based digital-skills tasks, teacher ratings, or independent academic records. Finally, the qualitative component involved teacher-adviser interviews rather than student interviews or focus groups.

Future studies should use larger samples from multiple public and private schools and include a more complete participant profile, particularly strand, gender, household socioeconomic indicators, prior academic performance, device availability, and the quality and regularity of internet access. Researchers should verify sample-size calculations and report the assumptions used. Scale validation should include confirmatory factor analysis and discriminant-validity evidence, alongside reliability estimates for each scale and subscale. Common-method bias should be assessed and reported. Where possible, self-report measures should be complemented by performance-based digital-literacy tasks, teacher assessments, and verified academic records. Longitudinal or multi-wave designs would help establish temporal ordering, while student interviews or focus groups could explain how learners use digital tools when they encounter academic difficulty. Future mediation analyses should report the bootstrap procedure, number of resamples, and lower and upper confidence limits for direct, indirect, and total effects, and should consider theoretically justified controls such as gender, family income, prior grades, and technology access.

For practice, schools may integrate digital-skills instruction with activities that build academic self-efficacy, including guided practice, achievable learning goals, constructive feedback, peer collaboration, and reflection on progress. Teachers can provide consistent academic and emotional support while helping students use digital resources critically and productively. School leaders and education stakeholders should also address unequal access by improving device availability, school-based connectivity, and opportunities to use shared ICT facilities. The proposed DIGI-RESILIENT program may serve as a starting point for these efforts, subject to implementation and evaluation.

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