

Social Support and Adolescents' Digital Reading Literacy: The Moderating Role of Information Literacy

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Abstract: Digital reading literacy helps adolescents learn in digital settings, but its social basis is still unclear. Relevant studies of digital reading often treat social support as a single variable, whereas this can hide the different effects of emotional, instrumental, informational, and peer support. In this study, we examined these four forms of support in relation to digital reading literacy among 1,052 middle school students from four county-level schools in Jilin Province, China. We also tested whether information literacy changes these different relationships. Structural equation modelling revealed that the researched four types of support have positive relationship with digital reading literacy. Peer support had the largest direct effect. Information literacy enhances the relationship between instrumental use and digital reading literacy, as well as between peer support and digital reading literacy. These results reveal that students may benefit more from practical and peer support when they can find, assess, and use information in digital context. The study also shows why social support should be examined by different types in county-level schools.

Keywords: Digital Reading Literacy; Information Literacy; Social Support; Middle School Students

1. Introduction

Digital technology is now part of most learning settings and has changed how adolescents read [1,2]. Digital reading literacy goes beyond understanding ordinary text, since students must navigate hyperlinks, judge the reliability of online sources, and combine information from several platforms [3]. PISA 2022 reported a broad decline in reading performance [4,5]. It also found a continuing gap in students' ability to learn with digital tools independently. Effective reading on digital

devices affects academic performance and social participation [6]. However, we still know little about the social conditions that support this ability, especially in places with limited resources. Most studies focus on cognitive skills, technology access, or family socio-economic status. These factors are often studied separately instead of as parts of students' social environments.

This issue matters in China's county-level schools. The study thus asks two questions to address this gap: How are four types of social support related to digital reading literacy among China's county-level secondary school students? Does information literacy change these relationships? County-level areas have fewer resources than prefectural cities but better device and peer access than remote rural townships. This makes them a useful setting for studying whether social support can reduce resource gaps [7]. However, few studies focus on these students, despite national policies that promote digital literacy [8,9].

Existing studies also often treat social support as one single and broad construct [10], while research on reading and digital literacy usually measures parental involvement or general teacher support. This approach also does not show whether emotional, instrumental, informational, and peer support work in different ways. Moreover, studies have also paid little attention to the skills students use to turn available support into learning gains. Information literacy includes finding, retrieving, evaluating, and using digital information ethically. It is usually studied as a cause or an outcome. This study, therefore, instead tests whether it changes how social support is related to digital reading literacy.

In the following, we examine four types of social support separately. We test information literacy as a moderator and focus on secondary schools in county-level areas, which have received limited research attention.

2 Literature Review and Hypothesis Formulation

2.1 A Multidimensional View of Social Support

Social support means the psychological and material that can help people receive through social relationships. It helps people feel valued and supported within a network [11]. During adolescence, it will support students in coping with stress and staying engaged in school. In this study, social support means help from peers, families, teachers, and institutions. We examine four types separately: emotional [12,13], instrumental [14], informational, and peer support [14]. This approach allows us to compare how each type relates to digital reading.

2.2 The Psychological Function of Emotional Support in Digital Reading

Emotional support includes empathy, care, trust, and understanding. It can make people feel safe when they face academic or social problems, and adolescents may be especially sensitive to it [15]. Digital reading frequently confronts students with overwhelming information whose volume can induce cognitive fatigue and anxiety, and emotional support buffers these states: feeling understood by reliable confidants reduces the psychological costs of academic frustration, sustaining motivation and engagement by unlocking a positive synergy between engagement and motivation [16], protecting even adolescents with low initial reading interest [17]. In Chinese educational settings, where academic pressure is considerable, emotional support appears particularly important as a buffer against anxiety during cognitively demanding tasks.

H1a: Emotional support is positively associated with adolescents' digital reading literacy.

2.3 Instrumental Support and the Material Conditions of Digital Engagement

Instrumental support encompasses tangible assistance, including device access, a conducive learning environment, and help with logistical challenges [14]. For students in county-level settings, where infrastructure is chronically uneven relative to urban centres, instrumental support is a precondition for consistent engagement with digital reading [18]: resource-supported students show greater autonomy and

engagement [19], and tangible support enables the sustained practice that builds reading habits. Given the material disparities in the schools examined here, practical provision should exert a particularly salient influence.

H1b: Instrumental support is positively associated with adolescents' digital reading literacy.

2.4 Informational Support as Instructional Scaffolding for Digital Navigation

Informational support refers to advice and actionable guidance that help individuals solve specific problems [14]. Navigating the digital ecosystem requires sophisticated search strategies and evaluation of multimedia texts [20], and guidance from teachers, parents, or mentors helps adolescents move beyond surface browsing, supporting more sophisticated literacy outcomes. County-level students, who have fewer informal channels for digital guidance than urban peers, depend particularly on such transmission: without well-informed guidance, the chaotic character of online information environments can overwhelm rather than educate adolescents [21].

H1c: Informational support is positively related with adolescents' literacy of digital reading.

2.5 Peer Support and Digital Reading Literacy

Peer support is defined by belonging, shared activity, and integration within a social group, and is especially salient in adolescence, shaping identity formation and academic attitudes. Digital reading is embedded in peer interaction, as students share and co-create knowledge through group messaging and collaborative platforms, fostering communities of practice that negotiate digital literacy norms [12] and encourage effort to maintain social connectedness. However, frequent peer-based digital interaction often centres on gaming or unstructured socialising, entertainment-driven behaviour that may distract students from purposeful reading, so it is postulated that excessive or unstructured peer support detracts from digital reading development.

H1d: Peer support is negatively associated with adolescents' digital reading literacy.

2.6 Information Literacy as a Capability for Resource Conversion

The hypotheses above treat social support as a

direct facilitator of digital reading literacy, raising a further question: does its effectiveness depend on the cognitive capabilities a student brings to bear? Information literacy, the capacity to identify information needs, retrieve material, evaluate sources, synthesise content, and communicate findings ethically, predicts reading achievement in its own right, and comparable digital capabilities buffer the cognitive fatigue of heavy technology reliance. Here it is theorised not as an antecedent but as a conditional mechanism, drawing on Sen's capability approach, which holds that possessing resources is insufficient without the conversion capability to transform means into functioning [22]: a student with a high-specification device will not automatically develop sophisticated reading competencies without the skills to direct it productively, so resources remain static until cognitive capability transforms them into a medium of learning.

The same idea may also apply to peer support. Peer exchanges can be fast and inconsistent. Students need to judge the quality of shared content and avoid false information [12,13]. Information literacy may therefore strengthen peer support when students may think carefully about what they receive. A study of Chinese university students has examined that the information literacy has enhanced the relationship between several forms of learning support and online participation [19].

The pattern may differ for emotional and informational support. Emotional support works mainly by regulating feelings and does not depend on information skills. Informational support often offers guidance that has already been selected or explained, so students need less independent evaluation. We still need to test moderation for all four types of support.

H2a: Information literacy strengthens the positive relationship between emotional support and digital reading literacy.

H2b: Information literacy strengthens the positive relationship between instrumental support and digital reading literacy.

H2c: Information literacy strengthens the positive relationship between informational support and digital reading literacy.

H2d: Information literacy strengthens the positive relationship between peer support and digital reading literacy.

2.7 Theoretical Framework

Three theories inform this study's insights. Social support theory states that wellbeing and adaptive behaviour depend partly on social networks [23]. These networks provide emotional, material, informational, and peer resources that can reduce the mental and practical demands of difficult tasks. In digital learning context, support may also reduce stress and mental effort during complex online reading [12]. For students, they can also rely on other people when they lack resources or struggle with a task. This support may be especially important in schools with limited institutional resources.

According to Bandura's social learning theory, individuals will acquire through interactions among personal, behavioural, and environmental factors [24]. Adolescents do not learn digital skills only through trial and error. They also watch others, copy useful behaviour, and respond to feedback. Parents, teachers, and peers can model effective digital reading and encourage students to use these practices. Digital activity is visible to others, so students can learn by seeing how peers find and use information. This process is more likely when their social network models useful digital behaviour.

The capability approach links available resources with individual outcomes. It holds that the same resources can lead to different results because people differ in their ability to use them [19].

In this framework, the four types of support mentioned above are external resources. Social learning explains how students acquire practices from others. Information literacy explains how well students turn these resources into digital reading skills.

3. Method

3.1 Data Collection

This present research belongs to a wider project of digital reading literacy among Chinese secondary school students. It was conducted in L City, a county-level municipality in Jilin Province. L City has fewer resources than prefectural cities but better digital connections than the rural townships often studied in digital-divide research. It thus gives a setting for examining social support where institutional resources are limited.

We distributed 1,300 questionnaires across all grade levels. After data cleaning, 1,052 valid questionnaires remained, giving a response rate

of about 80.9%. As reported in Table 1, the sample achieved exact gender parity (526 male, 526 female) and covered the first year of junior high school through final year of senior high school, with most participants attending as day

students. Ethical protocols including voluntary participation, anonymity, and institutional data protection were observed throughout, and a pilot test with 100 students preceded the main survey.

Table 1. Valid Sample Demographic Information

Variable	Category	n	%
Gender	M	526	50.00
	F	526	50.00
Grade level	7	166	15.80
	8	175	16.60
	9	186	17.70
	10	230	21.90
	11	164	15.60
	12	131	12.50
School boarding arrangement	Fully boarding school	0	0.00
	Day school / other non-boarding arrangement	527	50.10
	Semi-boarding and semi-day school	525	49.90
Individual boarding status	Boarding student	72	6.80
	Non boarding student	980	93.20

3.2 Measures

Table 2. Social Support Scale

Variable	Dimension	Item
Social Support	Emotion	There is someone who knows my problems.
		I have people I can rely on to discuss my problems.
		When I feel uneasy, I have someone I can talk to.
	Instrument	If I am unable to prepare meals myself, someone can help me.
		If I need help, there are people around me who can assist me.
		If I am ill and bedridden, I have someone who can take care of me.
	Information	I seek information from others to improve my performance in daily activities.
		I communicate with others to obtain help or improve my skills in activities (including but not limited to studying and gaming).
		My family is willing to assist me in making all kinds of decisions.
	Peer	I will still take time with the numerous people I've met through those activities even if I'm not taking part in them.
		I feel that I belong to the group that participates in these activities.
		Even beyond my circle of friends, I can find people to engage in activities with.

The survey used validated, internationally recognised scales, adapted and translated for the Chinese adolescent context through translation and back-translation, with all items were scored on a 1-5 scale. Scale items are presented in full in the appendix. Social support was valued through a 12-item scale distributed equally across the four dimensions. Table 2 lists the full item wording. Emotional and instrumental support items, which were adapted from the NIH Toolbox measures [25] for adolescent comprehension; informational and peer support

items were drawn from the PASSS [26], with one item from the MSPSS for cultural relevance. Cronbach's alpha was 0.768 (Emotional), 0.817 (Instrumental), 0.740 (Informational), and 0.765 (Peer).

Information literacy, the moderating variable, was measured with the 7-item subscale of the 3F-PICTLS, validated for junior secondary school students in Asian contexts. Table 3 presents the item set. Cronbach's alpha was 0.895.

Table 3. Information Literacy Scale

Variable	Item
Information Literacy	I can appropriately find the information needed to solve a problem.
	I can collect or search for information in digital contexts.
	I can utilize ICT (Information and Communication Technology) to appropriately process

	acquired information.
	I can explain and represent information, for example by leveraging ICT to synthesise, summarise, and contrast various information from different sources.
	I can use ICT to design, or to create new information based on what I have obtained.
	I can use ICT to communicate accurate information to proper audiences.
	I can evaluate the usefulness of information for task completion, including assessing bias, authority, and timeliness of sources.

Digital reading literacy, the dependent variable, was evaluated with a 5-item scale adapted from an established Chinese instrument built on the

OECD PISA 2009 reading literacy framework. Table 4 lists the items. Cronbach's alpha was 0.865.

Table 4. Digital Reading Literacy Scale

Variable	Item
Digital Reading Literacy	I am able to select digital reading tools and content that suit my needs.
	During digital reading, I can quickly locate and retrieve the information I need.
	I can critically express my own views on digital reading content.
	I am able to annotate or comment on reading materials.
	I can use appropriate digital devices or software to create my own work, upload it to relevant platforms, and share it with others.

3.3 Reliability and Validity

Exploratory and confirmatory factor analyses substantiated the structural validity of the instrument. The KMO value for the combined scale was 0.911, indicating strong sampling adequacy. Confirmatory factor analysis (CFA) for the full measurement model produced fit indices consistent with a satisfactory model fit: $\chi^2/df=3.273$, AGFI=0.922, GFI=0.938, TLI=0.945, NFI=0.934, CFI=0.953, RMSEA=0.047. For every construct, the Average Variance Extracted was greater than 0.50, confirming convergent validity. For all constructs, their square root of AVE exceeded the corresponding inter-construct correlations, providing discriminant validity; and Composite Reliability exceeded 0.70 throughout, confirming internal consistency.

3.4 Analytic Strategy

Descriptive statistics and bivariate correlations were computed in SPSS 24 to screen for normality and multicollinearity. Amos 24 then estimated a structural equation model for the direct effects of the four support dimensions on digital reading literacy, with fit evaluated using CFI, TLI, and RMSEA. Interaction terms for moderation analyses were generated by mean-centring the relevant variables prior to multiplication, reducing multicollinearity between main-effect and interaction terms.

4. Results

4.1 Descriptive Statistics and Correlations

Students reported moderately high social support across all four dimensions. Instrumental support revealed the highest mean ($M=4.07$, $SD=0.87$), suggesting practical assistance is comparatively more available to this cohort than emotional or peer resources; emotional support recorded the lowest mean ($M=3.70$, $SD=0.83$). Information literacy ($M=3.62$, $SD=0.66$) and digital reading literacy ($M=3.81$, $SD=0.79$) were moderate to moderately high.

Pearson correlations confirmed significant positive associations among all constructs. Digital reading literacy was most strongly correlated with peer support ($r=0.480$, $p<0.001$), that follows informational ($r=0.437$), emotional ($r=0.429$), and instrumental support ($r=0.401$, all $p<0.001$). Information literacy correlated positively with digital reading literacy ($r=0.309$, $p<0.001$) and with all four support dimensions ($r=0.138-0.220$, all $p<0.001$).

Independent-samples t-tests found male students marginally, non-significantly higher on digital reading literacy ($p=0.066$), female students significantly higher on information literacy ($p=0.030$), and no significant gender differences across the four support dimensions: gender functions as a minor covariate.

4.2 Main Effects: Social Support and Digital Reading Literacy

A structural equation model was constructed and analysed in Amos 24 to evaluate the proposed relationships, incorporating the four social support dimensions as exogenous variables and digital reading literacy as the endogenous variable, with maximum likelihood estimation

used for path coefficients and model fit (as shown in Figure 1).

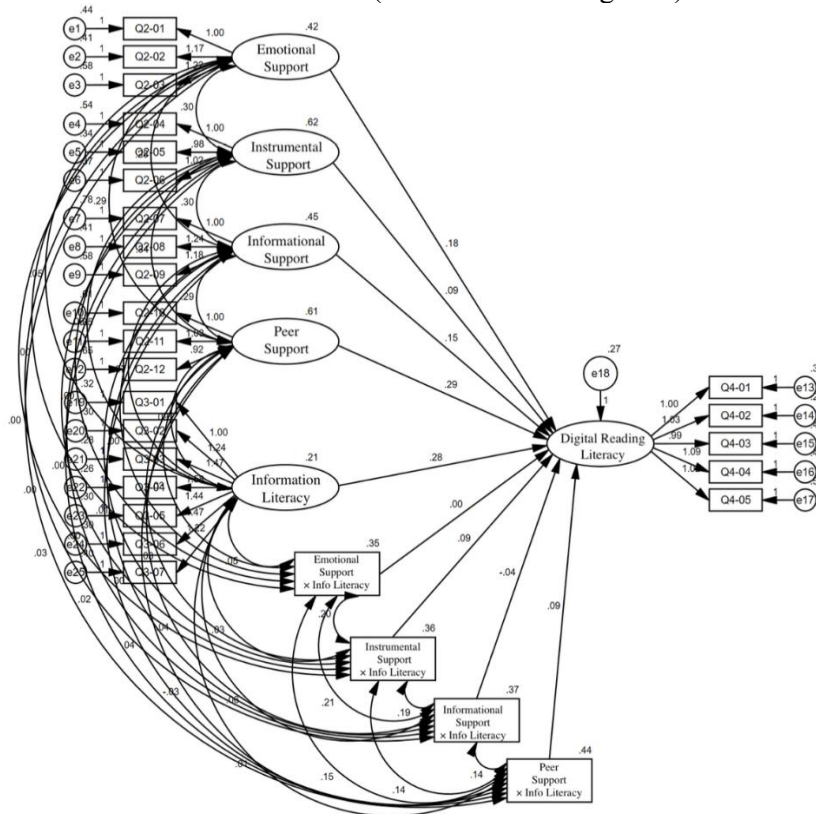


Figure 1. Structural Equation Model Estimated in AMOS 24

Table 5 presents the standardised coefficients and significance tests for the four direct paths. Emotional support significantly predicted digital reading literacy ($\beta=0.162$, $p=0.002$), supporting H1a; instrumental support was likewise positively linked with digital reading literacy ($\beta=0.101$, $p=0.019$), supporting H1b; and

informational support presented a similar positive relationship ($\beta=0.139$, $p=0.005$), supporting H1c. The most effective predictor was found to be peer support ($\beta=0.318$, $p<0.001$), rejecting H1d: peer support enhances rather than diminishes digital reading literacy.

Table 5. Main Effects of Social Support Dimensions on Digital Reading Literacy

Structural Path	Standardised Coefficient (β)	C.R. (t)	p	Hypothesis Result
Emotional Support → Digital Reading Literacy	0.162	3.140	0.002	H1a Supported
Instrumental Support → Digital Reading Literacy	0.101	2.337	0.019	H1b Supported
Informational Support → Digital Reading Literacy	0.139	2.795	0.005	H1c Supported
Peer Support → Digital Reading Literacy	0.318	6.627	< 0.001	H1d Unsupported

4.3 Moderation Analysis: the Role of Information Literacy

To determine the effectiveness of external support depends on students' internal cognitive

capability, the moderating function of information literacy was tested across all four social support pathways to assess. Table 6 reports the results of this moderation analysis.

Table 6. Moderating Effects of Information Literacy

Interaction Path	β	C.R. (t)	p	Hypothesis Result
Emotional Support × Info Literacy → Digital Reading Literacy	0.003	0.093	0.926	H2a Unsupported
Instrumental Support × Info Literacy → Digital Reading Literacy	0.072	2.143	0.032	H2b Supported
Informational Support × Info Literacy → Digital Reading Literacy	-0.035	-1.006	0.314	H2c Unsupported
Peer Support × Info Literacy → Digital Reading Literacy	0.087	2.834	0.005	H2d Supported

As Table 6 shows, information literacy significantly and positively moderates the pathway from instrumental support ($\beta=0.072$, $p=0.032$), supporting H2b, and from peer

support ($\beta=0.087$, $p=0.005$), confirming H2d: under higher information literacy, both benefits are substantially amplified. The interaction between the factors of emotional support and

information literacy did not show a predicted outcome ($\beta=0.003$, $p=0.926$), thus rejecting H2a, as is that between informational support and information literacy ($\beta=-0.035$, $p=0.314$), rejecting H2c.

The structural equation modelling results provide empirical support for all four main effect hypotheses. The final model's indices met or exceeded suggested levels, indicating a satisfactory overall fit ($\chi^2/df=2.737$, AGFI=0.924, GFI=0.942, TLI=0.948, NFI=0.935, CFI=0.958, RMSEA=0.041).

5. Discussion

This study investigated that how four dimensions of social support relate to the digital reading literacy of secondary school students in county-level areas of China, and whether information literacy conditions these relationships. All four dimensions exert positive effects of differing magnitude, and information literacy selectively moderates two of the four pathways, strengthening the instrumental and peer associations while leaving emotional and informational support unchanged.

5.1 Digital Reading Literacy as a Socially Embedded Competency

That all four dimensions positively predict digital reading literacy affirms that this competency is constituted through social relationships and behavioural participation rather than individual cognitive effort alone, extending existing work on the social antecedents of reading [13] to digital literacy within county-level schooling.

Peer support had the largest coefficient ($\beta=0.318$), clearly above those of the other three types of support. This agrees with evidence that peer approval strongly affects adolescent behaviour [13]. Students share links, discuss content, and move through digital platforms together. These everyday exchanges can build reading skills outside formal lessons and make reading part of group activity. This may be especially relevant in county-level areas in China, where adolescents often belong to close peer groups.

5.2 Information Literacy as a Selective Conversion Mechanism

Information literacy enhanced the instrumental and peer support pathways but not the other two. Instrumental support provides devices and other

practical resources, but access alone does not create reading skill [15]. A student with a cutting-edge device still needs to filter relevant search results and check their reliability. Without these skills, internet access may mainly support entertainment purpose. Peer support also involves fast and sometimes conflicting information. Students need information literacy to judge this content and avoid misinformation. With stronger information literacy, they can take part in creating and checking shared knowledge instead of only receiving it.

By contrast, information literacy did not change the effects of emotional or informational support. Emotional support reduces anxiety through affective regulation, so its benefits do not depend strongly on information skills [16]. Informational support usually comes as selected and explained guidance from teachers or parents. Because much of the evaluation has already been done, students' own information literacy may play a smaller role.

5.3 County-Level Educational Inequality and Policy Implications

Compared to urban schools, county-level Chinese schools frequently lack family cultural capital, teacher expertise, and infrastructure. However, contrasted with remote rural schools, they usually offer better device and peer access. As a result, students may have access basic digital resources but little assistance with critical reading. Even when peer assistance was integrated into the concept, instrumental support continued to be important. This shows the ongoing value of material availability. Its greater impact on students who are more information literate also implies that schools should work together to build resources and competencies. Another option is peer support. Teachers can organise group research and peer-led content review to guide existing peer activity toward digital reading. This approach may help where schools cannot sustain costly technology upgrades.

5.4 Theoretical Contributions and Practical Implications

The study divided social support into four types and shows that they are linked with the digital reading literacy in different ways. It also tests information literacy as a moderator. This adds students' ability to use resources to study that usually focuses on how resources are distributed.

Practically, schools cannot improve digital reading literacy through social support or hardware alone. Students need access to devices and supportive classrooms, but they also need information literacy. Schools should teach these skills in the curriculum so students can use instrumental and peer support more effectively. Group activity and shared digital annotation can also direct peer study toward clear academic tasks.

6. Conclusion

The findings show that four types of support are all positively related to literacy of digital reading among students enrolled in a secondary school at the county-level Chinese city. Peer support had the largest direct effect. This may reflect a strong role of peer groups in adolescence and the close peer networks found in researched county-level schools. Information literacy strengthened the effects of instrumental and peer support. It did not greatly change the effects of emotional or informational support. These results show that students' access to resources is still not enough. Students also need the imperative skills to find, assess, and use information.

The study has few limitations. Since the data were cross-sectional, it cannot be determined whether social support causes changes in digital reading literacy. Furthermore, longitudinal studies will be required to determine the order of these changes for future research. Because the assessments were self-reported, social desirability may have an impact. The sample came from one city in Jilin Province, so the findings may not apply to different regions. Therefore, future studies should include additional county-level areas, compare urban and rural samples, and collect data over time. They should also test whether the effect of informational support on digital reading literacy operates through information literacy.

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