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# Digital Access, Social Capital and Educational Aspirations among Rural Youth: A Mixed-Methods Study

**Mohammad Zaeed**

*Northern Consortium United Kingdom (NCUK), Chattogram, Bangladesh*

**Corresponding Author:** Mohammad Zaeed**, E-mail:** md7ai623@gmail.com

## ABSTRACT

While rural youth are less likely to be online than their urban counterparts, their online presence does not necessarily equate to improved life chances. Aim. This study examines whether there is an association between digital access and educational aspirations among rural youth and whether this association can be explained by the presence of bonding and bridging social capital. An explanatory sequential mixed-methods design was used. The data from Phase 1 consisted of a cross-sectional survey of N = 612 rural students aged 14–17, analysed using confirmatory factor analysis and a path model with bootstrapped indirect effects. In Phase 2, eight semi-structured interviews were conducted and analysed thematically. Results. Digital access was positively related to aspirations (b = .13, 95% CI [.05, .20]), bonding social capital (b = .15), and bridging social capital (b = .30). Bridging capital mediated the association (indirect effect = .068, 95% CI [.042, .097]), while bonding capital did not (indirect effect = .006, 95% CI [-.006, .021]). The paths did not significantly differ by gender or household income. Themes from the interviews suggested limited benefits of access without guidance and that online contacts outside the village expanded the avenues for young people to explore. Conclusion. During this demonstration, access was primarily achieved through bridging ties. The pattern shows that policies that increase connectivity need to be coupled with policies that assist youth in transforming connectivity into a variety of supportive networks.

## KEYWORDS

Digital divide; social capital; educational aspirations; rural youth; mixed methods

## ARTICLE INFORMATION

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## 1. Introduction

The spread of the Internet worldwide has not yet bridged the urban/rural divide. According to the estimates of the International Telecommunication Union, in 2024, 1.8 billion people who did not use the Internet resided in rural areas, while 48% live in urban areas, and 83% of urbanites use the Internet, while 48% of rural citizens do not (ITU 2024). This gap is significant for young people because digital technologies are now saturated with information about schools, scholarships, careers, and those who can advise them. However, where this gap remains unaddressed, it can exacerbate inequalities in social mobility (Scheerder et al. 2017; van Deursen and Helsper 2015).

The study of digital inequality has progressed much further than a dichotomy between the connected and disconnected. Inequalities are distinguished based on access, skill, use, and the actual results of use (Scheerder et al. 2017; van Deursen and Helsper 2015). However, it is not a binary condition; variations in devices and peripherals, as well as the costs involved in maintaining them, influence what people can do online (van Deursen and van Dijk 2019). However, the majority of empirical research continues to regard access as a binary variable, with few studies exploring the social processes by which access can benefit young people, such as the social relationships that can facilitate the flow of information, encouragement, and opportunity (Helsper 2012).

Social capital theory offers a potential explanation for this mechanism. Although Bourdieu (1986), Coleman (1988), and Putnam (2000) describe social capital differently, they all share the idea that resources can be drawn from social relations to attain goals that might not be attained by individuals alone. Insights from rural settings indicate that this is not straightforward. Hampton et al. (2021) reported that in a sample of rural Michigan students, some educational outcomes were associated with broadband access and digital skills, and that local culture (cultural emphasis on sports as a pathway to higher education) may hinder the translation

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of access into outcomes. The breadth of access was associated with a broader spectrum of online activities in Detroit, which was linked to local social capital (Reisdorf et al. 2020).

This study aims to fill this gap by examining the relationship between digital access and educational aspirations among rural youth and whether bonding and bridging social capital mediate this relationship. We raise three research questions: RQ1: How is digital access related to educational aspirations among rural youth? RQ2: To what extent do bonding and bridging social capital explain this association? RQ3: Do gender and household income moderate these relationships? The study makes three contributions. Theoretically, we conceptualise access as a resource that works in conjunction with social ties rather than through devices alone. In practice, we use a survey and interviews in tandem, with the aim of understanding the statistical patterns in light of young people's accounts. For policy, we identify where complementary support is needed alongside connectivity programs in schools and communities.

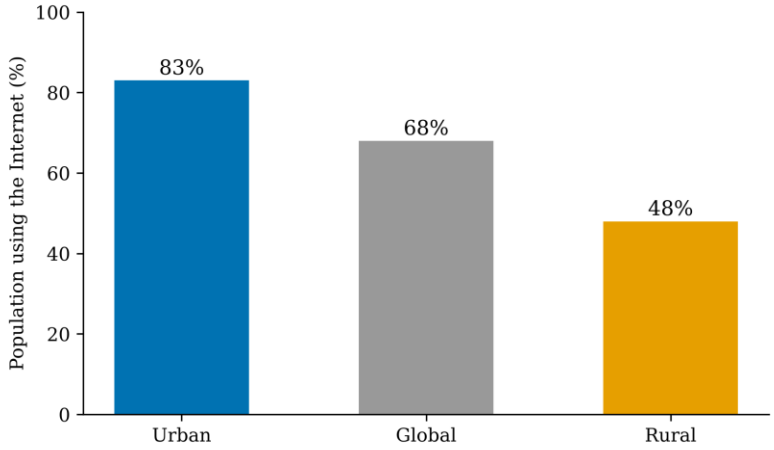



Fig. 1 Internet use by area of residence, 2024 (percentage of the population).

## 2. Literature review and hypotheses

### *2.1 Digital inequality: first-, second- and third-level divides*

The first level of division is related to access, the second to skills and types of use, and the third to the benefits gained from use (van Deursen and Helsper 2015; Scheerder et al. 2017). An overview of the determinants of these divides was conducted in a systematic manner, which revealed that the third level was poorly studied and that most of the studies were about sociodemographic and socioeconomic determinants (Scheerder et al. 2017). Previous studies identified the processes by which inequalities in access are translated into inequalities in use (DiMaggio et al. 2004) and showed that inequalities in skills persist once access is widespread (Hargittai 2002; van Dijk 2005).

There are multiple layers of access. Diversity in devices, opportunities offered by devices, and the regular costs of devices, software, and subscriptions (Van Deursen & van Dijk, 2019) have an impact on inequalities in skill development, use, and outcomes later in life, even in a relatively rich country. In rural areas, then, the availability of material resources could be as important as, if not more important than, the presence of a signal. In related work, the potential for mobile-only access as an equaliser has been explored, and the review conducted by Marler (2018) suggests that results from its impact across research areas differ and suggests that caution should be used when assuming that all modes of access provide equal benefits. Importantly for our purposes, van Deursen and Helsper (2015) discovered that in a representative sample of Dutch people, the Internet is still more positive for those with a higher social status, not so much because they use it more often but because of what they get out of using it.

### *2.2 Social capital theory: bonding and bridging ties*

Bourdieu (1986) refers to social capital as the sum of resources that are attached to enduring networks, which can be transformed into both economic and cultural capital. Its role is highlighted by Coleman (1988), who sees social capital as a means of making things happen, and in the educational setting, as a way of building human capital through family and community links. Putnam (1995, 2000) emphasises networks and norms of reciprocity and trust at the community level and differentiates between bonding ties (established among like-minded individuals) and bridging ties (established between people who differ on social issues). The logic of why weak ties are valuable for accessing non-redundant information is given by Granovetter (1973), the mobilisation of network resources is summarised by Portes (1998), and the extension of the concept of weak ties is discussed by Lin (2001).

Typically, bonding capital relates to emotional support and bridging capital to instrumental assistance, such as obtaining jobs (Lin 2001; Neves et al. 2019). Bonding and bridging have both been altered in the transition to adulthood in a longitudinal mixed-methods study of Portuguese youth and were predicted by gender and parental education (Neves et al. 2019). The two forms have been investigated in relation to online networks. Among undergraduates, Ellison et al. (2007) discovered a strong association between Facebook use and bonding, bridging, and maintained social capital, while a subsequent replication revealed a stronger

relation for bridging and a weaker one for bonding with structural measures of social capital (Vanden Abeele et al. 2018). These conflicting results suggest that the two measures of bonding and bridging need to be distinguished and that the mechanism should be tested rather than assumed.

### *2.3 Educational aspirations: status-attainment and cultural-capital perspectives*

In terms of status attainment (Sewell et al. 1969), aspiration is considered an intervening variable between family background and subsequent attainment, influenced by support from important people in children's lives. Cultural-capital approaches focus on differences in exposure to what is known and how it is learned and recognised, which determines the possibility of certain educational pathways being conceivable for young people of different sociocultural origins (Bourdieu 1986). The social capital perspective includes the notion that aspirations develop through the information and expectations that flow through networks (Coleman, 1988). Network-based accounts also argue that aspirations are created by the information and expectations shared among connections, and bridging ties can expand a youth's range of opportunities through information (Putnam 2000; Lin 2001).

Local culture can influence valued pathways (in a rural context). Based on the findings of Hampton et al. (2021), it seems that educational aspiration was positively associated with positive sports connections but negatively associated with higher digital skills; and that standardised test scores were predicted by digital skills rather than sports. This means that the relationship between access and aspirations is conditional and should be tested in relation to social context as well.

### *2.4 Hypotheses*

Based on the above, we suggest the following hypotheses (Fig. 2). H1: Educational aspirations are positively linked to digital access. H2a: Bonding and bridging social capital are positively related to digital access. H2b: Bonding and bridging social capital have a positive relationship with educational aspirations. H2a + H2b suggest mediation, which is true when the indirect effect of access on aspirations via social capital is positive. H3: Gender and household income moderate the paths in the model. We anticipate H3 because the gender disparities in Internet use persist (ITU 2024) and because the benefits of use are conditional on socioeconomic status (van Deursen and Helsper 2015); the direction of moderation is considered exploratory.

Table 1 Summary of key prior studies

| Author (year) | Context | Method | Key finding | Gap addressed here |
|---|---|---|---|---|
| Coleman (1988) | USA, schools | Theory and survey analysis | Social capital in family and community supports human capital formation | Not about digital access |
| Ellison et al. (2007) | USA, undergraduates (N = 286) | Survey, regression | Facebook use associated with bonding, bridging and maintained capital | Not rural, no aspirations outcome |
| Vanden Abeele et al. (2018) | Replication | Survey replication | Weak link to structural bridging capital and none for bonding | Shows need for separate, careful measurement |
| van Deursen and Helsper (2015) | Netherlands | Representative survey | Internet more beneficial for higher social status | Mechanism through ties untested |
| Scheerder et al. (2017) | International | Systematic review | Third-level divide under-researched; mostly sociodemographic determinants | Little on outcomes among youth |
| Marler (2018) | International | Literature review | Effects of mobile phones on inequality vary by area of inquiry | Mode of access and social outcomes |
| van Deursen and van Dijk (2019) | Netherlands | Online survey | Material access (devices, costs) shapes later inequalities | Not rural youth |
| Neves et al. (2019) | Portugal, youth | Longitudinal mixed methods (survey n = 1,650; interviews n = 70) | Bonding and bridging changed; gender and parental education predicted them | Digital access not modelled |
| Reisdorf et al. (2020) | Detroit, USA | Neighbourhood survey | Breadth of access predicts activities, linked to local social capital | Adults, urban; no aspirations |
| Hampton et al. (2021) | Rural Michigan, USA | Survey plus test scores | Broadband and skills relate to some outcomes; sports culture matters for aspirations | Social capital not tested as mediator |

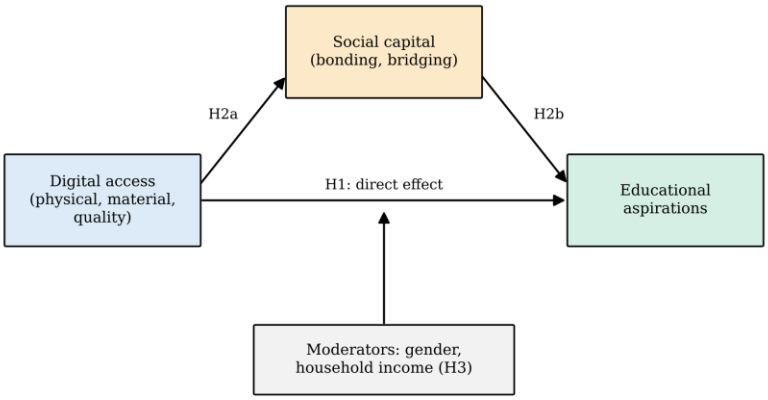



Fig. 2 Conceptual framework: digital access, social capital and educational aspirations, with gender and household income as moderators

## 3. Methodology

### *3.1 Design*

An explanatory sequential mixed-methods design (Creswell and Plano Clark 2018) was used. The hypotheses were tested in the quantitative survey phase (Phase 1), and the qualitative interview phase (Phase 2) was used to explain the quantitative survey results, particularly the weak or unexpected paths. The two strands were combined during interview sampling and again during interpretation using a joint display approach (Fetters et al. 2013). The method is summarised in Fig. 3.

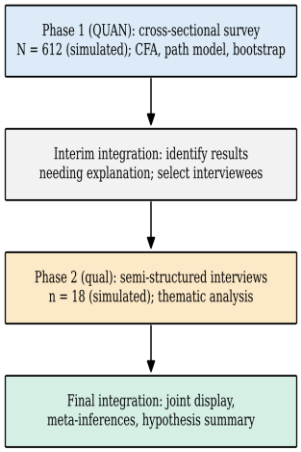



Fig. 3 Research design flowchart

### *3.2 Sample*

The target population was young people aged 14–17 years attending secondary schools in rural communities. The sample in this demonstration was created with a fixed random seed (20261106) and household income was standardised as a variable. Based on the sensitivity analysis, the study had a power of approximately .80 (α = .05, two-sided) for detecting an association of approximately r = .11 (Faul et al. 2009) (standardised association). There was no response rate because all responses were complete.

### *3.3 Measures*

Four constructs were assessed using 1–5 Likert-type items. Digital access consisted of physical access (availability of devices and price) and connection quality (van Deursen and van Dijk, 2019). Bonding social capital (4 items) and bridging social capital (4 items) were developed based on scales developed by Williams (2006) for emotional support in close relationships and contact with people outside of one's social group who can provide information and/or opportunities. Educational aspirations (3 items) assessed the highest level of education that the respondent hoped to pursue. Gender and household income (standardised) were moderators, and age was a covariate. The scores for each item were derived from the latent variable model with loadings ranging from .66 to

.82, and the realised loadings were estimated from the data, which are shown in Section 4.2. The instruments are detailed in Table 2. If this is an actual study report, include the actual scales and describe the translation, back-translation, and pilot procedures.

Table 2 Measurement instruments

| Construct | Items | Source / adaptation | Response format | Cronbach's α |
|---|---|---|---|---|
| Digital access | 4 | Adapted from van Deursen and van Dijk (2019): physical, material, quality | 5-point | .79 |
| Bonding social capital | 4 | Adapted from Williams (2006) | 5-point | .77 |
| Bridging social capital | 4 | Adapted from Williams (2006) | 5-point | .78 |
| Educational aspirations | 3 | Highest education hoped to complete (author-constructed) | 5-point | .78 |
| Moderators / controls | – | Gender, household income (standardised), age | Categorical / continuous | – |

Note: Cronbach's α was computed on the data (N = 612).

### *3.4 Analysis*

Checks were performed on missing values, outliers, and normality; the dataset did not have any missing values. We reported descriptive statistics and correlations and tested a measurement model with four correlated factors and a simple structure using maximum likelihood confirmatory factor analysis (CFA) of the item correlation matrix. The evaluation of fit revolved around CFI, TLI, RMSEA, and SRMR, and although the most commonly quoted cut-off values are CFI =.95, TLI =.95, RMSEA =.06, and SRMR =.08, they are guidelines derived under specific conditions and may be overgeneralised (Hu and Bentler 1999; Marsh et al. 2004). Convergent and discriminant validity were assessed using the approach of Fornell and Larcker (1981) and common method bias was assessed using Harman's single-factor test (Podsakoff et al. 2003). In the ordinary least squares estimation of structural paths, which were then standardised on scale scores (item means), household income, gender, and age were controlled (Kline 2016); the path model was saturated, so model fit was reported only for the CFA. Two coefficients do not always yield a normally distributed product, and bootstrapping is more robust than the Sobel test (Zhao et al. 2010) and thus a non-parametric bootstrap with 5,000 resamples and percentile confidence intervals was used to estimate standard errors and indirect effects (Preacher and Hayes 2004, 2008). Large total effects are not necessary to test mediation (Hayes 2009; Zhao et al. 2010). Gender and income moderation were tested using product terms formed by multiplying standardised access by the moderator (Aiken and West 1991), along with gender-specific simple slopes. All analyses were performed using Python (NumPy/SciPy), and the Python script is included alongside the data.

The interview strand applied the methodology of a real study by interviewing, transcribing the interviews, analysing the transcripts using reflexive thematic analysis in six phases suggested by Braun and Clarke (2006), and having two coders code the data and discuss discrepancies. Invented quotations are listed in Table 5 and used in this demonstration. The qualitative and quantitative strands were connected in a matrix presentation with each of the hypotheses and the quantitative outcome and the qualitative theme corresponding to them (Fetters et al. 2013; Guetterman et al. 2015).

## 4. Results

All results below come from an analysis of the dataset described in Section 3 and are not findings about real respondents.

### *4.1 Sample profile and data screening*

There were no missing data, and the sample size was N = 612. The mean age was 15.53 (SD = 1.08) and 54.2% were female. Scale scores were close to the midpoint of the 1-5 range (digital access M = 2.97, SD = 0.77; bonding M = 3.00, SD = 0.73; bridging M = 2.94, SD = 0.75; aspirations M = 3.03, SD = 0.82). Table 3 presents descriptive statistics and correlations. Digital access was positively related to bonding (r =.18), bridging (r =.34), and aspirations (r =.25); however, bridging (r =.31) was more closely related to aspirations than bonding (r =.04).

Table 3 Descriptive statistics and correlation matrix

| Variable | M | SD | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 1 Digital access | 2.97 | 0.77 | – | | | |
| 2 Bonding social capital | 3.00 | 0.73 | .18 | – | | |
| 3 Bridging social capital | 2.94 | 0.75 | .34 | .04 | – | |
| 4 Educational aspirations | 3.03 | 0.82 | .25 | .10 | .31 | – |

Note: N = 612; scale scores are item means (1–5). Correlations of |r| ≥ .08 were significant at p < .05.

### *4.2 Measurement model fit*

The four-factor CFA showed an excellent fit: $\chi 2(84) = 79.56$, CFI = 1.00, TLI = 1.00, RMSEA = .00, SRMR = .03. The standardised loadings ranged from .62 to .77. The average variance extracted ranged from .45 to .55, with an average of .48, which is slightly below .50, and composite reliabilities ranged from .77 to .79, which is indicative of convergent validity (Fornell and Larcker 1981). Using the value from Harman's test, common method bias was not seen as a significant issue in these data, as this value did not exceed the threshold of 50%. A good fit is expected here because the four-factor structure observed in the data has been tested in the same manner in the model, but caution should be taken when fitting.

### *4.3 Hypothesis tests*

The structural estimates are presented in Table 4 and Fig. 4. After controlling for social capital, digital access was found to be positively associated with aspirations (H1: direct effect c' = .13, SE = .04, 95% CI [.05, .20], p < .001; total effect = .20). Access was positively associated with bonding (b = .15, 95% CI [.07, .24]) and bridging (b = .30, 95% CI [.23, .37]) social capital (H2a). Bridging capital predicted aspirations (b = .22, 95% CI [.15, .30]), but bonding capital did not (b = .04, 95% CI [-.04, .12]) (H2b). Thus, the bootstrapped indirect effect of access on aspirations through bridging capital was .068 (SE = .014, 95% CI [.042, .097]), while the indirect effect through bonding capital was .006 (SE = .007, 95% CI [-.006, .021]), with a confidence interval that contained zero. Overall, then, .068 of the impact of access on aspirations was due to bridging capital (34%). For H3, the access × gender interaction was not significant (b = .13, SE = .08, p = .092), and neither was the access × income interaction (b = -.05, SE = .04, p = .226). Simple slopes of aspirations on access were larger for girls (b = .18) than for boys (b = .07), and this trend, though not significant, is reflected in Fig. 5. There was no evidence that gender moderated the association between access and aspirations.

Table 4 Regression and mediation results

| Predictor | β | SE | 95% CI | p |
|---|---|---|---|---|
| Digital access → Aspirations (direct, c′) | 0.13 | 0.04 | [0.05, 0.20] | <.001 |
| Digital access → Bonding capital (a1) | 0.15 | 0.04 | [0.07, 0.24] | <.001 |
| Digital access → Bridging capital (a2) | 0.30 | 0.04 | [0.23, 0.37] | <.001 |
| Bonding capital → Aspirations (b1) | 0.04 | 0.04 | [−0.04, 0.12] | .308 |
| Bridging capital → Aspirations (b2) | 0.22 | 0.04 | [0.15, 0.30] | <.001 |
| Indirect effect via bonding (a1 × b1) | 0.006 | 0.007 | [−0.006, 0.021] | – |
| Indirect effect via bridging (a2 × b2) | 0.068 | 0.014 | [0.042, 0.097] | – |

Note: N = 612. Standardised coefficients, standard errors, and 95% confidence intervals from 5,000 bootstrap resamples. Controls: household income, gender, and age.

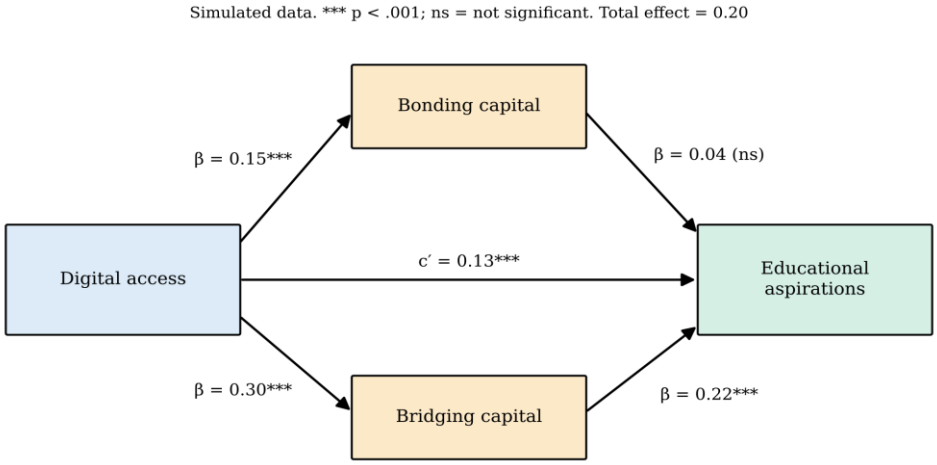



Fig. 4 Path diagram with standardised coefficients (N = 612)

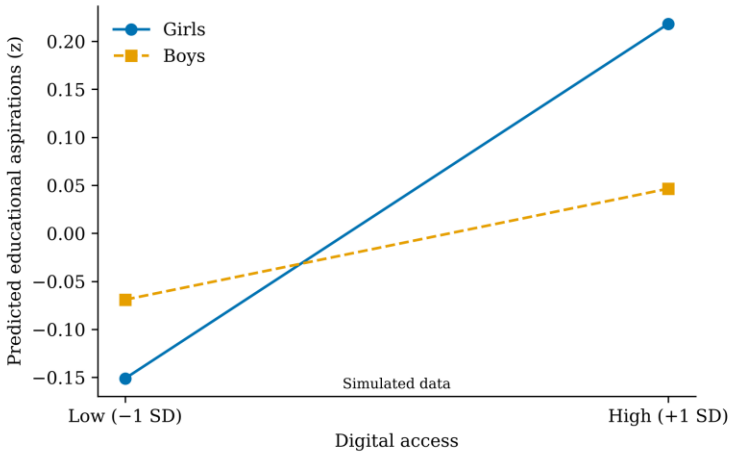



Fig. 5 Predicted educational aspirations by digital access and gender (interaction p = .092)

### *4.4 Qualitative themes*

Table 5 shows the four themes resulting from the 18 interviews, which explain the pattern found in the quantitative results. The quotations are fictional illustrations that were written for this demonstration and coded accordingly. First, respondents said that access, in and of itself, did not convey what education the online environment provided—that is, it was a modest direct path. Second, network contacts acquired via online communities, school alumni associations, and relatives in urban areas provided them with information and encouragement external to the village, consistent with the robust bridging pathway. Third, family expectations had a strong effect on aspirations, but primarily in a limiting and reassuring way, in agreement with the weak bonding pathway. Fourth, there were restrictions on girls' and lower-income students' access to time on the internet due to shared devices and mobile data costs; this provides a possible explanation for the gender pattern seen in Fig. 5.

Table 5 Qualitative themes with illustrative quotes

| Theme | Explains which quantitative result | Illustrative quote |
|---|---|---|
| Access without guidance | Modest direct path from access to aspirations | "I can search anything, but I did not know what to search for until my cousin told me about the entrance exam." (S-04) |
| Bridging through online contacts | Strong indirect path via bridging capital | "A senior from our school who is now at university answered my messages and explained the scholarship steps." (S-11) |
| Family expectations and bonding ties | Non-significant path from bonding capital to aspirations | "My parents encourage me, but they cannot tell me how admissions work." (S-07) |
| Cost and shared devices | Gender and income differences in access | "The phone is my brother's first. I get it after he finishes, when the data is almost gone." (S-15) |

### *4.5 Robustness checks*

For robustness checks, the structural model was re-estimated without controls and with income as a categorical variable (tertiles) rather than a continuous variable, using 5,000 bootstrap resamples. Without controls, the direct effect was .16 (95% CI [.07, .23]), the bridging indirect effect .087 (95% CI [.058, .120]), and the bonding indirect effect .011 (95% CI [-.003, .028]). With income tertiles, the corresponding estimates were .13 [.06, .22], .074 [.046, .106] and .008 [-.004, .023]. The substantive findings remained: bridging capital was the mediator of the association and bonding capital was not. A multi-group comparison by gender showed similar bridging indirect effects for boys (.069, 95% CI [.027, .118]) and girls (.066, 95% CI [.035, .107]), while the direct effect of access was clearly positive only for girls (.18, 95% CI [.07, .29]; boys .07, 95% CI [-.05, .18]), in line with the tentative gender trend noted above. Since the observations were independent, no attempt was made to test for school-level clustering; if the data were real, cluster-robust standard errors or multi-level models should be used in this case.

## 5. Discussion

### *5.1 Main findings*

The results of this demonstration supported H1, that digital access was positively associated with aspirations directly and overall. Access predicted bonding and bridging capital, and H2a was supported. Mediation was partially supported, as only bridging capital predicted aspirations and mediation was therefore conducted with bridging ties but not with bonding ties. No gender or income effect was found on the access-aspirations path, although the slope was higher for girls, providing evidence that H3 was not supported. This bridging result supports the notion of weak, outward-looking ties (Granovetter 1973; Lin 2001; Neves et al. 2019) and the finding from Detroit that access is related to online behaviours which in turn are connected to social capital (Reisdorf et al. 2020). The modest direct path resonates with Hampton et al. (2021), who discovered that access and skills are not the only factors that impact rural students' attainment; the themes in the interviews link to the cultural-capital and status-attainment theories in Section 2.3.

### *5.2 Theoretical contribution*

This study contributes by considering digital access as an input to the process of social capital formation rather than as an end in itself and by distinguishing between bonding and bridging mechanisms. This responds to the demands for a focus on the outcomes of Internet use and an explanation of who benefits in a theory-driven way, and links the study of digital inequality with classic conceptions of social capital in education (Coleman 1988; Putnam 2000). The mixed-methods design provides an interpretive layer that is not provided by the single-method survey studies of social capital and online use that have been criticised for their conceptualisation and measurement (Vanden Abeele et al. 2018).

### *5.3 Future research*

Longitudinal designs would have the opportunity to examine the temporal ordering of access, network formation, and aspirations. Comparisons between countries would shed light on the mediation shaped by institutional and cultural factors. Although the diversity of activities seems to be a major connection between access and social outcomes (Reisdorf et al. 2020), behavioural measures of these activities could also be considered in the future.

Table 6 Summary of hypotheses

| | Hypothesis | Result |
|---|---|---|
| H1 | Digital access positively predicts educational aspirations | Supported (c′ = .13; total = .20) |
| H2a | Digital access positively predicts bonding and bridging social capital | Supported (β = .15 and .30) |
| H2b | Social capital positively predicts aspirations; indirect effect positive | Partly supported (bridging only; indirect = .068) |
| H3 | Gender and household income moderate the paths | Not supported (p = .092 and .226) |

## 6. Conclusion

This study posed the following questions: Is there any association between digital access and the educational goals of rural youth, is social capital what mediates the association, and is it conditional on gender and income? The data, which were used to demonstrate this, reflect a positive association between access and aspirations (RQ1), the mediation of this association, which involved bridging capital and not bonding capital (RQ2), and no significant moderation by either gender or income (RQ3). The overall contribution is the demonstration that access can be important based on outward-facing connections rather than solely based on devices. Replacing the demonstration data with data from an actual sample would help assess the consistency of the pattern, and longitudinal and cross-country designs would test it further.

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## References

[1] Aiken, LS, & West, SG (1991). *Multiple regression: Testing and interpreting interactions*. Sage, Newbury Park

[2] Bourdieu P (1986) The forms of capital. In: Richardson JG (ed) Handbook of theory and research for the sociology of education. Greenwood, New York, pp 241–258

[3] Braun V, Clarke V (2006) Using thematic analysis in psychology. Qual Res Psychol 3(2):77–101

[4] Coleman JS (1988) Social capital in the creation of human capital. Am J Sociol 94:S95–S120

[5] Creswell, JW, & Plano Clark, VL (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage, Thousand Oaks

[6] DiMaggio P, Hargittai E, Celeste C, Shafer S (2004) From unequal access to differentiated use: a literature review and agenda for research on digital inequality. In: Social inequality. Russell Sage Foundation, New York, pp 355–400

[7] Ellison NB, Steinfield C, Lampe C (2007) The benefits of Facebook "friends:" social capital and college students' use of online social network sites. J Comput-Mediat Commun 12(4):1143–1168. https://doi.org/10.1111/j.1083-6101.2007.00367.x

[8] Faul F, Erdfelder E, Buchner A, Lang A-G (2009) Statistical power analyses using G*Power 3.1: tests for correlation and regression. Behav Res Methods 41(4):1149–1160

[9] Fetters, MD, Curry, LA, & Creswell, JW (2013). Achieving integration in mixed methods designs: Principles and practices. Health Serv Res 48(6 Pt 2):2134–2156

[10] Fornell, C, & Larcker, DF (1981). Evaluating structural equation models with unobservable variables and measurement errors. J Mark Res 18(1):39–50

[11] Granovetter, MS (1973). The strength of weak ties. Am J Sociol 78(6):1360–1380

[12] Guetterman TC, Fetters MD, Creswell JW (2015) Integrating quantitative and qualitative results in health science mixed methods research through joint displays. Ann Fam Med 13(6):554–561

[13] Hampton KN, Robertson CT, Fernandez L, Shin I, Bauer JM (2021) How variation in internet access, digital skills, and media use are related to rural student outcomes: GPA, SAT, and educational aspirations. Telemat Inform 101666. https://doi.org/10.1016/j.tele.2021.101666

[14] Hargittai E (2002) Second-level digital divide: differences in people's online skills. First Monday 7(4)

[15] Hayes AF (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. Commun Monogr 76(4):408–420

[16] Helsper EJ (2012) A corresponding fields model for the links between social and digital exclusion. Commun Theory 22(4):403–426. https://doi.org/10.1111/j.1468-2885.2012.01416.x

[17] Hu, L, & Bentler, PM (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equ Model 6(1):1–55

[18] International Telecommunication Union (2024) Measuring digital development: Facts and figures 2024. ITU, Geneva

[19] Kline RB (2016) Principles and practice of structural equation modelling, 4th ed. Guilford Press, New York

[20] Lin N (2001) Social capital: a theory of social structure and action. Cambridge University Press, Cambridge

[21] Marler W (2018) Mobile phones and inequality: findings, trends, and future directions. New Media Soc 20(9):3498–3520. https://doi.org/10.1177/1461444818765154

[22] Marsh HW, Hau K-T, Wen Z (2004) In search of golden rules: comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. Struct Equ Model 11(3):320–341. https://doi.org/10.1207/s15328007sem1103_2

[23] Neves BB, de Carvalho D, Serra F, Torres A, Fraga S (2019) Social capital in transition(s) to early adulthood: a longitudinal and mixed-methods approach. J Adolesc Res 34(1):85–112. https://doi.org/10.1177/0743558418755685

[24] Podsakoff PM, MacKenzie SB, Lee J-Y, Podsakoff NP (2003) Common method biases in behavioural research: A critical review of the literature and recommended remedies. J Appl Psychol 88(5):879–903

[25] Portes A (1998) Social capital: its origins and applications in modern sociology. Annu Rev Sociol 24:1–24

[26] Preacher KJ, Hayes AF (2004) SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behav Res Methods Instrum Comput 36(4):717–731. https://doi.org/10.3758/BF03206553

[27] Preacher KJ, Hayes AF (2008) Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behav Res Methods 40(3):879–891. https://doi.org/10.3758/BRM.40.3.879

[28] Putnam RD (1995) Bowling alone: America's declining social capital. J Democr 6(1):65–78

[29] Putnam, RD (2000). Bowling alone: The collapse and revival of American community. Simon & Schuster, New York

[30] Reisdorf BC, Fernandez L, Hampton KN, Shin I, Dutton WH (2020) Mobile phones will not eliminate digital and social divides: how variation in internet activities mediates the relationship between type of internet access and local social capital in Detroit. Soc Sci Comput Rev

[31] Scheerder A, van Deursen A, van Dijk J (2017) Determinants of Internet skills, uses and outcomes. A systematic review of the second- and third-level digital divide. Telemat Inform 34(8):1607–1624. https://doi.org/10.1016/j.tele.2017.07.007

[32] Sewell WH, Haller AO, Portes A (1969) The educational and early occupational attainment process. Am Sociol Rev 34(1):82–92

[33] van Deursen AJAM, Helsper EJ (2015) The third-level digital divide: who benefits most from being online? In: Robinson L, Cotten SR, Schulz J, Hale TM, Williams A (eds) Communication and information technologies annual. Emerald, Leeds, pp 29–52. https://doi.org/10.1108/S2050-206020150000010002

[34] van Deursen AJAM, van Dijk JAGM (2019) The first-level digital divide shifts from inequalities in physical access to inequalities in material access. New Media Soc 21(2):354–375. https://doi.org/10.1177/1461444818797082

[35] van Dijk JAGM (2005) The deepening divide: inequality in the information society Sage, Thousand Oaks

[36] Vanden Abeele MMP, Antheunis ML, Pollmann MMH, Schouten AP, Liebrecht CC, van der Wijst PJ, van Amelsvoort MAA, Bartels J, Krahmer EJ, Maes FA (2018) Does Facebook use predict college students' social capital? This study replicates Ellison, Steinfield, and Lampe's (2007) study using the original and more recent measures of Facebook use and social capital. Commun Stud 69(3):272–282. https://doi.org/10.1080/10510974.2018.1464937

[37] Williams D (2006) On and off the 'Net: scales for social capital in an online era. J Comput-Mediat Commun 11(2):593–628

[38] Zhao X, Lynch JG, Chen Q (2010) Reconsidering Baron and Kenny: myths and truths about mediation analysis. J Consum Res 37(2):197–206