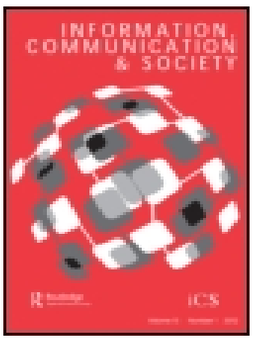

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Digital remediation: social support and online learning communities can help offset rural digital inequality

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ABSTRACT

While all students enter college with varying levels of digital skills, those from rural areas may face extra challenges because their own skills and those of their pre-college networks may be underdeveloped. Without some type of intervention, digital deficits can perpetuate further educational disadvantages. We developed an online learning community (OLC) in two sections of an introductory college course and integrated collaborative learning into students' weekly activities. Regression analysis of survey data ($N = 373$) shows three impacts: access to social support is associated with higher skill assessment and improvements in digital skills; rural status is associated with a clear and significant disadvantage in digital skill assessment; and that involvement in an OLC contributed substantially to improvements in digital skills. We conclude with limitations and considerations for future research.

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Community; skills; inequality; self-efficacy; digital inequality; rurality

Introduction

The full potential of information and communication technologies (ICTs) has yet to be fully realized. Although ICTs have provided various benefits to both individuals and the society, the realization of the full spectrum of gains becomes limited when some are excluded. It is known that students enter college with varying levels of knowledge, resources, social support, and digital skills (Correa, 2010; DiMaggio, Hargittai, Celeste, & Shafer, 2004). Digital inequality is a reality that is manifested along the lines of gender, race, social class, geography and culture (Van Dijk, 2005; Witte & Mannon, 2009). In terms of location and geography, rurality can lead to digital disadvantage as profound as those caused by race and social class (Stern, Adams, & Elsasser, 2009). Rurality, especially in Appalachia can dramatically reduce access to ICT, leading to a systematic disadvantage for students hailing from those areas. The emancipatory potential of education depends on instructional opportunities that can help offset inequalities derived from ascribed attributes.

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Our study draws from a University located in the Appalachian region where technical and cultural barriers to digital involvement can be substantial, especially for students from rural communities. We created a survey to measure the perceived skill distribution in our sample of students and involved a subsample in an online learning community (OLC) with access to resources and support for digital skills. In this community, students were introduced to digital collaboration tools and were encouraged to appropriate those tools for purposes outside the classroom. We hoped that experiencing structured engagement would improve participants' knowledge of, and confidence in, using such tools. We therefore investigate differences in student skills and participatory activities upon entering college and unearth whether such form of engagement leads to an improvement in skills and online collaboration.

Methods

Data collection and sample descriptive

Students were recruited via an introductory social science course at a large mid-western university. A total of 628 students were solicited for participation, 450 students started the survey, of which only 373 were usable, yielding a response rate of 62.6%.

The sample is similar to the undergraduate population at the university under investigation, with three notable differences. Our sample is more likely to be: female (57.1% vs. 52% in population), white (87.9% vs. 81.6%), and in their first year of college. There were not any substantive or significant differences in demographics of the control and learning community groups, nor were there significant differences in terms of prior use or skills.

Overview of the online learning community

Online learning communities can be defined as 'networks of social relationships in which engagement and interaction are critical factors' (Lock, 2002, p. 131). We created a learning community hosted on a private sub-Reddit. Involvement in this intervention group was integrated into two courses taught by the researchers. The forum was open to 318 students in these courses (class A had 266 students and class B had 52 students; not all of the students participated in the online community). Participation points in these classes could be earned in the classroom, in the online community, or both. The purpose of the OLC was to give students concrete experience in peer participation and give them an opportunity to participate in the course through digital tools.

The content of these courses also focused on developing socio-technical skills relevant to the course and academics more generally, with special emphasis on student led collaboration, discussion, and sharing. Collaborative digital tools such as Google Documents were also used extensively in the courses. These tools were used to facilitate collaborative note taking, create in-class assignments, and make it easier for students to submit their work. Several threads were created by the instructors early in the quarter that explained the culture of Reddit, how to use the site more effectively, and how to post content, comment on others' posts, vote, format comments and posts, and so on. Reddit and Google docs were preferred over official digital learning systems (like Blackboard) because students were encouraged to use these tools for both class and their own purposes.

The comparison group consisted of students in the same course number, but in a different section of the course, during the same term; these students did not participate in any online forum or learning community as part of their courses (a survey question prompted students to identify any such communities they participated in).

Measures

Academically relevant digital skills arise through experience and social interaction involving the use of those skills. We measured digital skill as an averaged index by asking respondents to rate how 'skilled or successful' they were in their first month of college in four different activities (collaborating, searching, sharing, and participating in groups). These four activities were combined as an index (Cronbach's $\alpha = .82$). A key explanatory variable measured self-reported use rates, with an index measuring how often students needed to employ these same skills ($\alpha = .84$).

The second dependent variable assessed the degree to which students' perceived skills have either worsened or improved since their first month of college, a period of at least 6 months, as a 4-item index ($\alpha = .88$). We operationalized participation in the OLC as a sum of the learning community activities the respondent participated in. These variables provide the core around which we built a set of demographics, contextual, and social support variables to investigate how identity and social structure intersect with social support and online learning communities in the development of digital skills (Table 1).

Both analyses include the same set of background variables and measures of access to digital social support. A rurality variable used RUCA (Rural-Urban Commuting Areas) version 2.0 codes associated with student zip codes.[1] The RUCA score was further condensed into three categories as suggested on the Rural Health Research Center's website. Family SES is a subjective social class assessment with choices of lower, lower middle, middle, upper middle and upper. Self-esteem is measured using the standard six-item measure index. Motivation for digital literacy is a single item strength of respondent motivation for improving digital literacy. Giving tech support indicates how often a respondent serves as technical support for peers. Social support is an index that indicates

Table 1. Descriptive statistics of model variables with correlations with Dependent Variables (Digital Skills and Change in Skills).

		Bivariate r		Univariate distribution			
	Variable	Skills	Increase	Min	Mean	SD	Max
DV1	Digital skills	–	–	1	3.60	0.84	5
DV2	Increase in skills	.09	–	−2	2.82	2.43	8
3	Academic year	−.19	.14	1	1.38	0.72	4
4	Gender ID (Female)	.06	.08	0	0.57	0.50	1
5	Race (White)	−.01	−.05	0	0.93	0.25	1
6	Rurality	−.14	.03	1	1.21	0.54	3
7	Family SES	.14	.05	1	3.32	0.77	5
8	Self-esteem	.23	.11	−14	8.22	4.40	14
9	High school GPA	−.03	−.06	1	3.29	0.99	5
10	Motivation for digital lit	.06	.18	1	3.08	0.82	5
11	Giving tech support	.22	.07	0	2.13	0.77	3
12	Social support	.25	.32	7	19.41	5.06	32
13	First month collaboration	.57	.20	1	2.80	1.04	5
14	OLC participation	.12	.31	0	3.92	3.54	12

Note: $N = 373$; correlations > |.09| are significant at the .05 level or better in one-tailed tests.

whether respondents have knowledgeable peers in their social surroundings, and whether these friends or classmates might serve as technical and academic sources of information and support ($\alpha = 0.64$).

Analysis

Table 2 reports OLS regression models that estimate digital skills self-assessed for the first month of college and increases in digital skills since the first month. Model 1 shows that academic year is negatively related to collaborative digital skills, which reflects the greater involvement of more recent cohorts in collaborative digital systems. This control variable allows us to see how rurality is negatively related to digital skills, self-esteem is positively related, and both giving and receiving technical help are associated with higher levels of self-assessed digital skills. Model 1 excludes first month utilization of collaborative digital skills and explains 16% of variance in the dependent variable. Model 2 adds the index of first month utilization of collaborative digital skills and increases the amount of variance explained from 16% to 38%. This substantial increase in model fit alters the significance level of some predictors, but the direction of effect and general magnitudes are not substantially changed, except for integration into social–digital systems of support which becomes insignificant when active use of collaboration tools is accounted for.

Assessing levels of digital collaboration dramatically increases the significance and strength of the effect of rurality on digital skill assessment (from −.19 at .05* to −.24 at .001***). When the model accounts for use rates of digital collaboration tools the negative impact of rurality becomes stronger and more easily detected as an important influence. Growing up in a more rural context can negatively impact capacity to collaborate directly and through social network effects. Directly, the capacity to access and the quality of access are likely to be less favorable, but rural respondents are also embedded in a social context where others are less able to collaborate, which should further impede expression of successful digital skills.

Table 2. OLS regression predicting digital skills during the first month of college and increase in skills since the first month.

	Digital skills		Increase in skills	
Variable	1	2	3	4
Intercept	2.48***	2.61***	−2.58*	−2.41*
Background				
Academic year	−0.17**	−0.10*	0.63***	0.76***
Gender ID (Female)	0.01	0.00	0.05	0.06
Race (White)	−0.11	−0.17	−0.49	−0.78.
Rurality	−0.19*	−0.24***	0.03	−0.10
Family SES	0.08	0.00	0.12	0.06
Self-esteem	0.03**	0.02*	0.03	0.04
High school GPA	0.01	0.01	0.00	0.03
Motivation for digital literacy	0.02	−0.09.	0.32*	0.27.
Giving tech support	0.19***	0.14**	0.15	0.03
Social support	0.03***	0.01	0.12***	0.11***
Using digital skills				
First month collaboration		0.43***	0.19	0.15
OLC participation				0.21***
Adjusted R^2	0.16	0.38	0.13	0.22

Note: $N = 373$; ***$p < .001$; **$p < .01$; *$p < .05$; .$p < .10$.

Models 3 and 4 report OLS results predicting increases in digital skills between month one and the current month of enrollment for respondents. Because more time has elapsed since their first month, students of advanced academic year tend to improve more, as our results show (beta = .76***). Motivation for digital literacy and access to social support are also positive and significant predictors of increases in skills (beta = .32*; .12***). In Model 4, the introduction of an OLC represents a major substantive and statistically significant increase in digital skill improvement with an increase in adjusted R^2 from 0.13 to 0.22. In Model 2, the introduction of first month collaboration eclipsed the influence of social support. In contrast, Model 3 and Model 4 show that access to social support remains a significant predictor for increases in skills. This suggests that students who are embedded in an ongoing network of digital social support are strongly and statistically significantly developing stronger increases in digital skills (beta = .12***, .11***) for the reduced and full models, respectively.

Rurality is notably not a significant negative predictor of improvement in digital literacy while enrolled in college. This suggests that while rurality may represent an initial disadvantage, the college context can allow students to improve once they engage with a new and actively digital social environment. We note that this study utilized observational data combined with an intervention, and it falls short of an experimental design. However, from a purely descriptive level, we believe Table 3 illustrates part of the positive potential of computer mediated learning communities to help overcome digital disadvantages that accumulate prior to college experience.

Table 3 demonstrates evidence of two valuable insights: (1) participation in an OLC dedicated to encouraging the use of collaborative systems results in clear increases in digital skills compared to students of similar regional background; and (2) improvement impacts of the learning community seem more beneficial for the more rural students. This effect is instructive, but due to the small sample size of highly rural students, must remain a provisional insight, awaiting further investigations. Regardless, the regression results and the simple descriptive table comparing means indicate that while rural students may face an initial disadvantage, academic intuitions can implement online learning communities to help overcome initial disadvantages arising from differential access and use.

Conclusions, limitations and future research

Members of the OLC reported higher levels of improvement in their skills regardless of their demographic and socioeconomic characteristics. This suggests that there are

Table 3. Average first month skill and change in skill since the first month compared by rurality and participation in the OLC.

	N	Skill	SD	Change	SD
Urban					
No OLC	119	3.51	(0.87)	1.97	(2.30)
OLC	196	3.73	(0.75)	3.24	(2.40)
Rural					
No OLC	13	3.73	(0.96)	2.38	(2.10)
OLC	23	3.26	(1.02)	4.04	(2.25)
High rural					
No OLC	6	3.09	(1.02)	1.17	(1.60)
OLC	16	3.27	(0.89)	3.13	(2.60)

methods for improving individual student's capital accumulation through online activities that can also potentially serve to benefit a larger community through collaborative engagement. Our results also show that growing up rural is associated with substantially lower self-assessment of online participatory skills, but that these students showed substantial improvements related to participation in the OLS. This suggests that rural students may especially need, and benefit from, digital remediation programs that build their experience with online collaborative skills.

The study is limited by the demographically narrow sample (mostly white, middle class, and mid-western), the lack of random assignment into OLC or non-OLC conditions, and the retrospective assessment of digital skills. Future studies of digital remediation should try to implement a true experimental design. Another limitation stems from the lack of direct measurement of digital skills. Hargittai (2005) found that self-assessed skills are relatively poor indicators of actual skills, and her study developed instruments that more accurately address levels of actual Web-use skills and knowledge.

Future research should continue to examine the nuanced ways in which students can effectively and efficiently use technology to help manage their various needs and lifestyles and promote collective needs. One way is through online learning communities as part of a course – though focusing on institutional changes in the curriculum may be more advantageous for the larger student population. It is also notable that the disadvantages associated with rurality do not impede the growth in learning related to OLC involvement. We conclude by noting that promoting knowledge through online community-building has the potential to benefit individual students in terms of improvements in self-efficacy, and as a result, potentially the wider community through increased civic engagement and broader digital literacy and competence.

Note

1. RUCA version 2.0 is based on 2000 Census commuting data and 2004 ZIP codes. These codes include: (a) 2000 Census work commuting information, and (b) Census Bureau defined Urbanized Areas (cities of 50,000 and greater population) and Urban Clusters (cities/towns of from 2,500 through 49,999 populations). The RUCA scores measure 'functional isolation,' but not 'objective remoteness.'

Disclosure statement

No potential conflict of interest was reported by the authors.

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