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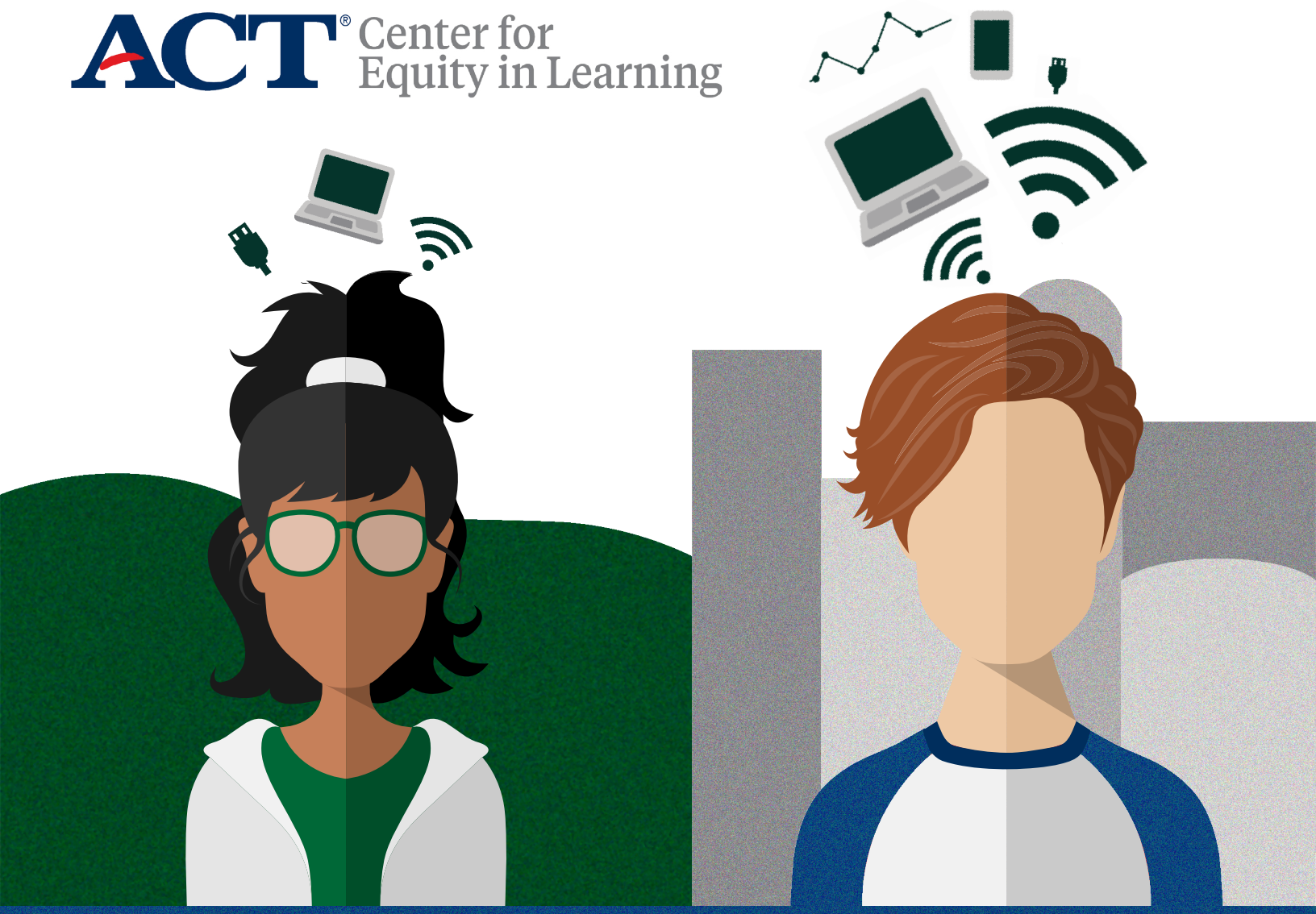

Rural Students: Technology, Coursework, and Extracurricular Activites

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INSIGHTS IN EDUCATION AND WORK
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ABOUT THE AUTHORS

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RELATED WORK

This paper is one of a series of reports on students' access to technology. For more information, see:

Raeal Moore, *Smartphones and Laptops are the Most Accessible Technological Devices Students Have at Home* (Iowa City, IA: ACT, 2018), https://www.act.org/content/dam/act/unsecured/documents/R1680-tech-devices-at-home-2018-05.pdf.

Raeal Moore and Dan Vitale, *High School Students' Access to and Use of Technology at Home and in School* (Iowa City, IA: ACT, 2018), https://www.act.org/content/dam/act/unsecured/documents/R1692-technology-access-2018-08.pdf.

Raeal Moore, Dan Vitale, and Nycole Stawinoga *The Digital Divide and Educational Equity: A Look at Students with Very Limited Access to Electronic Devices at Home* (Iowa City, IA: ACT, 2018), http://www.act.org/content/dam/act/unsecured/documents/R1698-digital-divide-2018-08.pdf.

SUMMARY

Rural students are often overlooked when it comes to education policy reform. However, the majority of rural students in nearly half the states are from low-income families, generally earn lower scores on standardized high school assessments, lack access to rigorous coursework, and attend college at lower rates than do students from non-rural areas.

Efforts to ameliorate the effects of some of these issues depend increasingly on access to technology such as broadband and devices. Access to technology is important for education, not only because there is a plethora of technology-based resources for learning, but also to teach students the basic computer skills that are important for many careers.

This brief takes a closer look at rural students' access to technology, coursework, and extracurricular activities opportunities in various facets of their high school experiences.

SO WHAT?

ACT surveyed a sample of students who took the ACT® in 2018. Using student responses from two online surveys, one group of students was asked about their access to and use of technology and internet connectivity both at home and at school, while the second group of students was asked the number of courses they were enrolled in that could result in college credit (e.g., dual enrollment or Advanced Placement).

NOW WHAT?

Access to quality internet connectivity, course-taking behavior, and extracurricular participation were different for rural students vs. non-rural students. Policy recommendations are to improve access to technology and rigorous course taking, especially among rural students, and to expand opportunities for personalized learning.

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Rural Students: Technology, Coursework, and Extracurricular Activities

Michelle Croft, PhD/JD, and Raeal Moore, PhD

Although approximately one in five students in US public elementary and secondary schools lives in a rural area,[1] rural students are often overlooked when it comes to education policy reform.[2] The majority of rural students in nearly half the states are from low-income families,[3] generally earn lower scores on standardized high school assessments,[4] lack access to rigorous coursework,[5] and attend college at lower rates than do students from non-rural areas.[6]

Efforts to ameliorate the effects of some of these issues depend increasingly on access to technology such as broadband and devices. Access to technology is important for education, not only because there is a plethora of technology-based resources for learning, but also to teach students the basic computer skills that are important for many careers.[7] Further, rural students may have a greater need for technology compared to their non-rural peers in order to access courses not offered at their school[8] and to increase opportunities for personalized learning.[9]

This project's purpose is to provide information on rural students' access to technology, coursework, and extracurricular activities in various facets of their high school experience. This report informs policy decisions for providing rural students with the same opportunities as their non-rural peers.

Data

The data for this report come from two different student surveys administered to selected students who participated in national ACT® testing in 2018.

The primary survey was related to technology access and includes over 6,000 respondents.[10] In addition to the sample of students who completed the online survey, a subsequent random sample of students who either did not start the survey, or started but did not finish, were sent a paper copy of the survey in addition to the electronic version.[11] The data from the primary survey were paired with background data collected when students registered for the ACT to provide additional information on course taking and extracurricular activities. The secondary survey asked students about their college-bearing credit coursework, and approximately 5,600 students responded to it.[12]

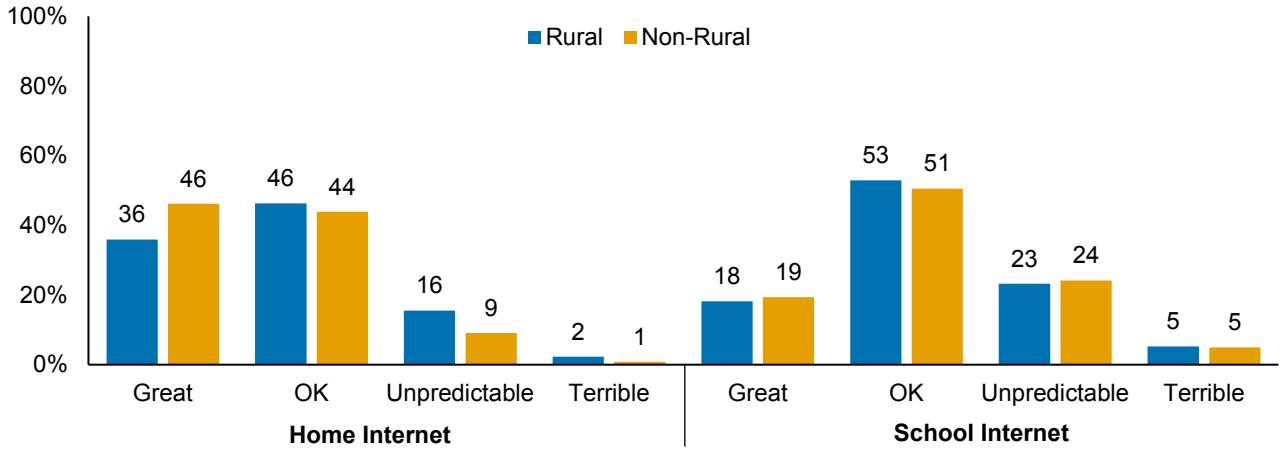
Findings

Technology Access

Rural areas are less likely to have access to broadband internet.[13] Twenty-seven percent of rural residents do not have access to broadband at a minimum speed for consistently receiving high-quality voice, data, graphics, and video or supporting multiple streams within a household.[14] Although the Federal Communications Commission provides funding for the E-Rate Program, which provides eligible schools and libraries discounts of up to 90% to fund affordable telecommunications and internet access,[15] 6% of schools still do not meet federal connectivity benchmarks—and the vast majority of those schools are in rural areas.[16]

Similar to other studies, our survey of high school students who took part in ACT testing indicated that rural[17] and non-rural students had differing access to technology. In terms of internet connectivity, rural students were less likely than non-rural students to claim that their home internet access was "great" (36% vs. 46%; Figure 1).[18]

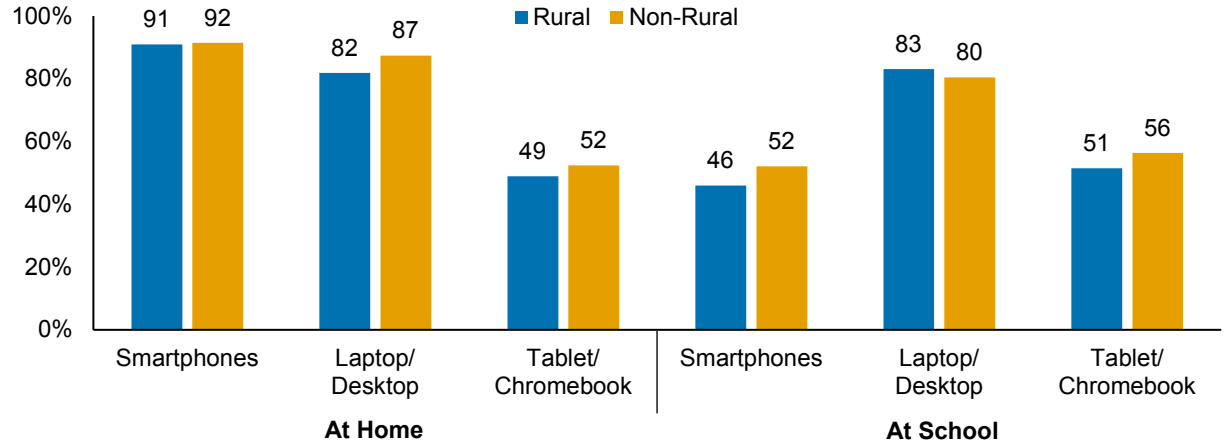
Figure 1. Quality of Internet Access, by Geographic Area



Similarly, rural students were almost twice as likely as non-rural students to state that their internet access was "unpredictable" (16% vs. 9%). At school, however, there were no substantive differences in reported internet quality between rural and non-rural students.

Rural and non-rural students also had differing access to devices both at school and at home. Notably, rural students reported somewhat less access to a laptop or desktop computer at home compared to non-rural students (82% vs. 87%; Figure 2).

Figure 2. Access to Technology Devices at Home and in School, by Geographic Area



Access to a computer with a dedicated keyboard also varied between rural and non-rural students. Lack of such access may make schoolwork-related tasks like conducting research or writing more difficult. Rural students did, however, report somewhat higher levels of access to laptop and desktop computers at school compared to non-rural students (83% vs. 80%). Conversely, at school, rural students reported somewhat less access to tablets and Chromebooks compared to non-rural students (51% vs. 56%).

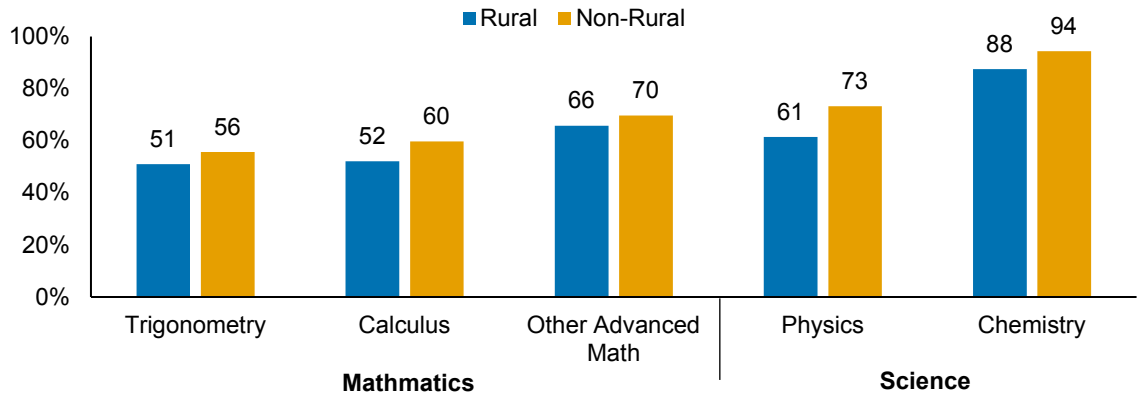
In addition, a higher percentage of rural students reported access to only one device at home compared to students in non-rural areas (24% vs. 11%). Given the potential benefits of one-to-one device initiatives, the lack of access to devices could create additional disparities in access to more personalized learning opportunities.[19] Finally, lower percentages of rural students than non-rural students reported using technology to research/find information online (51% vs. 57%) and to complete homework assignments (59% vs. 68%).

Course Taking

ACT research has found that students who complete a minimum core curriculum that includes four years of English, three years of mathematics (including rigorous courses in Algebra I, Geometry, and Algebra II), three years of science (including rigorous courses in Biology, Chemistry, and Physics), and three years of social studies earn higher ACT scores than those who do not.[20] Of the students we surveyed, those in rural areas were less likely than non-rural students to complete (or plan to complete) the ACT-recommended core curriculum (76% vs. 81%).

Because rural schools are typically smaller in size, they may lack sufficient staff to teach additional or advanced courses. For example, a study from 2009 found that 50% of students in rural areas and small towns attend schools that only offer one to three advanced mathematics courses.[21] Similarly, the rural students in our study were less likely than non-rural students to report taking or planning to take advanced math and science courses (Figure 3).

Figure 3. Students Reporting Having Taken or Planning to Take Advanced Mathematics and Science Courses, by Geographic Area

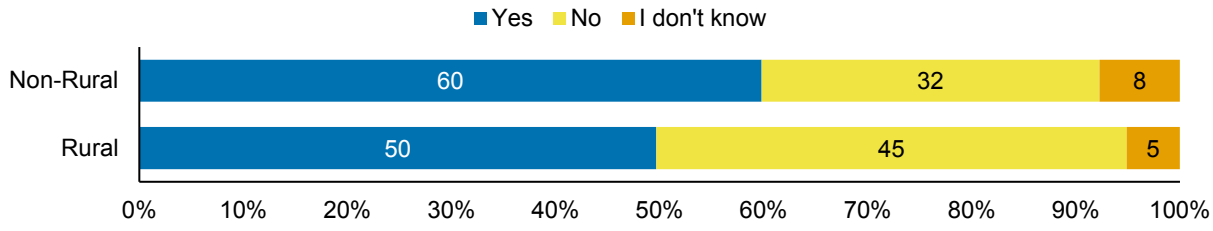


For instance, 60% of non-rural students either took or planned to take calculus, compared to only 52% of rural students. Rural students were also less likely than non-rural students to report taking or planning to take physics (61% vs. 73%) or chemistry (88% vs. 94%).

In addition to general advanced courses offered by schools, many high schools offer programs, such as dual enrollment or Advanced Placement (AP), that provide students with the opportunity to take courses that could result in college credit. These credit-bearing college-level courses expose students to the rigor of college coursework and potentially allow them to complete a bachelor's degree in less time once they reach college.[22] Past research indicates that rural students are increasingly able to participate in such programs but not necessarily at the rate of access as their non-rural peers.[23]

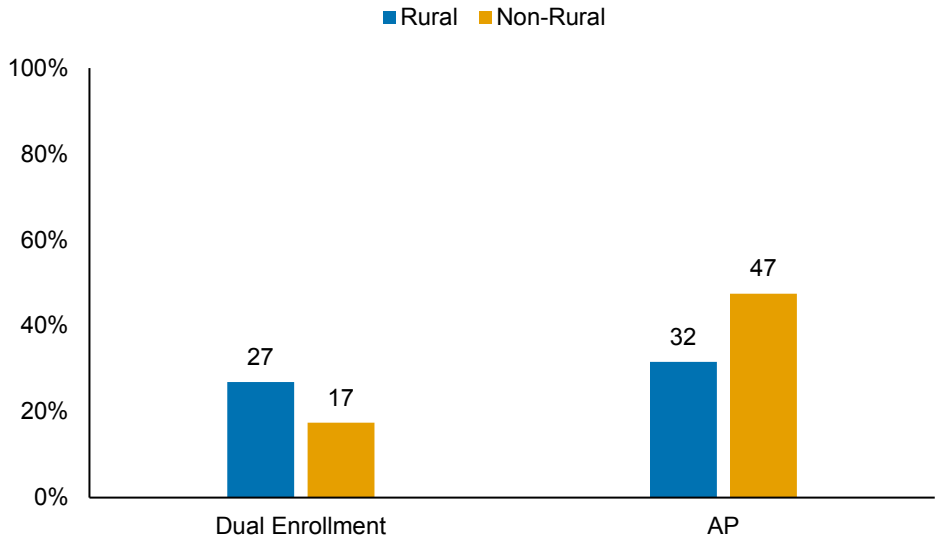
In a separate ACT survey of high school students related to credit-bearing college courses,[24] only 50% of the rural respondents reported being enrolled in a course during the academic year that awards college credit, compared to 60% of non-rural students (Figure 4).

Figure 4. Enrollment in a Credit-bearing College Course in the Past Academic Year, by Geographic Area



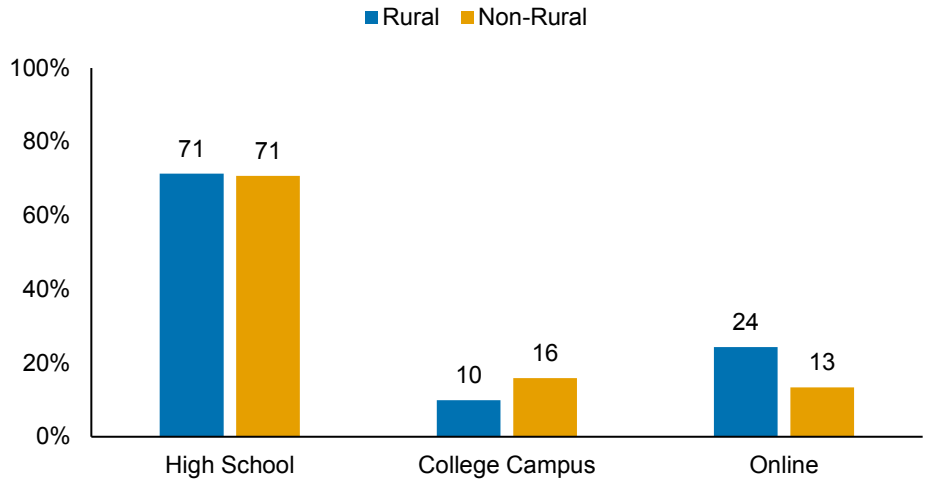
Prior research also suggests that rural students are more likely than non-rural students to participate in dual enrollment courses via distance learning instead of being taught on a college campus where the experience tends to be more authentic and encompassing.[25] Consistent with the prior research, rural students in our study were more likely than non-rural students to enroll in dual or concurrent enrollment courses and less likely than non-rural students to participate in AP courses (Figure 5).

Figure 5. Enrollment in a Credit-bearing College Course in the Past Academic Year, by Course Type and Geographic Area



Of the students who reported participating in dual enrollment programs, rural students were more likely than non-rural students to enroll in an online course (24% vs. 13%; Figure 6), an 11% gap between the two groups. While these results show that rural students, relative to non-rural students, are more likely to enroll in online dual enrollment programs, as noted previously, rural students are also less likely to have the technological devices they need to complete school-related activities.

Figure 6. Enrollment in a Credit-bearing College Course in the Past Academic Year, by Course Location



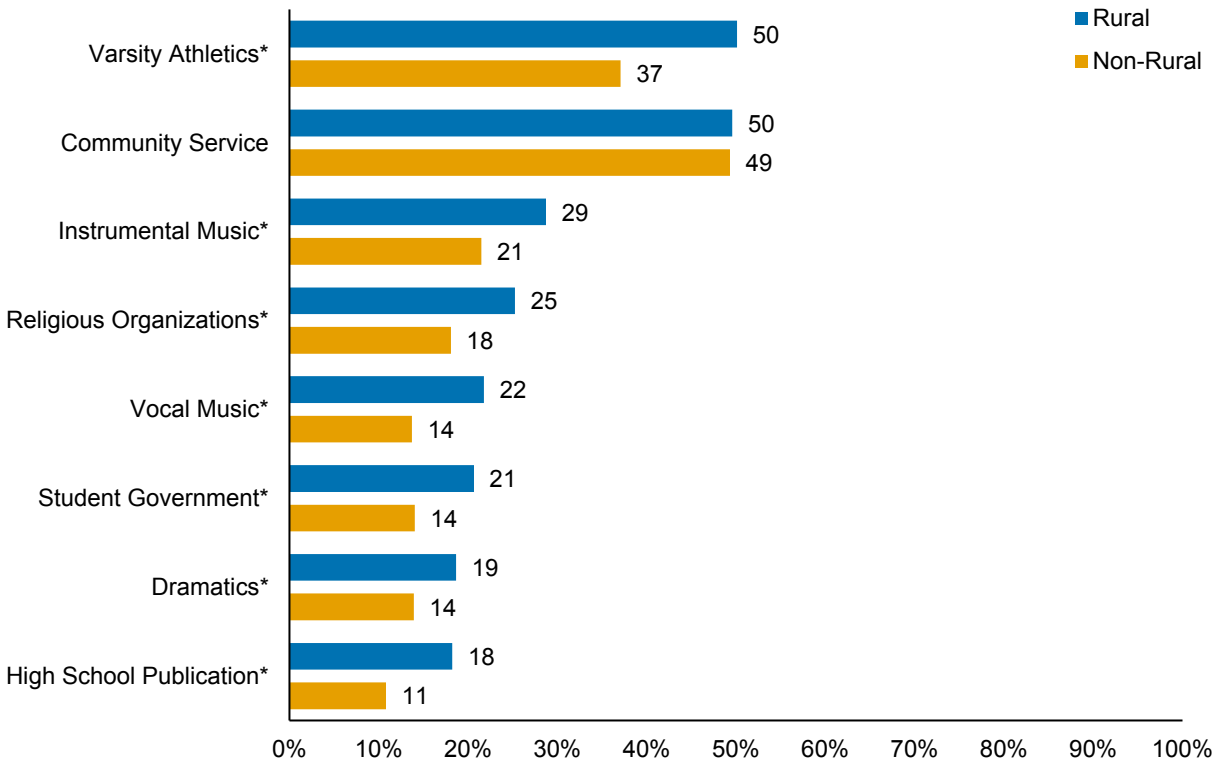
Note: Because some students enrolled in more than one course, the percentages do not add to 100.

Extracurricular Activities

Participation in extracurricular activities is one area in which rural students may have greater access than non-rural students. Extracurricular activities provide students with an opportunity to explore academic and non-academic interests.[26] Extracurricular activity participation is related to school engagement[27] and may also reduce the likelihood of dropping out of school.[28] Further, participation in certain extracurricular activities may be related to student learning growth. ACT research has found that activities such as community service, instrumental music, and debate are all positively related to academic growth, but fraternities/sororities and other social clubs, radio/TV, and varsity athletics are negatively related to growth.[29]

Overall, there were differences in the percentage of rural and non-rural students participating in extracurricular activities, except for participation in community service. The largest differences in participation were reported for activities that require larger groups of students (e.g., varsity athletics, instrumental music, and vocal music). This is not surprising since rural schools may need to recruit relatively large proportions of students in order to have the numbers needed for full group participation.

Figure 7. Participation in Extracurricular Activities, by Geographic Area



Note: An asterisk indicates statistically significant differences ($p \leq .05$).

Policy Recommendations

The needs of rural students are unique. As illustrated by the survey data, rural students lack the same access to technology as their non-rural peers. While they have higher rates of extracurricular activity participation, they also are less likely to take rigorous coursework, and when they do take credit-bearing college courses, they are more likely to do so online. These findings, coupled with the results that showed rural students are less likely to have the technological devices they need to complete school-related activities, lead to the following policy recommendations.

1. Improve access to technology both at school and at home.

The Federal E-Rate program must continue to fund access to affordable broadband internet to rural areas and completely close the gap between schools with broadband access and those without. According to AASA, The School Superintendents Association, changes to the E-Rate program in 2014 vastly increased internet access for rural schools, allowing them to offer students more opportunities to take advanced coursework.[30] Further, state and local interventions should be implemented to ensure that students have access to digital learning resources at home, including having internet access with sufficient connection speeds for completing homework.[31]

2. Increase opportunities for rigorous course taking.

Students must have access to and be encouraged to take a minimum core curriculum of four years of English, three years of mathematics, three years of science, and three years of social studies. As a number of states require fewer than the ACT-recommended minimum numbers of courses for graduation,[32] states need to consider raising graduation requirements so that rural schools are required to provide expanded course offerings to all students. In doing so, states should ensure that the rigor of the courses is maintained.[33] Similarly, districts should consider initiatives to increase access to credit-bearing college coursework.[34]

3. Expand opportunities for personalized learning.

Students need the opportunity to receive personalized, student-centered learning. In the case of the rural students in the survey, personalized learning could help provide greater access to advanced coursework. These opportunities could potentially leverage rural students' high rates of extracurricular participation while being evidence-based and effective. As highlighted in the first recommendation above, districts must also ensure that students have access to adequate technology to implement personalized learning opportunities if they are delivered online.

Notes

1. According to NCES, in 2013, 18.4% of students in public elementary and secondary schools lived in a rural area. In 2014, it was 18.6%. US Department of Education, and National Center for Education Statistics, "Percentage of Distribution of Enrollment in Public Elementary and Secondary Schools, by School Urban-centric 12-category Locale and State of Jurisdiction: Fall 2013," Table A.1.a.-4, https://nces.ed.gov/surveys/ruraled/tables/A.1.a.-4_2.asp; US Department of Education, and National Center for Education Statistics, "Number of City, Suburban, Town and Rural Regular Public Elementary and Secondary Schools with Membership and Percentage Distribution of Students in Membership, by Stae or Jurisdiction: School Year 2014-15," Table 4, https://nces.ed.gov/pubs2016/2016076.pdf.
2. Megan Lavalley, *Out of the Loop* (Alexandria, VA: Center for Public Education, 2018), http://www.centerforpubliceducation.org/system/files/Rural%20School%20Full%20Report.pdf.
3. The School Superintendents Association, *Leveling the Playing Field for Rural Students* (Alexandria, VA: The School Superintendents Association, 2017), https://www.aasa.org/uploadedFiles/Equity/AASA_Rural_Equity_Report_FINAL.pdf.
4. Soo-yong Byun, Judith L. Meece, and Matthew J. Irvin, "Rural-Nonrural Disparities in Postsecondary Educational Attainment Revisited," *American Education Research Journal* 49, no. 3 (June 2012).
5. Abigail Swisher, "Preparing Rural Students for College and Career," *New America*, August 4, 2016, https://www.newamerica.org/education-policy/edcentral/rural-postsecondary/; Brian A. Sponsler, Jeff Wyatt, Meredith Welch, and Sharmila Mann, *Advanced Placement Access and Success: How do Rural Schools Stack Up?* (Denver, CO: Education Commission of the States, 2017), https://www.ecs.org/advanced-placement-access-and-success-how-do-rural-schools-stack-up/; Douglas J. Gagnon and Marybeth J. Mattingly, *Limited Access to AP Courses for Students in Smaller and More Isolated Rural School Districts* (Durham, NH: Carsey Research Issue Brief 80, 2015), https://scholars.unh.edu/cgi/viewcontent.cgi?article=1234&context=carsey; Suzanne E. Graham, *Students in Rural Schools Have Limited Access to Advanced Mathematics Courses* (Durham, NH: Carsey Research Issue Brief 7, 2009), https://scholars.unh.edu/cgi/viewcontent.cgi?article=1088&context=carsey.
6. Matthew R. Burke, Elisabeth Davis, and Jennifer L. Stephan, *College Enrollment Patterns for Rural Indiana High School Graduates* (Washington, DC: National Center for Education Evaluation and Regional Assistance, 2015), https://ies.ed.gov/ncee/edlabs/regions/midwest/pdf/REL_2015083.pdf; and Byun et al., "Rural-Nonrural Disparities in Postsecondary Educational Attainment Revisited."
7. Pew Research Center, *The State of American Jobs: How the Shifting Economic Landscape is Reshaping Work and Society and Affecting the Way People Think about the Skills and Training They Need to Get Ahead* (Washington, DC: Pew Research Center, 2016), http://www.pewsocialtrends.org/wp-content/uploads/sites/3/2016/10/ST_2016.10.06_Future-of-Work_FINAL4.pdf.
8. Rural schools have difficulty offering advanced coursework in part due to challenges in attracting and retaining teachers. David H. Monk, "Recruiting and retaining high-quality teachers in rural areas," *The Future of Children* 17, no. 1 (Spring 2007): 155–174. Distance learning can be a solution to providing accelerated instruction for rural students. Aimee Howley, Megan Rhodes, & Jimmie Beall, "Challenges Facing Rural Schools: Implications for Gifted Students," *Journal for the Education of the Gifted* 32, no. 4 (June 2009): 515–536. Eleazar Vasquez III, and Barbara A. Serianni, "Research and Practice in Distance Education for K–12 Students with Disabilities," *Rural Special Education Quarterly* 31, no. 4 (April 2017): 33–43. Carolyn Chuong and Jennifer O'Neal Schiess, *The Promise of Personalized Learning in Rural America* (Washington, DC: Bellwether, 2016), https://bellwethereducation.org/sites/default/files/Bellwether_Personalized%20Learning-Rural_FINAL_0.pdf.
9. Chuong, C. and O'Neal Schiess, J., *The Promise of Personalized Learning in Rural America*.
10. 61,639 students who registered to take the ACT (17% of all registrants for the April 2017 test date) were invited to participate in the online survey, and 7,233 students participated (response rate of 12%). Some questions were adapted from the American Community Survey (ACS) and the Pew Research Center, while others were developed internally by ACT researchers. A random sample of students who did not finish the web survey or

never started it were mailed a paper survey to ensure that responses from the online administration were not a function of mode of survey delivery. A comparison of web and paper survey respondents showed that the percentages of students with internet access and electronic-device access were similar across the two delivery modes. Location information was not available for all students, leaving 6,063 respondents.

11. A paper survey was administered to ensure that access to technology did not interfere with the ability to participate in the survey.

12. A random sample of 28,562 students who registered to take the ACT (8% of all registrants for the June 2017 test date) were invited to participate in the online survey, and 5,874 students participated (response rate of 21%). Location information was not available for all students, leaving 5,645 respondents. Items were developed internally by ACT researchers.

13. Christine Fox and Rachel Jones, *The Broadband Imperative II: Equitable Access for Learning* (Washington, DC: State Educational Technology Directors Association (SETDA), 2016), https://www.setda.org//wp-content/uploads/sites/14/2016/09/SETDA-Broadband-ImperativeII-Full-Document-Sept-8-2016.pdf.

14. Adie Tomer, Elizabeth Kneebone, and Ranjitha Shivaram, *Signs of Digital Distress* (Washington, DC: The Brookings Institution, September 12, 2017), https://www.brookings.edu/research/signs-of-digital-distress-mapping-broadband-availability/.

15. US Department of Education, "Office of Non-Public Education," last modified August 21, 2013, https://www2.ed.gov/about/offices/list/oii/nonpublic/erate.html.

16. Eighty percent of the schools that do not meet the federal benchmarks are in rural areas. Tara Garcia Mathewson, "Federal Penny Pinchers Keeping Rural Schools From the Internet," *The Hechinger Report*, March 21, 2018, https://hechingerreport.org/bids-to-bring-fiber-internet-to-schools-are-denied-funding-seven-times-more-often-than-other-projects/.

17. Rural status was based on the geographical location of the school in which the student was enrolled. The NCES definition of rural was used in this study.

18. In the survey, internet quality indicators included the following descriptions: Great = I never have problems connecting to the internet when I need to; OK = Most days I have a good internet connection but occasionally the internet doesn't work; Unpredictable = Sometimes the internet connection is good, sometimes it's not; and Terrible = Allegedly we have access, but it doesn't work.

19. Chuong, C. and O'Neal Schiess, J., *The Promise of Personalized Learning in Rural America.*

20. ACT, *The ACT Profile Report – National Graduating Class of 2017* (Iowa City, IA: ACT, 2017), https://www.act.org/content/dam/act/unsecured/documents/cccr2017/P_99_999999_N_S_N00_ACT-GCPR_National.pdf. Similarly, students who take advanced mathematics coursework have higher NAEP scores than those who take less rigorous mathematics courses. Suzanne E. Graham, "Students in Rural Schools Have Limited Access."

21. Graham, S., "Students in Rural Schools Have Limited Access."

22. ACT, *Using Dual Enrollment to Improve the Educational Outcomes of High School Students* (Iowa City, IA: ACT, 2015), https://www.act.org/content/dam/act/unsecured/documents/UsingDualEnrollment_2015.pdf.

23. The research literature suggests that rural students are less likely to participate in Advanced Placement courses, but rural students may be more likely to enroll in dual enrollment courses. Sponsler, et. al., *Advanced Placement Access and Success*. James Appleby et al., *A Study of Dual Credit Access and Effectiveness in the State of Texas* (College Station, TX: The Bush School of Government & Public Service, 2011), https://academicaffairs.southtexascollege.edu/highschool/pdf/research/Report%20-%20A%20study%20of%20dual%20enrollment%20effectiveness%20-%20State%20of%20Texas%20-%20May%202011.pdf.

24. See earlier endnote 12 for a description of the sample.

25. Jennifer Dounay Zinth, *Dual Enrollment: A Strategy to Improve College-Going and College Completion among Rural Students* (Denver, CO: Education Commission of the States, 2014), http://www.ecs.org/clearinghouse/01/12/61/11261.pdf.

26. Amy F. Feldman and Jennifer L. Matjasko, "The Role of School-Based Extracurricular Activities in Adolescent Development: A Comprehensive Review and Future Directions," *Review of Educational Research* 75, no. 2 (2005): 159–210.

27. Students who participated in extracurricular activities were more likely to be highly engaged in school compared to students who did not participate in extracurricular activities. Brian Knop and Julie Siebens, *A Child's Day: Parental Interaction, School Engagement, and Extracurricular Activities: 2014*, Current Population Reports P70-159 (Washington, DC: US Census Bureau, 2018), https://www.census.gov/content/dam/Census/library/publications/2018/demo/P70-159.pdf.

28. Research by Mahoney suggests the social networks a student gains through the extracurricular activity is what keeps the student engaged in school. Joseph L. Mahoney, "School Extracurricular Activity Participation as a Moderator in the Development of Antisocial Patterns," *Child Development* 71, no. 2 (March 2000): 502–516. See also Amy F. Feldman & Jennifer L. Matjasko, "The Role of School-Based Extracurricular Activities in Adolescent Development." Joseph L. Mahoney, and Robert B. Cairns, "Do Extracurricular Activities Protect Against Early School Dropout?" *Developmental Psychology* 33, no. 2 (March 1997): 241–253. Merrill J. Melnick, Donald F. Sabo, and Beth E. Vanfossen, "Educational Effects of Interscholastic Athletic Participation on African American and Hispanic Youth," *Adolescence* 27, no. 106 (February 1992): 295–308. Merrill J. Melnick, Donald F. Sabo, and Beth E. Vanfossen, "Effects of Interscholastic Athletic Participation on the Social, Educational, and Career Mobility of Hispanic Girls and Boys," *International Review for the Sociology of Sport* 27, no. 1 (March 1992): 57–73.

29. Jonathan Wai and Jeff Allen, *Examining Predictors of Academic Growth in Secondary School Among Academically-Advanced Youth Across 21 Years*, (Iowa City, IA: ACT, 2018), https://www.act.org/content/dam/act/unsecured/documents/R1702-academically-advanced-growth.pdf.

30. The School Superintendents Association, *Leveling the Playing Field for Rural Students.*

31. National Center for Education Statistics, *Student Access to Digital Learning Resources Outside of the Classroom* (Washington, DC: National Center for Education Statistics, 2017), https://nces.ed.gov/pubs2017/2017098/section5.asp.

32. Achieve, *State-by-State Graduation Requirements (Class of 2015)* (Washington, DC: Achieve, 2016), https://www.achieve.org/publications/state-state-graduation-requirements-class-2015.

33. Richard Buddin and Michelle Croft, *Missing the Mark: Students Gain Little from Mandating Extra Math and Science Courses* (Iowa City, IA: ACT, 2014), http://www.act.org/research/policymakers/pdf/MissingtheMark.pdf.

34. See the description of the Niswonger Foundation's Investing in Innovation grant program, which increased access to college-credit coursework, among other college readiness initiatives, in Northeast Tennessee. Abigail Swisher, "Preparing Rural Students for College and Career," *New America*, August 4, 2016, https://www.newamerica.org/education-policy/edcentral/rural-postsecondary/.

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