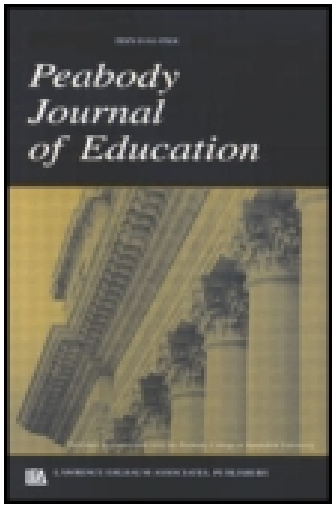

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Rural Students in Washington State: STEM as a Strategy for Building Rigor, Postsecondary Aspirations, and Relevant Career Opportunities

Barbara Peterson, Greta Bornemann, Cheryl Lydon, and Kimberly West
University of Washington

In rural settings, leaving for college can mean a young person's first step in leaving home forever (Sherman & Sage, 2011). That presents a serious challenge for college recruiters as they ask parents from Indian reservations or close-knit Hispanic or rural farming communities to allow their children to consider postsecondary opportunities. In this article, the authors discuss impediments to college-going that rural students face and shine a light on several efforts in central Washington State that help students connect to job opportunities in fast-growing, lucrative STEM (science, technology, engineering, and mathematics) careers in the region. Beyond inviting STEM professionals to job fairs, these efforts can expand opportunities for collaboration between STEM professionals and rural schools and teachers. Such opportunities might include enriching the K–12 curriculum with locally relevant problems of science, using local STEM professionals to collaborate on learning projects, and possibly engaging students to contribute to national databases and studies. These programs represent one way to highlight the real-world application of postsecondary education, encouraging students to pursue STEM college programs and careers.

Maria is Hispanic and lives in a small town in eastern Washington State with her family. Her parents, along with many of her aunts and uncles, have chronic health issues such as diabetes and heart disease. Maria worries because many of her family members have no health insurance.

Brian is the third generation in his farming family to be raised on an orchard along the Columbia River. His father, he knows, would like him to stay on and manage the orchard with him. Brian's math teacher urges him to consider an engineering degree at the University of Washington because he has excellent math scores and problem-solving skills.

John is a member of the Colville Tribe, who lives with his family on the reservation. John wants to remain close to his tribe and family and feels called to help preserve his people's way of life, to respect the land that nurtured them and protect its resources. He is a strong student but does not see himself completing college.

As these composite portraits illustrate, when rural students aspire to—and seek—postsecondary education, they frequently face a difficult choice. For many, postsecondary education is the first step away from the small rural community in which they were raised: a move

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that they and their families know could be permanent. Like Brian, they may feel they should stay and contribute to the family enterprise. Like Maria, they may believe their energy and support are needed for the health and well-being of a large extended family. Like John, they may have strong cultural reasons to remain near their homes and maintain close community ties. A complex array of additional educational, socioeconomic, and interpersonal factors can also influence postsecondary achievement for rural youth, including inadequate curriculum, too few highly qualified teachers, a lack of job opportunities requiring postsecondary study, and a scarcity of college-educated role models (Bajema, Miller, & Williams, 2002; Ball, 2009; Barton, 2012; Breen & Quaglia, 1991; Byun, Meece, & Irvin, 2012; Demi, Coleman-Jensen, & Snyder, 2010).

Historically, rural schools have had higher high school graduation rates, but lower college-going rates, than urban and suburban schools (White, 2011). Recent research shows that students from rural schools continue to trail suburban students in this regard, but they now attend some kind of postsecondary institution in greater percentages than urban students. They remain, however, significantly less likely than their urban or suburban peers to complete college (U.S. Department of Agriculture, 2003).

In *Why Rural Matters 2013–2014: The Condition of Rural Education in the 50 States*, the Rural School and Community Trust reports that rural contexts apply to 20.4% of all U.S. students, nearly half (49.9%) of all districts, and 32.9% of all schools (Johnson, Showalter, Klein, & Lester, 2014, p. 6). With only 20% of the nation's students educated in rural schools, issues of rural education tend to be less visible in the national discourse on education.

In this paper we provide a brief picture of the state of postsecondary aspirations for our nation's rural students, consider historical barriers rural students have faced, and examine how these barriers may be changing. We then look at examples of how rural school districts in eastern Washington State are using STEM (science, technology, engineering, and mathematics) education to enhance academic rigor and student engagement and identify possible careers for rural students in a region that is home to such well-known STEM giants as Microsoft, Amazon, and Boeing. Specifically, we investigate the following questions:

1. What are the aspirations of our nation's rural youth as they consider careers and postsecondary options, and what barriers do they face?
2. Can rural schools promote opportunities that provide students with economically viable options to remain in their communities?
3. Can STEM programs create school learning environments that engage K–12 students in rigorous courses of study, preparing them for possible careers in STEM fields located in their rural communities and elsewhere?

THE RURAL CONTEXT: POSTSECONDARY ASPIRATIONS AND ENROLLMENT

Two of the most powerful determinants of students' educational aspirations and attainment are parents' education and family socioeconomic status. Students whose parents have no or little college education are less likely to pursue postsecondary options. Adults in rural communities tend to have lower educational attainment than adults in suburban communities and often lower than in urban communities (U.S. Department of Agriculture, 2003). Several studies have documented that

students from rural low-income families are less likely than more affluent youth to complete high school and attend college (Byun et al., 2012; Demi et al., 2010). Nearly half of all rural students (46.6%) are eligible for subsidized school meals, and many rural communities experience high levels of poverty (Johnson et al., 2014). Students' racial and ethnic backgrounds affect students' aspirations and attainment as well. Minority students—especially black, Hispanic, and Native American students—are less likely to enroll in college and complete college degrees. Many rural communities have significant student populations of color and, especially in the West, large and growing numbers of English language learners (ELL) (Johnson et al., 2014).

Barriers Limiting Postsecondary Aspirations and Enrollment

Rural students' educational experiences have been called inferior (Bajema et al., 2002) to those of students in urban and suburban schools because of geographic isolation, inadequate funding, fewer highly qualified teachers, small and declining student enrollments, limited access to rigorous coursework, community cultures that may de-emphasize postsecondary education, and too few college-graduate role models. These challenges affect the ability of rural students to enroll in and complete postsecondary programs.

Geographic Isolation

Most rural communities are far from campuses, providing little opportunity for students and their parents to be exposed to a college campus. This lack of familiarity with postsecondary institutions, coupled with significant distances from the student's community, makes the prospect of attending college daunting for students and families (Rosser, 2014). Furthermore, rural economies lack the diversity of career options that urban and suburban students observe daily. Rural youth can be hundreds of miles from varied and robust job markets, leaving them ignorant of many career opportunities and the preparation it takes to engage them (Bajema et al., 2002).

Limited Course Offerings

Students who have completed college-preparatory or other rigorous coursework are more likely to enroll and persist in postsecondary education (Meece et al., 2013). Many rural districts have small enrollments, making it fiscally difficult to provide the breadth of rigorous coursework to prepare students for ambitious college opportunities (Handwerk, Tognatta, Coley, & Gitmer, 2008). Rural students are less likely than their nonrural peers to have access to Advanced Placement, International Baccalaureate, and other rigorous coursework in high school (Byun et al., 2012), undermining their readiness for college work.

Difficulty in Recruiting Rural Educators

Although many excellent teachers choose careers in rural schools, there aren't enough. Most rural districts find it difficult to recruit and retain highly capable teachers. It is especially challenging to find teachers who teach ELL, high-level math and science courses, STEM coursework, and

world languages. Often rural schools must hire teachers with multiple subject endorsements to teach various classes and grade levels (Barton, 2012; Wood, Finch, & Mirecki, 2013). Although average teacher tenure is higher in rural than in urban or suburban schools, the percentage of teachers with advanced degrees is smaller (Barton, 2012).

Inadequate Resources

Rural America is experiencing a modest increase in student enrollments, but many individual rural districts have seen precipitous declines as families seek employment elsewhere. Declining enrollments reduce state funding to districts, making it hard for rural districts to recruit and retain highly qualified teachers (Barton, 2012). When small districts lose too many students, they face threats of state-imposed consolidation, melding multiple small districts together to find operational efficiencies (Johnson et al., 2014).

Too Few College-Educated Role Models

There are fewer opportunities for rural youth to come in contact with college-educated role models, and there is often a paucity of jobs in rural communities that require a college education (Ball, 2009). Teachers themselves often have limited knowledge of careers outside of education and cannot adequately help students understand and explore the broad range of options available to them with a college degree (Poole & More, 2013).

SOCIAL/CULTURAL DYNAMICS AND FORCES THAT SHAPE EXPECTATIONS IN RURAL COMMUNITIES

In the pursuit of postsecondary education, rural families often share a common challenge. Whether they are farm families who have been connected to specific tracts of land for generations, families who have lived in rural small towns for decades, newly settled migrants who value living near their large extended families, or Native Americans who want to live on ancestral lands close to their family and traditions, postsecondary options will likely take their children out of the community. "Rural youth often experience a tension between moving away to pursue educational and vocational opportunities not supported in their home communities, while remaining close to family and community" (Meece et al., 2013, p. 177).

Fears of "Brain Drain"

The purpose of schools is to help prepare students academically for future careers and to help them become productive members of society and contributors to the economy (Demi et al., 2010). But, as members of small, often close-knit communities, rural educators also recognize their role in supporting and maintaining local economic vitality, a responsibility not typically assumed by their urban and suburban colleagues. When teachers and counselors advise students to pursue

ambitious postsecondary goals, they feel the burden of contributing to the "brain drain" that is part of discussions in every rural school district and community (Sherman & Sage, 2011). With few career options open to students in rural areas outside of the schools, teachers and counselors face the reality that their advising may contribute to more talented residents leaving their communities for good.

Settling for Less: Misalignment of Educational Goals and Career Focus

Some rural students adopt postsecondary pathways to meet community, family, and educators' expectations that they return to their communities. In some instances, they take on jobs that are not commensurate with their abilities (Meece et al., 2013). The mismatch between aspirations and local realities prompt some highly qualified rural youth to believe they must settle for less in order to remain in or return to their communities.

A MORE PROMISING FUTURE

Today, U.S. youth, including rural youth, aspire to postsecondary education at higher rates than ever, with 9 of 10 rural students surveyed in 2007–08 indicating they seek to go to college (Byun, Meece, & Irvin, 2010; Meece et al., 2013). A National Research Center on Rural Education Support (n.d.) study of 8,000 rural adolescents found that 84% aspired to a postsecondary degree: 13% to a two-year degree, 36% to a four-year degree, and 35% to an advanced degree.

Reenvisioning Career Options

Some rural communities have courted manufacturing companies with offers of tax incentives, an educated workforce, and inexpensive land or housing. Given that educational and vocational aspirations are linked, teachers and parents ask if there are more ways to give rural youth career training and development opportunities that allow them to remain connected to their communities. Must students lower their college and career aspirations if they choose to return to their rural communities after postsecondary education? Can rural communities help identify employment options that allow rural students to find meaningful and challenging work in the communities they love? To do so would meet the desires of many youth and their families, while contributing to the sustainability and welfare of rural communities (Meece et al., 2013). Rural regions of the West are rethinking and reimagining their options. In several rural communities in Washington State, the answer is STEM.

WHY STEM PRESENTS REAL OPPORTUNITIES NATIONALLY

The National Academies' seminal 2007 report, *Rising of the Gathering Storm*: *Energizing and Employing America for a Brighter Economic Future,* urged the nation to "attract and educate new generations of world-class scientists, technologies, engineers, mathematicians" in order to ensure the vitality of our economic and strategic future (Miller & Benbow, 2012, p. 1). Scientific,

business, and education leaders agree that America's ability to innovate and compete globally is linked to our public schools' ability to adequately prepare all students in STEM (Pearson & Miller, 2012). Critical to meeting this goal is "placing a higher priority on improving the undergraduate and graduate talent pool for science and engineering by improving precollege science and mathematics education" (Miller & Solberg, 2012, p. 6).

Nationally, growth in STEM jobs has been three times faster than non-STEM jobs (Langdon, McKittrick, Beede, Khan, & Doms, 2011), and in the next decade almost all of the 30 fastest growing jobs will require some STEM skills. "From 2008–2018, STEM jobs are expected to grow 17.0% compared to just 9.8% for non-STEM" (U.S. Department of Labor, 2009, p. 2). To meet the demand, the nation must produce approximately 1 million more STEM professionals over the next decade than the number currently projected (Executive Office of the President, 2012). Yet, not enough students are entering STEM fields, and fewer than 40% of students who enter college intending to major in STEM actually persist to graduate with a STEM degree (ACT, 2011).

Why STEM Makes Sense for Rural Washington

For several reasons, rural Washington is a logical place to emphasize STEM education. Washington State is a leader in STEM, ranking first in the nation in innovation capacity in the "New Economy" index, reflecting leadership in the number of patents granted; percentage of jobs held by scientists and engineers; and venture capital investment in the state. Washington ranks a close second to Virginia in the percentage of information technology jobs (Atkinson & Nager, 2014). A study conducted for the Washington Roundtable, a business think tank, found that in March 2013 there were 25,000 unfilled jobs in Washington as a result of gaps in job skills, which will grow to 50,000 by 2017; 80% of these unfilled jobs are in STEM fields such as computer science and engineering, along with high-demand health care (Boston Consultancy Group & Washington Roundtable, 2013, p. 3). An International Monetary Fund report in 2011 noted that the mismatch in Washington between the skills required for available jobs and individuals with those skills is growing faster than any other state except Delaware (Estãvo & Tsounta, 2011, p. 10). The prime reason for this gap is that although Washington ranks fourth in the country in technology-based corporations, the state ranks 46th in residents' participation in STEM graduate degrees (www.washingtonstem.org).

As STEM employers in the state import much of their workforce, rural districts seek to understand how their students too might land these lucrative jobs. A significant number of STEM positions will come from retirements peaking in this decade. Some of the turnover of existing STEM jobs in hydroelectric power, green energy, land management, and resource protection will happen in Washington's rural regions, where it has been challenging to recruit out-of-state professionals. The best fit for these jobs would be well-qualified local youth who know and love these beautiful and isolated rural communities.

BEYOND JOB ASPIRATIONS TO K–12 CURRICULAR REINVENTION

If STEM is to be an option for rural students, how can rural educators ensure their students can successfully compete (Wang, 2013)? STEM is critical not just for career aspirations. Many believe the promise of STEM is that this approach can support rural students' exploration of foundational

math and science and engage them in applied research in issues in their own communities. Through this exploration, STEM can help students see themselves as mathematicians, engineers, and scientists, who are aware of regional STEM career opportunities and prepared to engage in the rigorous study needed to compete for these positions. Researchers studying students' intent to pursue postsecondary education leading to STEM careers found that students' interest was related to their level of math achievement in grade 12, exposure to math and science courses, and math self-efficacy beliefs (Miller & Benbow, 2012). This finding suggests that interest must be nurtured throughout a student's K–12 education. STEM literacy can be defined as "the ability to identify, apply, and integrate concepts from science, technology, engineering and mathematics to understand complex problems and to innovate to solve them" (Washington State STEM Education Foundation, 2015). A STEM focus can be incorporated into the curriculum as early as elementary school. Indeed, many say that the youngest students have the greatest potential to benefit from an infused STEM curriculum, as they still possess the basic curiosity and exploratory thinking that are the hallmark of STEM (Stone-MacDonald, Bartolini, Douglass, & Love, 2011).

EXAMPLES OF STEM INITIATIVES IN RURAL WASHINGTON STATE

In Washington, most existing STEM jobs are in industries concentrated on the west side of the state, along the Puget Sound corridor. Eastern Washington, on the other side of the Cascade Mountain range, is predominantly rural and agricultural. Of the state's 39 counties, 31 are rural, but only 10% of students statewide are considered rural. Thirty percent of rural students are minority students, and Washington ranks just third, behind New Mexico and Alaska, among states with the highest percentage of rural ELL students (Johnson et al., 2014, p. 88).

Rural eastern Washington is undergoing dynamic demographic changes. As small farm families sell out to larger agribusinesses, schools are seeing a growing number of low-income families that include newer populations of Spanish-speaking former farmworkers and dwindling numbers of rural White farm families. The region is also home to several Indian tribes, including the Colville to the east and the Yakama to the south. Many districts are small, with a single middle school and high school, some combined into one building, and one or more feeder elementary schools.

Cheap electricity from the Columbia River has provided unexpected opportunities for careers in the region. BMW's planned expansion of its plant in Moses Lake has been described as "the largest carbon-fiber plant on earth" (Gates, 2014). There are new data centers in the Quincy area, located close to the Columbia River on the I-90 corridor, serving Microsoft, Dell, and Yahoo. Data centers themselves will not provide significant numbers of jobs, but the burgeoning computer industry will offer local rural youth new opportunities. As yet, however, they are opportunities for which most of these youth are not adequately prepared. Some programs are seeking to address this gap by providing students with skills in STEM fields. Below, we offer some examples of initiatives that range from afterschool programs to college readiness strategies to public/private partnerships.

Rural Alliance

To address the administrative and physical isolation that plagues small rural school districts, 60 school districts, several postsecondary institutions, and a number of nonprofit partners in

the region are loosely confederated in a "Rural Alliance" that promotes students' preparation for, access to, and success in college and career (see http://ruralalliancewashington.org). Several districts have formed consortia to participate in the AVID Program (Advancement Via Individual Determination, a postsecondary preparation program for low-income students), in order to be able to meet the program's administrative requirements. Rural Alliance districts are currently designing a series of rigorous online courses using their best teachers and a robust online platform from Eastern Washington University to broaden curricular offerings available to their students.

Collaboration With Postsecondary Institutions

This region, like other rural areas across the country, offers opportunities for rural school districts to build valuable alliances with postsecondary institutions, including Central Washington University, Eastern Washington University, and Washington State University. These institutions participate in GEAR UP, Upward Bound, and similar college outreach programs. They match university STEM research faculty with K–12 students and teachers, offer "college in the classroom" programs, and support curricular offerings that align with the Common Core State Standards (http://ruralalliancewashington.org).

State Promotion of Dual-Credit Options Serving Rural Districts

Washington State's "Running Start" program (Office of Superintendent of Public Instruction, 2014b) allows qualifying junior and senior high school students to earn high school and college credits simultaneously by completing coursework in a community college. This usually requires students to attend classes on the college campus. The program, however, does not typically serve rural students who might have to drive an hour, or three, to reach the closest campus. To address this challenge, rural districts have worked with area universities and community colleges to bring Running Start to their schools, empowering qualified K–12 teachers to teach the dual-credit bearing courses. Washington State also allows noncitizen students who meet a residency requirement to pay in-state tuition rates, allowing these and other rural students to reduce college costs by completing college credits while still in high school (Washington Student Achievement Council, n.d.).

An Elementary STEM Program

Although many STEM-focused programs target secondary students, Waterville Elementary is an example that partners grade 4 students with area farmers in a place-based, real-time science research project. To help University of Washington scientists deepen their understanding of the habits of the local horny toad lizard, students engage with local farmers to observe and capture details about the species. Students provide data collection sheets to partner farmers who note the time, place, and outdoor temperature for each horny toad lizard sighted. One day each October, partner farmers and students meet to share their data, enter it into a data file for university researchers, and examine area maps. Teachers help students use sophisticated programs to analyze the data and scientists take students into the field to learn techniques in lizard tracking using GPS

technology. It is not a field trip: it is an extension of classroom instruction. The information students and their partner farmers collect adds relevant and important data to a national database about the lizard, while transforming young students into citizen scientists (Edutopia, 2010).

Afterschool Programs

A variety of afterschool programs also cater to STEM literacy for all ages. Linda Hillman's 21st Century Community Learning Center program, for example, regularly engages elementary students in engineering design projects during out-of-school time. A recent challenge required students to identify a household device, describe how it operates, design improvements, and build a prototype. Students, many of whom are English language learners in a high-poverty district, were also asked to explain and defend their designs to their classmates in a 3-minute presentation. Students started with a paper and pencil sketch and then crafted prototypes with Legos, K'NEX, or construction paper. They designed a wide array of objects, including a drone with Bluetooth capabilities that flies through the house at night to make sure the oven is off and the backdoor is locked. Another example was a hydraulic lift for a bed that makes it easier to change the sheets and exposes additional household storage. This elementary project-based STEM approach enables students to perform at high levels. They describe themselves as "innovators" and "entrepreneurs."

Building Engineers

In a policy brief entitled "Building a Science, Technology, Engineering and Math Education Agenda," funded in 2011 by the National Governors Association, a key recommendation was that states increase student motivation and interest in math and science, noting that in most school systems, math and science are disconnected from other disciplines. Student may not see the connection between what they're studying and STEM career options (Thomasian, 2011). For the last eight years, the Toppenish School District in rural Yakima Valley has used an engineering and biomedical curriculum, Project Lead the Way (PLTW), to build interest and involvement in math and science for rural middle and high school students. Toppenish High School has nearly 100% eligibility for free and reduced-price lunch and nearly 88% of their students are identified as Hispanic/Latino (Office of Superintendent of Public Instruction, n.d.). PLTW provides a rigorous, relevant, hands-on curriculum to engage Toppenish students in STEM experiences and encourage them to consider STEM careers, with powerful results. By 2014, nearly 60% of their high school sophomores, juniors, and seniors had completed at least one engineering class. PLTW students must display and defend group projects during annual showcases, demonstrating skills called for in the Common Core State Standards (A. Gonzalez, teacher at Toppenish High School, personal communication, November 2013). In 2012, Toppenish was named a Washington State STEM Lighthouse School, one of seven such schools in the state that serve as exemplars and resources to others seeking to create a learning environment focused on STEM; in 2014, Toppenish Middle School was also named a STEM Lighthouse School (Office of Superintendent of Public Instruction, 2014a). That this engineering curriculum has been so embraced by students reflects the research finding that "there may be a unique potential for recruiting [students] from Latino communities" to enter engineering (Camacho & Lord, 2011, p. 135).

Highly Qualified Rural Teachers and Administrators

Toppenish High's track record with PLTW brought special notice to the school's former principal, Trevor Greene. Greene grew up on the rural Yakama Nation Indian reservation in Washington State's Yakima Valley, returning after college to become first a teacher and then principal of Toppenish High School. Greene was named the 2013 National Principal of the Year by MetLife/National Association of Secondary School Principals, in part because of student engagement in PLTW (Farrace & Atherley, 2012). Also in 2013, the White House honored the Yakima Valley again by naming Jeff Charbonneau, whose school is seven miles from Toppenish in the town of Zillah, 2013 National Teacher of the Year. Like Greene, Charbonneau was recognized for expanding engineering classes, boosting the science curriculum, and bringing in robotics and engineering classes ("Teacher of the Year," 2013). Both educators demonstrate the caliber of talent in rural districts that, when merged with a passion for rural roots, can pay dividends to students in these communities.

Educational Outreach by a Scientific Installation

Another example of educational outreach is provided by the Laser Interferometer Gravitational-Wave Observatory (LIGO), located in Hanford. This federally funded research facility seeks to understand wave action in outer space. LIGO's installation, operated by the Massachusetts Institute of Technology and Cal-Tech, provides programming to K–12 schools throughout Washington State. In a new collaboration with Central Washington University's GEAR UP college outreach project, LIGO will engage their STEM professionals in periodic Skype-facilitated brownbag lunches that connect their facility with classrooms throughout rural central Washington. Students will engage in discussions with STEM professionals, sharing the design challenges they are facing in school science projects and learning firsthand about the fascinating "messiness" of rigorous scientific inquiry (Central Washington University, 2014).

CONCLUDING REMARKS: AN OPPORTUNITY NOT TO MISS

As in Washington State, rural communities across the nation are exploring how STEM education can answer some of their most challenging economic and social problems. Although in the past, rural communities have provided few challenging jobs for postsecondary graduates (with the exception of teaching and school administration), the White House Office of Rural Affairs heralds new opportunities in rural America for industries engaged in renewable energy, agriculture, and technology (White, 2011). Even as states and communities pursue STEM options, professionals familiar with STEM note that the field is very fluid, with the science and technologies associated with STEM careers experiencing dramatic change. Existing career fields are evolving with a "continual creation of new occupations that could not have been imagined two decades ago" (Miller & Benbow, 2012, p. 3).

A recent RAND Corporation study identified several factors changing the world of work, including shifts in demographic patterns, the pace of technological change, and economic globalization (Karoly & Panis, 2004). New opportunities may open up to nimble, well-educated

STEM-trained rural professionals. Traditional brick and mortar enterprises will give way to businesses that are more decentralized, with more firms outsourcing goods and services. "Some sectors may be comprised of 'e-lancers,' businesses of one or a few workers linked in a global marketplace for products and services" (Karoly & Panis, 2004, p. xv). These entrepreneurs will communicate with the marketplace through the Internet, and can serve clients and organizations anywhere. The ongoing change in technology "is expected to continue to propel demand for highly skilled workers who can develop the new technologies" in the production of goods and services and bring them to market (Karoly & Panis, 2004, p. xviii). These coming changes provide new opportunities for rural students, if they have completed the rigorous STEM training Washington State imagines for more of its rural youth.

With these trends, a well-educated, visionary workforce of rural residents may not need to leave the rural communities they love to have jobs that are challenging and rewarding. STEM may bring new opportunities to students in this region, as imagined in the composite vignettes of local students that started our inquiry.

Maria, who worries about the health concerns of her extended family, could entertain getting a health degree in affiliation with the University of Washington's WWAMI (Washington, Wyoming, Alaska, Montana, Idaho) Rural Health initiative, becoming a certified medical assistant, nurse, or physician. Her Spanish language skills will be very useful in such roles.

Brian might parlay training as an engineer to return to the Okanogan Valley where he could help his dad's orchard operations with innovative engineering and technology upgrades, while also doing other custom engineering jobs for clients around the world, supporting a global supply chain developing products in a warehouse on his family property and communicating specs and sending product via telecommunications.

John might learn that there are jobs in the U.S. government or public utility districts where he could monitor resource allocation—including land, wildlife, and salmon—on his reservation and the beautiful rural terrain in which he was raised.

What rural schools need to do is to prepare these students for these opportunities and for the myriad jobs we have not yet seen or can even imagine.

AUTHOR BIOS

Barbara Peterson serves as the Executive Director of the Northwest Learning and Achievement (NLA) Group, an education nonprofit that she cofounded in 1999 in the rural central Washington community of Wapato. NLA works with low-income school districts throughout central Washington State, bringing auxiliary college outreach and afterschool programs.

Greta Bornemann serves as the Director of Mathematics for the Puget Sound Educational Service District, supporting 35 school districts in Washington State. With more than 25 years of experience as a classroom teacher, instructional coach, and Washington State Director of Mathematics, her interests include curriculum synergy, systems that promote quality mathematics experiences for underserved populations, and mathematics teacher professional development. She is currently completing her Ed.D. at the University of Washington.

Cheryl Lydon, STEM program manager for the Puget Sound Educational Service District, leads a career awareness exploration system to connect young people with real-world learning experiences. She also focuses on supporting teacher professional learning and whole-system design to make science accessible to all students. Lydon, who earned an M.Ed. in Science Education from Western Washington University, is currently completing her Ed.D. at the University of Washington.

Kimberly West is a professional learning specialist working with school districts across the United States. Her work focuses on redefining what teaching and learning looks like in the 21st century. She is a National Board Certified k-12 educator in her 16th year of teaching both students and teachers.

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