edWeb

Rock Valley Case Study

Research-Based Practices for PD

Anytime, Anywhere Learning

edWeb.net

Personalized, Professional Learning — Anytime, Anywhere

edWeb.net was founded over 10 years ago, and in that time, we've grown into an award-winning professional learning network that helps engaged and innovative educators share their best ideas and practices — anytime, anywhere — with educators around the country and the world.

It's been 10 years since the dawn of the "connected educator" movement. In 2010 the U. S. Department of Education issued a National Education Technology Plan. The plan included the first statement officially endorsing the use of social networks for professional learning in education. "Social networks can be used to provide educators with career-long personal learning tools and resources that make professional learning timely and relevant as well as an ongoing activity that continually improves practice and evolves their skills over time." That statement remains as relevant as ever today, but equally relevant is the need for a space dedicated specifically for professional collaboration in education.

edWeb has realized the dream of personalized professional learning at scale. edWeb is a community of over 650,000 educators from preK through higher education who are committed to lifelong learning for themselves and to help their students learn more, achieve more, be more creative, and be better prepared for life. We are able to provide these professional learning programs for free thanks to our sponsors and partners.

edWeb has accumulated a body of research and practice to help educators get the most value from our free professional networking platform and our award-winning edWebinar programs. We hope this guide gives you inspiration and ideas to expand the ways you can offer personalized professional learning for educators, and make the learning more relevant, more immediate, and more fun.

The edWeb Team

edWeb

edWeb.net Case Study:
Rock Valley Community School DIstrict (Iowa)
Research report by Cambridge Learning Group

Rock Valley Community School District in Iowa relies on edWeb.net to support its professional development program for teachers. Their program embodies four of the key features identified by educational researchers as characterizing high-quality professional learning experiences, the effective design of online communities for teachers, and best practices for integrating informal online professional learning with formal district professional development. In each case, edWeb.net provides critical support that empowers Rock Valley leaders to implement research-based practices.

This case study explains each of these key practices and shows how they align with the research base. Information about the Rock Valley professional development program comes from review of Rock Valley's edWeb.net community content and interviews with the district leader responsible for it and two elementary school teachers who have participated in it, one in her second year in the classroom and a second with more than two decades of experience. The characteristics of effective professional development described are from a recent synthesis of research to date performed by the Learning Policy Institute (Darling-Hammond, Hyler, & Gardner, 2017). The characteristics of effective online communities and effective integration of informal and formal professional learning draw on research conducted and synthesized by the U.S. Department of Education's Office of Educational Technology (Cambridge, 2014; Cambridge & Nussbaum-Beach, 2014).

Professional development at Rock Valley

Rock Valley Community School District employs 65 teachers who serve 850 students. The student population is growing, in part because of a recent influx of Hispanic agricultural workers. The district has a growing special needs population. The district elementary, middle, and high school are co-located in a single building, allowing for increased differentiation, co-curricular learning opportunities, and occasions for younger students to learn from their older peers. The district went one-to-one five years ago. Each student in grades 1 through 3 has an iPad, and in grades 4 through 12 a laptop, to use throughout the school day.

Teacher Leadership and Compensation (TLC), an Iowa state-wide program that allows teachers to take on leadership responsibilities, provides funding to staff the district's leadership team. Rachel Langenhorst is among the district leaders whose responsibility it is to develop the professional development programs the district uses. Through TLC, experienced teachers are now serving as instructional coaches in areas where the district sees opportunities to strengthen instruction, such as instructional technology, English as a Second Language, and data analysis.

Through the professional development program, each teacher develops a yearly professional development plan that sets goals for building new knowledge and applying it in the classroom. The plan guides their participation in ongoing professional learning activities, such as participating in webinars, testing out new

edWeb.net provides critical support that empowers Rock Valley leaders to implement research-based practices

strategies, or receiving coaching. This ongoing learning is punctuated by periodic, more intensive learning experiences, such as Rocket University—an in-house conference where teachers choose from a large list of sessions led by other teachers, leaders, and local and regional experts—and in-service days that include "personalized PD days." As detailed in the following sections, edWeb.net plays a central role in each of these types of professional learning activities.

Together, these edWeb-supported activities exemplify four of the key characteristics of an effective professional learning program identified by LPI as supported by rigorous research[1]. They are content-based, employ active learning, embrace collaboration, and are of a sustained duration. As summarized in Table 1, each of these characteristics aligns both with one of the key elements of effective online communities for teachers and with a principle for integration of online, informal professional learning with formal professional development programming.

Content-based professional development through edWeb.net resources applied to instruction

Professional development is most effective when it focuses on instructional strategies tied to the specific goals of the curriculum (Darling-Hammond, Hyler, & Gardner, 2017). Online communities support content-based professional learning by providing learning opportunities and resource repositories indexed to such strategies (Cambridge, 2014). Combining these online resources with face-to-face professional learning activities such as instructional coaching has the potential to dramatically improve teaching and learning (Cambridge & Nussbaum-Beach, 2014).

All of Rock Valley's professional development activities focus on the specific challenges of instruction within teachers' content areas. According to Langenhorst, teachers have a "serious need" for information from "real experts" they can apply directly to the challenges they face helping students meet learning goals. Often, teachers need help developing interventions and accommodations for struggling students, adapting instruction to English Language Learners (ELLs), and integrating technology effectively.

edWeb.net powerfully supports Rock Valley's content focus with its edWebinars™. Through a wide range of communities, edWeb hosts several edWebinars each week, which Langenhorst reports are often led by "high-profile, well-known experts with a track record." When teachers join communities on edWeb.net, they receive regular updates about edWebinars and other new activities and resources. Kathy McGill, a third-grade teacher nearing retirement, adds that unlike others in which she has participated that were "too academic," edWeb's webinars feature "specific instructional ideas, not just background."

All edWebinars are recorded, yielding an extensive archive available to Rock Valley teachers in addition to edWeb's live offerings. For example, McGill has focused much of her recent professional learning on improving reading instruction, seeking to make it more individualized, hold students accountable for their independent reading, and help

edWeb's webinars feature "specific instructional ideas, not just background."

— Kathy McGill,
Third-Grade Teacher

1. Rock Valley's professional development enacts the other three key characteristics identified by the Learning Policy Institute—modeling, coaching, and reflection—as well. This report focuses on the subset of professional learning activities within which edWeb.net plays the most integral role.

improve fluency. There are five edWeb.net communities explicitly focused on literacy instruction, each with an average of over 4300 members, all of which have hosted edWebinars presented by literacy coaches, researchers, and consultants. Teachers can access 37 edWebinar recordings focused on helping students learn to read.

From the edWebinars in which she participated, McGill both learned about foundational concepts—such as how the brain processes written language—and "cool little things to try," such as a musical chairs game that helps expose students to a wide range of genres. After completing this activity, her students were "on fire" for biographies, a genre with strong connections to social studies and science content knowledge they had not previously encountered.

Active learning through structured online activities and classroom application

Active learning is also key to effective professional learning (Darling-Hammond, Hyler, & Gardner, 2017). Online communities are more powerful when they offer structured activities that engage teachers in such active learning (Cambridge, 2014). Research shows that applying what is learned through such online learning activities in the classroom maximizes the impact of professional development on student learning (Cambridge & Nussbaum-Beach, 2014).

edWeb.net makes it possible for Rock Valley to conduct "individualized PD days" through the district's Rocket University community, an innovative approach to in-service days. Using a digital template Langenhorst created, teachers share their goals and areas of focus on edWeb.net at the beginning of the day, spend three hours individually investigating, and then share the results of their inquiry on Rock Valley's edWeb community discussion forum. Teachers often watch edWebinars but also read books and articles, access instructional materials available elsewhere online, or even visit other nearby schools, synthesizing these sources in their online reports.

Lanae Faber is a second-grade teacher in her second year of service. She loves how the structure of the individualized PD activities allows her to investigate topics the demands of teaching otherwise make it difficult to learn about in-depth—"When would I ever have time to look into that?"—and then to apply the fruits of her inquiry with her students right away. Her dtrategies for wording instructions and feedback to increase students' responsiveness and avoid discouragement stemmed from the combination or a review of edWeb's online resources and reading Johnson's book *Choice Words:How Our Language Affects Children's Learning* (, 2003).

Collaboration that builds knowledge and makes collective decisions

The active professional learning activities Rock Valley teachers use edWeb.net to perform are also collaborative. Collaboration is key to realizing professional learning's potential to systemically improve instruction (Darling-Hammond, Hyler, and Gardner, 2017). Collaboration is supported most fully in online communities when leadership roles are distributed across the membership (Cambridge, 2014), and this combination of shared expertise and authority maximizes the value of a district's talent (Cambridge

Collaboration is key to realizing professional learning's potential to systemically improve instruction

& Nussbaum-Beach, 2014).

When teachers complete their individual inquiries on Rocket University, they report back what they learned and share their implementation plans on edWeb. net, getting feedback from peers. Langenhorst actively facilitates and participates in these discussions, but each teacher takes primary responsibility for moderating the discussion of their work. This interaction benefits both the teacher conducting the inquiry, who becomes the group's authority on the topic, and the group discussing it. McGill reports that comments she has received from other teachers have triggered new ideas for her, leading to a collaborative process of "online brainstorming" in the discussion forum. In reviewing and commenting on others' reports, she's "always found four or five things" where she thought, "oh, hey, that's a great idea," many of which she then tried in her classroom.

These conversations between teachers often go deeper than just information exchange. For example, Faber's most recent personalized PD project was to learn how better to manage explosive children, a focus triggered by the challenge raised by a particularly difficult student. She watched an edWebinar, read several articles, and shared common themes that emerged across them in her report, including that "when a volatile child acts appropriately, that behavior must be praised and reinforced." Another more experienced teacher suggested that, while this may be generally true, in her experience different strategies are needed for different children, and what worked one day may not work the next. A third teacher agreed, but offered a different generalization: "What I learned the most though, was the fact that each student would flourish in their own way, if they could have a mutual respect for you." This principle affirms both the need for praise Faber notes as a common theme in the literature and the need for ongoing adaptation her colleague suggests. Together, these three teachers are not just sharing but also creating pedagogical knowledge.

These individual decisions about practice can lead to systemic changes. In an earlier personalized PD day, Faber investigated guided math. Sharing the results of her inquiry got other teachers sufficiently interested that her principal sent her to a conference on this differentiation approach. Guided math is now being used by her whole grade level team.

Sustained development through personal learning plans linked to activities in edWeb.net

In addition to being focused on content through active and collaborative activities, professional development is most effective when it is sustained in duration (Darling-Hammond, Hyler, & Gardner, 2017). One key way that online communities achieve sustained engagement is through activities that produce tangible products (Cambridge, 2014). These activities have the most impact on teaching and learning when they are integrated with the district's continuous improvement processes, including teacher evaluation and recognition systems (Cambridge & Nussbaum-Beach, 2014).

Rock Valley's professional learning activities all connect to teachers' professional learning plans (PLPs). Each teacher creates a plan each year setting goals for learning

and improvement. Mid-year and end-of-year reviews track progress towards these goals. McGill's PLP this year focuses on using iPads with struggling readers. Teaming up with another teacher with similar goals, McGill examined the efficacy of apps she learned about through edWebinars and discussions, including ones offering access to audiobooks, supporting paired reading, and measuring fluency in real time. Each activity yields reports published on edWeb.net with links to related resources and archived discussions. The Rocket University community currently includes three years' worth of these products, which are easily searchable.

edWeb.net also contributed to sustained professional learning through a "Pajama PD day." When a large snowstorm threatened a planned in-service day with cancellation, Langenhorst's creative use of edWeb.net in conjunction with other online tools enabled teachers to learn from home in a manner that very well may have been more powerful than if they had been able to meet face-to-face. Through self-paced and real-time activities coordinated through the district's edWeb community, teachers engaged in collaborative inquiry and reflected on what they had learned. McGill reports that she was surprised to be engaged and active throughout the day, reading articles and talking with others on the discussion forum. "I just had fun. No carrots and sticks." She appreciated the added frankness she attributes to the online environment. "People are more willing to say what they think when they're typing."

The value of edWeb.net to Rock Valley

edWeb.net has made it possible for Rock Valley Community School District to put a professional development program into place that embodies many of the features most important for improving instruction. Langenhorst acknowledges that some of the activities could have been supported using general-purpose tools, such as Google Docs, and some do incorporate such tools. However, she says that she would gladly pay for edWeb.net because it provides a central hub through which to link together a "hot mess" of free tools. It offers an intuitive interface, keeps everything in one place, and offers extensive community administration options.

edWeb.net enables leaders to design and deliver professional development programming that exemplifies much of what we know from research to be effective in transforming instructional practice to accelerate student growth. Rock Valley teachers benefit from edWebinar content aligned with their goals for instructional improvement that they can use right away in their classrooms. The school year is punctuated with intensive, active, collaborative learning activities that are structured and documented on edWeb.net. These are tied to continuous improvement through each teacher's professional learning plans and their collective decisions about instructional strategies, some of which are also made on the platform. Rock Valley's Individualized PD Day and Rocket University experiences are shared with their AEA as well as their school board to further increase communication and common goals.

Other districts would do well to build on Rock Valley's example of how best to use edWeb.net to support powerful professional development grounded in research on how teachers learn.

edWeb.net has made it possible for Rock Valley Community School District to put a professional development program into place that embodies many of the features most important for improving instruction

Table 1: How research supports key features of the Rock Valley PD program

Best Practices

Rock Valley practice	edWeb.net support	Effective professional development	Effective online community for teachers	Effective integration of informal online and formal PD
Focused on individual instructional goals	Access to content: edWebinars repository of related resources	Content-based	Resource repositories and robust tools	Instruction-related
Inquiry process	Access to expertise (members and presenters)	Active learning	Structured activities	Research-based
Reporting out and back, making collective decisions about practice	Discussion and sharing tools. Support with logistics, modeling of moderation	Collaboration	Distributed leadership	Taps local expertise
Intensive and ongoing, linked to personal development plan	Automatic updates, persistent record in central space	Sustained duration	Tangible products	Aligns with continuous improvement

Correlation to Research

Rock Valley practice	edWeb.net support	Key studies
Focused on individual instructional goals	Access to content: edWebinars repository of related resources	Booth, 2012; Carroll, et. al., 2003; Chen & Whinston, 2011; Gray, 2004; Heller, et. al., 2012; Penuel, Gallagher, & Moorthy, 2011; Roth, et. al., 2011; Shaha & Ellsworth, 2013; Vavasseur & MacGregor, 2008; Wenger, White, & Smith, 2009
Inquiry process	Access to expertise (members and presenters)	Barab, MaKinster, & Scheckler, 2003; Chen, Chen, & Tsai, 2009; Duncan-Howell, 2010; Fishman, et. al., 2013; Garet, et. al., 2001; Greenleaf, et. al., 2011; Killion, 2013; Kleickmann, et. al., 2016; Supovitz, J. A., Mayer, D. P., & Kahle, J. B., 2000
Reporting out and back, making collective decisions about practice	Discussion and sharing tools. Support with logistics, modeling of moderation	Allen, et. al., 2011; Babinski, Jones, & DeWert, 2001; Bourhis, Dubé, & Jacob, 2005; Buczynski & Hansen, 2010; Gairín-Sallán, Rodríguez-Gómez, & Armengol-Asparó, 2010; Gareis & Nussbaum-Beach, 2007; Hur & Brush, 2009; Meissel, Parr, & Timperley, 2016; National Center for Literacy Education, 2013; Prestridge, 2010
Intensive and ongoing, linked to personal development plan	Automatic updates, persistent record in central space	Allen, et. al., 2015; Blitz, 2013; Darling-Hammond, et. al., 2009; Farooq, et. al., 2007; Hew & Hara, 2007; Hickey, et. al., 2017; Johnson & Fargo, 2014; Weiss & Pasley, 2000

Cambridge Learning Group

Darren Cambridge, Founder and President

Cambridge Learning Group leads research, program development, and strategic communications projects on behalf of NGOs and companies in the United States and Europe. The founder, Darren Cambridge, has extensive experience in policy and research on the impact of social networks and online communities in education, the development of effective professional development, and the development of the Future Ready Schools initiative. https://www.linkedin.com/company-beta/456688/

Darren was a principal consultant for the American Institutes for Research from 2010–2013 where he advanced the use of technology to improve education learning and performance through research, development, and outreach as principal investigator and project director of Connected Educators and Future Ready Leaders, funded by contracts totaling $7.1 million from the United States Department of Education. As the organizer of Connected Educator Month from 2012–2015, Darren brought together more than 400 organizations to provide free online professional learning opportunities to hundreds of thousands of educators. Darren was the principal investigator for the CS10K Community project for the National Science Foundation (NSF), a three-year, $2.4 million project that scales up professional learning opportunities for teachers of high school computer science nationally as part of NSF's broadening participation agenda. From 2011–2013, he also oversaw Teachers Engage, the Intel Corporation's 40,000-member global online community for teachers. Darren's publications include The Connected Community: Exploratory research on designing online communities of practice for educators to create value. Office of Educational Technology. Washington, DC: U.S. Department of Education, 2014; and with co-author Nussbaum-Beach, The Future Ready District: Professional learning through online communities of practice and social networks to drive continuous improvement. Office of Educational Technology. Washington, DC: U.S. Department of Education, 2014.

Darren was Director of Policy Research and Development for the National Council of Teachers of English (NCTE) from 2014–2016, where he successfully lobbied for the inclusion of a comprehensive literacy education program and a research-based redefinition of professional development in the Every Student Succeeds Act.

He is the CEO and co-founder of Mia Learning.

References

Allen, J. P., Hafen, C. A., Gregory, A. C., Mikami, A. Y., & Pianta, R. (2015). Enhancing secondary school instruction and student achievement: Replication and extension of the My Teaching Partner-Secondary intervention. *Journal of Research on Educational Effectiveness, 8*(4), 475–489

Allen, J. P., Pianta, R. C., Gregory, A., Mikami, A. Y., & Lun, J. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement. Science, 333(6045), 1034–1037.

Babinski, L. M., Jones, B. D., & DeWert, M. H. (2001). The roles of facilitators and peers in an online support community for first-year teachers. *Journal of Educational & Psychological Consultation, 12*(2), 151–169.

Barab, S. A., MaKinster, J. G., & Scheckler, R. (2003). Designing system dualities: Characterizing a web-supported professional development community. *Information Society, 19*(3), 237–256.

Blitz, C. L. (2013). *Can online learning communities achieve the goals of traditional professional learning communities? What the literature says (REL 2013–003).* Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Mid-Atlantic. Retrieved from http://ies.ed.gov/ncee/edlabs/regions/midatlantic/pdf/REL_2013013.pdf

Booth, S. E. (2012). Cultivating knowledge sharing and trust in online communities for educators. *Journal of Educational Computing Research, 47*(1), 1–31.

Bourhis, A., Dubé, L., & Jacob, R. (2005). The success of virtual communities of practice: The leadership factor. *The Electronic Journal of Knowledge Management, 3*(1), 23–34.

Buczynski, S. & Hansen, C. B. (2010). Impact of professional development on teacher practice: Uncovering connections. *Teaching and Teacher Education, 26*(3), 599–607

Cambridge, D. (2014). *The connected community: Exploratory research on designing online communities of practice for educators to create value.* Office of Educational Technology. Washington, DC: U.S. Department of Education.

Cambridge, D. & Nussbaum-Beach, S. (2014). *The future ready district: Professional learning through online communities of practice and social networks to drive continuous improvement.* Office of Educational Technology. Washington, DC: U.S. Department of Education.

Carroll, J. M., Choo, C. W., Dunlap, D. R., Isenhour, P. L., Kerr, S. T., MacLean, A., et al. (2003). Knowledge management support for teachers. *Educational Technology Research and Development, 51*(4), 42–64.

Chen, Y., Chen, N. S., & Tsai, C.-C. (2009). The use of online synchronous discussion for web-based professional development for teachers. *Computers & Education, 53*(4), 1155–1166.

Chen, J., Xu, H., & Whinston, A. B. (2011). Moderated online communities and quality of user-generated content. *Journal of Management Information Systems, 28*(2), 237–268.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development. Palo Alto, CA: Learning Policy Institute.*

Darling-Hammond, L., Wei, R. C., Andree, A., Richardson, N., & Orphanos, S. (2009). *Professional learning in the learning profession.* Washington, DC: National Staff Development Council.

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational researcher, 38*(3), 181–199.

Duncan-Howell, J. (2010). Teachers making connections: Online communities as a source of professional learning. *British Journal of Educational Technology, 41*(2), 324–340.

Farooq, U., Schank, P., Harris, A., Fusco, J., & Schlager, M. (2007). Sustaining a community computing infrastructure for online teacher professional development: A case study of designing Tapped In. *Computer Supported Cooperative Work, 16*(4), 397–429.

Fishman, B., Konstantopoulos, S., Kubitskey, B. W., Vath, R., Park, G., Johnson, H., et al. (2013).

Comparing the impact of online and face-to-face professional development in the context of curriculum implementation. *Journal of Teacher Education*. Retrieved from http://jte.sagepub.com/content/early/2013/05/24/0022487113494413.full.pdf+html

Gairín-Sallán, J., Rodríguez-Gómez, D., & Armengol-Asparó, C. (2010). Who exactly is the moderator? A consideration of online knowledge management network moderation in educational organisations. *Computers & Education, 55*(1), 304–312.

Gareis, C. R., & Nussbaum-Beach, S. (2007). Electronically mentoring to develop accomplished professional teachers. *Journal of Personnel Evaluation in Education, 20*(3), 227–246.

Garet, M., Porter, A., Desimone, L., Birman, B., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915–945.

Gray, B. (2004). Informal learning in an online community of practice. *Journal of Distance Education, 19*(1), 20–35.

Greenleaf, C. L., Hanson, T. L., Rosen, R., Boscardin, D. K., Herman, J., Schneider, S. A., Madden, S., & Jones, B. (2011). Integrating literacy and science in biology: Teaching and learning impacts of reading apprenticeship professional development. *American Educational Research Journal, 48*(3), 647–717.

Heller, J. I., Daehler, K. R., Wong, N., Shinohara, M., & Miratrix, L. W. (2012). Differential effects of three professional development models on teacher knowledge and student achievement in elementary science. Journal of Research in Science Teaching, 49(3), 333–362.

Hew, X., & Hara, X. (2007). Knowledge sharing in online environments: A qualitative case study. *Journal of the American Society for Information Science and Technology, 58*(14), 2310-2324.

Hickey, D. T., Otto, N., Itow, R., Schenke, K., Tran, C., & Chow, C. (2017). *Badges design principles documentation project*. Bloomington, IN: Indiana University, Center for Research on Learning and Technology.

Hur, J. W., & Brush, T. A. (2009). Teacher participation in online communities: Why do teachers want to participate in self-generated online communities of K–12 teachers? Journal of *Research on Technology in Education, 41*(3), 279–303.

Killion, J. (2013). Tapping technology's potential. *JSD, 34*(1), 10–18. Retrieved from http://learningforward.org/docs/default-source/jsd-february-2013/killion341.pdf?sfvrsn=2

Johnson, C. C., & Fargo, J. D. (2014). A study of the impact of transformative professional development on Hispanic student performance on state mandated assessments of science in elementary school. *Journal of Elementary Science Teacher Education, 25*(7), 845–859.

Johnson, P. (2003). *Choice words: How Our Language Affects Children's Learning*. Portland, ME: Stenhouse Publishing.

Kleickmann, T., Trobst, S., Jonen, A., Vehmeyer, J., & Moller, K. (2016). The effects of expert scaffolding in elementary science professional development on teachers' beliefs and motivations, instructional practices, and student achievement. *Journal of Educational Psychology, 108*(1) 21–42.

Meissel, K., Parr, J. M., & Timperley, H. S. (2016). Can professional development of teachers reduce disparity in student achievement? *Teaching and Teacher Education(58),* 163–173.

National Center for Literacy Education. (2013). *Remodeling literacy learning: Making room for what works*. Urbana, IL: National Council of Teachers of English.

Penuel, W. R., Gallagher, L. P., & Moorthy, S. (2011). Preparing teachers to design sequences of instruction in Earth systems science: A Comparison of three professional development programs. *American Educational Research Journal, 48*(4), 996–1025.

Prestridge, S. (2010). ICT professional development for teachers in online forums: Analysing the role of discussion. *Teaching and Teacher Education, 26*(2), 252–258.

Roth, K. J., Garnier, H. E., Chen, C., Lemmens, M., Schwille, K., & Wickler, N. I. Z. (2011). Videobased lesson analysis: Effective science PD for teacher and student learning. *Journal on Research in Science Teaching, 48*(2), 117–148.

Shaha, S.H., & Ellsworth, H. (2013). Predictors of success for professional development: Linking student achievement to school and educator successes through on-demand, online professional learning. *Journal of Instructional Psychology, 40*(1), 19–26.

Supovitz, J. A., Mayer, D. P., & Kahle, J. B. (2000). Promoting inquiry based instructional practice: The longitudinal impact of professional development in the context of systemic reform. *Educational Policy 14*(3), 331–356.

Vavasseur, C., & MacGregor, S. (2008). Extending content-focused professional development through online communities of practice. *Journal of Research on Technology in Education, 40*(4), 517–536.

Weiss, I. R., & Pasley, J. D. (2006). *Scaling up instructional improvement through teacher professional development: Insights from the local systemic change initiative.* Philadelphia, PA: Consortium for Policy Research in Education (CPRE) Policy Briefs

Wenger, E., White, N., & Smith, J. (2009). *Digital habitats: Stewarding technology for communities.* Portland, OR: CPsquare.