Connected Educators

The Connected Community

Exploratory Research on Designing Online Communities

of Practice for Educators to Create Value

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Introduction

During the past three years, the U.S. Department of Education's Office of Educational Technology's Connected Educators project—a project run by American Institutes for Research (AIR)—has sought to understand how to capitalize on the promise of online communities of practice to support professional learning for educators.

The Connected Educators project investigated two overarching questions in its research:

- How do successful online communities of practice for educators create value for their members that may lead to improved outcomes for students?

- For newly launched communities, what are the key challenges and decisions that leaders must negotiate in the crucial first year? How can what is learned from successful communities inform the process of helping a new community thrive?

To address these questions, researchers at AIR and the Friday Institute for Educational Innovation at North Carolina State University (Friday Institute) did the following:

- Conducted two multiple case studies, one examining how mature communities create value for their active participants and a second tracking the evolution of newly launched communities during their first year.

- Incorporated design research into communities designed and managed by Connected Educators project partners.

- Explored the application of learning analytics techniques in a mature community.

Table 1 presents the communities that were studied.

Table 1. Communities Studied

Mature Communities	Newly Launched Communities	Connected Educators Communities[a]
- The English Companion Ning (English Ning), which is an informal venue for English teachers to share experiences and resources and build relationships - The National Science Teacher's Association Learning Center (NSTA Learning Center), which is designed to support professional learning for science teachers at all grade levels - The Teacher Leaders Network (TLN), which links participants in its teacher leadership initiatives - TFANet, which supports the professional growth of Teach For America corps members, alumni, and staff	- Assess4Ed, which is focused on supporting state leaders preparing for the online and computer-based tests aligned with the Common Core State Standards - BrainPOP Educators, which is focused on engaging teachers concerning the company's videos, games, and other resources - The Literacy and Learning Exchange, which is focused on making the work of local groups of educators working to improve literacy instruction across subjects areas visible to others - EPIC-Ed, which seeks to engage teachers in addressing the challenge of digital transition	- The Dropout Prevention and Recovery Online Community of Practice (Dropout Community), which engages teams composed of school-based practitioners and their community partners - The CS10K Community (CS10K), which supports high school computer science education for the National Science Foundation (NSF)

[a]Assess4Ed and EPIC-ed where project-run communities as well as cases in the community evolution research.

How Communities Create Value

Previous research, such as that surveyed in *Connect & Inspire,* an earlier publication of the Connected Educators project (U.S. Department of Education, 2011a), shows that participation in online communities of practice produces a range of values for teachers, students, schools, and districts. Researchers used the five types of value defined by Wenger, Trayner, and De Laat (2011) to investigate the full range of values. Participants in the mature communities reported each type of value. Table 2 lists the key themes from data on the value created in each category.

Table 2. Key Value Themes Created by Participation

Immediate Value—Experienced immediately by participating in community activities
• Feeling less isolated • Engaging in professional conversations with other teachers with whom they identified • Receiving help and support • Providing advice or encouragement
Potential Value—Knowledge, resources, and relationships that could prove useful in the future
• Deepening knowledge through structured processes of engagement • Gaining a broader perspective by deprivatizing practice • Increasing self-confidence and a sense of professional identity • Expanding the network of professional connections • Accessing resources and tools • Increasing trust in individuals and the collective community
Applied Value—Changes in practice applying knowledge, resources, and/or relationships

• Teachers translated knowledge and relationships into practice:
  ▪ Using lessons or ideas from the community in the classroom
  ▪ Changing classroom practices
• Teachers often changed the ways in which they shared knowledge with their peers and public audiences:
  ▪ Initiating and leading professional development experiences for other teachers
  ▪ Creating collections of materials for use by other teachers
  ▪ Collaborating with other members to present at conferences and write for public audiences

Realized Value—Improvements in outcomes caused by application
• Improving communication and learning within an educational institution • Producing knowledge products that influence educational policy at district, state, and national levels
Reframing Value—Changes in an understanding of success
• High-quality dialogue caused participants to rethink their views on not only specific practices but also key issues in education and its role in society. • Teachers who previously saw their professional responsibilities as being limited to serving the students in their individual classrooms took on leadership roles and engaged in collaboration with other teachers to support professional learning throughout their schools and attempted to influence the public policy that sets the conditions for their work.

Community Features That Produce Value

Across all communities, four features were most strongly associated with value creation:

- **Distributed Leadership.** Members got more out of participation when there were opportunities for them to play a role in community leadership.

- **Structured Activities.** Participants particularly valued activities with a predefined focus and sequence that were actively moderated and time bounded.

- **Tangible Products.** Members valued community activities that resulted in tangible products and applied those products in their professional practices.

- **Resource Repositories and Robust Tools.** Having access to high-quality content from the community and well-designed tools for finding, interacting with, and adapting that content were key to many members receiving value from the community.

Key Questions for Community Designers

The community evolution research on newly launched communities, combined with the design research on project-led communities and applications of learning analytics, suggest key questions that community designers should ask about community focus, leadership and stakeholders, the role of resources, public versus private, adapting technology, recruiting members, sustaining engagement, ongoing formative evaluation, and addressing specific community management challenges through learning analytics.

- Community focus

    - **What Is the Community's Purpose?** What problem is it trying to solve? What opportunity is it intended to take advantage of? Why is this significant?

    - **Who Is the Core Audience?** Which educators will need to become active in the community for it to achieve its purpose? Will the focus be on a role-alike group or a more heterogeneous collection of educators? Will the scope be local, regional, national, or global?

    - **How Will Users Participate?** What kinds of activities and interactions do you envision? Where, when, and by what means will members connect with each other?

    - **What Value Does Your Community Add to Educators' Practices?** What will motivate educators to participate actively in the community? What areas of their practices that they are motivated to improve will it address and how?

    - **What Differentiates Your Community From Existing Communities?** There are numerous existing means for educators to connect online, and there are likely some that address purposes and audiences similar to yours. What is distinct about your community that will provide value to educators, students, schools, and districts that these other communities and networks do not? What kinds of collaboration with other social learning spaces might be advantageous?

- Leadership and stakeholders

    - **Who Are the Community's Leaders?** Will staff of the sponsoring organization lead the community? Will members of the community itself serve as leaders?

    - **What Are Their Roles?** What roles will different leaders play, and what competencies are needed for each? How will leaders be supported and recognized?

    - **Who Are the Key Stakeholders?** Who are the sponsors of the community? Whom might the activities of the community affect, directly and indirectly, and how?

    - **Who Will Help Inform Decisions About the Community?** How will the needs of all stakeholders be determined and addressed? Are some more important than others?

- **How Will Decisions Be Made About the Community?** What role will sponsors have in directing the work of leaders and providing them with the support they need? What say will community members have in determining the community's priorities and activities?

- Role of resources

  - **What Role Will Resources Play in Your Community?** Are they a means for members to learn from each other or is access to or the production of resources an end in itself?

  - **How Will Resources Align With Your Community's Focus?** What kinds of resources align with the community's objectives and values? Which are likely to be useful to the community's intended audience? What genres and media are likely to be most accessible?

  - **Who Is Responsible for Contributing Resources?** Will resources be developed by the sponsoring organization, outside experts, community members, or some combination?

  - **How Will You Organize the Resources for Easy Access?** Will resources be organized into preset categories or will categories emerge across time? Who will do the categorization?

  - **How Will You Vet the Quality of Resources?** Do community resources need to meet some external standard of quality? Will people externally designated as experts or community members determine quality? How will members' judgments be solicited?

- Public versus private

  - **What Types of Privacy Issues Might Be Encountered?** How sensitive are the experiences and the artifacts that members will likely need to share advance the community's purpose? How comfortable is your intended audience about sharing practices in public forums?

  - **What Is the Appropriate Balance Between Making Practices Public and Fostering Trust?** How much of the knowledge shared and produced through community activities needs to be made public to achieve the community's goals? What level of privacy do members need to feel comfortable participating frankly and authentically? How can private activities be structured to build confidence in public sharing?

- Adapting technology

  - **How Can Technology Be Leveraged to Support Your Vision?** What needs for communication, resource exchange, collaboration, and relationship building can technology help fulfill?

  - **What Constraints Will Affect the Platforms, Tools, and Features Being Used?** Are there policies about privacy or technology development and use that affect managers or community members that must be considered? What are the budget and the time frame for implementation?

  - **What Limitations Does Technology Place on Your Community?** How will the chosen tools constrain as well as enable community activities? How will technology shape members' perceptions of what the community values?

  - **What Is the Learning Curve for Members? For Managers?** What is the comfort level of members and managers with learning new technology? How much time are they likely to be able and willing to devote to it?

  - **What Technology Issues Might Be Encountered? How Will You Negotiate Them?** When the technology does not work as expected, what will you do to ensure that the community can continue its activities effectively?

- Member recruitment

  - **How Do We Advertise Our Community?** What channels of communication are available and are likely to make your intended audience aware of the opportunity to join? Where do potential members already spend time online? What existing relationships with potential members can you leverage?

- **How Do We Effectively Communicate the Community's Purpose to New Members?** What are the clearest and most concise and concrete ways to help potential members understand why it would benefit them to participate in the community?

- **How Do We Convert Users Into Members?** What are ways to begin participating in the community that have a low barrier to entry and will be appealing to your audience?

- **How Big Can and Should the Community Be?** How many members can the community leadership and infrastructure effectively support? Is there a critical mass necessary for the community to serve its purpose?

- Sustaining engagement

  - **How Do You Encourage Members to Participate?** What kinds of communication will you continue beyond initial recruitment? What incentives for participation can you offer?

  - **How Do You Sustain Engagement?** What will motivate members to participate regularly across time? How can activities be designed to encourage regular and substantive contributions from members?

  - **How Do You Support Members in Achieving the Community's Goals?** What tools and services do you need to provide to members to enable their collaborations to bear fruit? How will you work to clarify and modify the community's purpose across time?

  - **How Do You Engage Users Who Vary Widely in the Time Available to Commit?** What are reasonable expectations about how often and for how long members will be able to participate? How do you ensure a high-value-to-time ratio for that participation?

- Formative evaluation

  - **How Do You Define Success?** What does it look like when the community serves its envisioned purpose? At what scale does it need to function? How quickly can it reach its goals?

  - **How Will You Measure Success?** How does success translate into specific metrics that can be tracked? What methods for tracking them are feasible and appropriate?

  - **What Data Are Most Useful?** What kinds of data are likely to yield actionable information about community activity? How much is enough to inform decision making?

  - **How Will You Report Data to Stakeholders?** Which formats for presenting data are appropriate to which groups? How much time do they have to digest it? What skills do they have for working with it?

- Social learning analytics

  - **What Challenges Might Be Addressed by Analyzing Community Data?** What patterns in community activity might community leaders miss as a result of the volume of activity? What kinds of complex problem solving might benefit from computational assistance?

  - **How Can Computational Guidance Be Used More Efficiently?** Where could computational analysis and visualization allow managers to see potentially important patterns more efficiently? Where might it suggest starting points to solve problems that could jump-start the process of developing solutions?

  - **Which Tools and Techniques Can Community Managers Use Directly and Which Require Specialized Analysts?** How much computational and quantitative analysis capacity does the management team have? Are there any low-cost and easy-to-learn analytics tools that are sufficient for the community's needs?

The Connected Educators research suggests that educators' participation in online communities of practice can positively impact their happiness and effectiveness. However, building communities that realize this promise is challenging and requires a clear community vision, careful planning, skilled implementation, and integral evaluation. There are no one-size-fits-all best practices for community design and management, but the research has revealed a set of key questions that, if thoughtfully addressed, are likely to increase the likelihood of success.

Introduction

The 2010 National Educational Technology Plan argued that online communities of practice should be an integral component of the future of professional learning for educators (U.S. Department of Education, 2010). Building on at least two decades of existing scholarship, this report summarizes three years of exploratory research conducted by the Connected Educators project and identifies how best to capitalize on this promise. The research investigated two overarching questions:

- How do successful online communities of practice for educators create value for their members that may lead to improved outcomes for students?

- For newly launched communities, what are the key challenges and decisions that leaders must negotiate in the crucial first year? How can what is learned from successful communities inform the process of helping a new community thrive?

The findings should prove useful to anyone sponsoring or leading an online community of practice designed to support educators, particularly those contemplating or beginning the process of developing a new one. The first two sections—"Research Design" and "How Communities Create Value"—explain the design of the research and the findings about the types of value that participation can create. These may be most useful to (1) potential sponsors weighing an investment in developing an online community of practice for educators and (2) researchers. Community designers tasked with developing and launching a community or strengthening an existing one may wish to jump to the third section—"Planning and Implementing a New Community." This section presents a set of key questions to consider when designing a community and examples of how the communities studied in the research approached those questions. The examples illustrate some of the many challenges that developers of new communities may need to negotiate to succeed. They do not present ready-made solutions, but they do offer others' experiences on which to reflect in the process of planning.

Past research has already suggested that, if designed, implemented, and supported well, online communities of practice can help educators strengthen their performance. Through these online social learning spaces, evidence shows that educators can effectively access, share, and create knowledge, as well as strengthen their commitment to the profession (Booth, 2011; Chen, Chen, & Tsai, 2009; Duncan-Howell, 2010; Gray, 2004; Hur & Brush, 2009; Schlager, Farooq, Fusco, Schank, & Dwyer, 2009; U.S. Department of Education, 2011a; Vavasseur & MacGregor, 2008; Wang, Yang, & Chou, 2008). Online communities also are common beyond education, and researchers have applied theories from multiple social science disciplines to establish design principles, many of which are summarized in Kraut and Resnick (2011). In a previous Connected Educators report, *Connect & Inspire,* we surveyed this literature in more depth and explored a range of examples of current practice to argue that educators participating in these social learning spaces report a strong sense of ownership and investment, and the cost of supporting them is modest compared with face-to-face equivalents (U.S. Department of Education, 2011a). However, there is a lack of complete consensus among researchers about the effectiveness of all forms of the professional development. Those researchers who see large-scale experimental studies as essential to determining the effectiveness of educational interventions note that there have been a limited number of these studies, and their results have been inconclusive (Gersten, Taylor, Keys, Rolfhus, & Newman-Conchar, 2014). Studies of this sort focused specifically on online professional development are particularly rare, and studies concentrating on online communities of practice are practically nonexistent. Although recent randomized controlled trials comparing the effectiveness of comparably structured online face-to-face professional development activities in support of curriculum implementation show that they have significant and generally equivalent effects on classroom practice and student learning outcomes, more and larger studies are needed to make strong generalizations (Fishman et al., 2013). The Connected Educators research was not an attempt to fill this gap in the research literature.

Research Design

This report overviews the results from two multiple case studies, the first focused on four mature online communities of practice for educators and the second on four in their first year of operation. It also discusses findings from research on three additional communities launched and led by the Connected Educators project and exploratory applications of learning analytics techniques to address the challenges of community management. Online communities of practice for educators can take numerous forms. This research design focused on communities where members were geographically distributed beyond a single district and whose participation was voluntary.

The first multiple case study examined four mature communities in which members actively participated in knowledge-building activities, such as discussions and collaborative projects. The four communities are as follows:

- The English Ning, founded and led by Jim Burke, provides an informal venue for English teachers to share experiences and resources and build relationships. The community has approximately 30,000 members, primarily K–12 English and language arts teachers.

- The NSTA Learning Center is designed to support professional learning for science teachers at all grade levels by providing a suite of tools, content, and activities that each teacher can personalize to his or her own needs. There are well over 100,000 active members of the Learning Center, primarily in-service teachers of science in primary and secondary education in the United States, but also including preservice teachers and university faculty. In some cases, teachers utilized the Learning Center as part of district-sponsored professional development activities.

- TLN (rebranded as the CTQ Collaboratory after the study concluded), which is run by the Center for Teaching Quality (CTQ), links participants in its leadership initiatives to improve student learning by advancing the teaching profession. At the time of the study, membership was by invitation only, and TLN had approximately 1,200 participants, primarily teachers who were or had been engaged with teacher leadership programs run by CTQ.

- TFANet supports the professional growth of its corps members, alumni, and staff through access to high-quality resources and expert advice. It has approximately 65,000 members.

Researchers interviewed a purposeful sample of 25 active participants from these communities using a semistructured protocol based on the value creation framework that is explained in the next section. They also conducted periodic ethnographic observation of community activity.

The second multiple case study examined four newly launched communities that were followed through their first year of operation. The four communities are as follows:

- Assess4Ed, led by the State Educational Technology Directors Association (SETDA) as part of the Connected Educators project, focuses on supporting state leaders preparing for the online and computer-based tests aligned with the Common Core State Standards that schools will need to begin using in the 2014–15 school year. Members included state readiness coordinators, state educational technology directors, state directors of professional development, superintendents, and district chief technology officers.

- BrainPOP Educators (BrainPOP), a community sponsored by the educational software company BrainPOP, focuses on engaging educators concerning videos, games, and other resources offered on the company's website. Members were primarily teachers who used these resources.

- The Literacy and Learning Exchange, a project of the National Center for Literacy Education (NCLE), focuses on making the work of local groups of educators working to improve literacy instruction across subjects areas visible to others and encourages collaboration and knowledge exchange between these groups. Members of the community included classroom teachers from multiple subject areas, literacy coaches, and school district and state leaders. NCLE strongly encouraged the participation of school or districtwide literacy teams, rather than just individual educators.

- EPIC-Ed, co-led by the Friday Institute and the Consortium for School Networking (CoSN), seeks to engage classroom teachers, along with building, district, and state administrators, in addressing the challenge of digital transition, moving toward more ubiquitous and effective use of technology to support student learning. The membership was diverse, but school and district leaders, including teacher leaders, who participated in structured professional learning activities facilitated by the Friday Institute were most strongly represented.

Researchers conducted monthly interviews with the managers of each community, as well as regular ethnographic observation of community activity and content.

The analysis also includes observations of activities and design research interventions within three additional communities developed and led by the Connected Educators project:

- The Dropout Community, which is led by AIR, engages 13 teams composed of school-based practitioners and their community partners to improve practices and better understand the characteristics of successful partnerships.

- CS10K was developed by AIR in collaboration with NSF to support high school computer science education as part of NSF's broadening participation agenda in coordination with regional professional development projects funded by NSF. The Connected Educator research is purely descriptive. The results are not scientifically generalizable, and the results should be taken as suggestive rather than predictive. Rather than offering prescriptions for how to design online communities of practice in the service of learning for educators, the results suggest features of and questions about community design that are worthy of consideration by practitioners and further study by researchers.

How Communities Create Value

Participation in the online communities of practice studied is voluntary, the participants are diverse, and the activities offered varied widely. Educators come to these communities for different reasons, and what constitutes a productive engagement with the community for one may not for another. For these reasons, it is important to look broadly at the value created through community activity. Depending on the context, the value generated may range from something as immediate as teachers feeling more confident in their work having heard others' experiences to (1) applications of innovative practice in the classroom, (2) measurable improvements in student learning outcomes as a result of those applications, and (3) changes to school and district policy to embrace those innovations.

The research employed the value creation framework developed by Wenger et al. (2011), which was designed to capture the range of values created by participating in communities and networks and begin to understand the relationships among them. Building on a well-established approach for evaluating training developed by Kirkpatrick (1976, 1994), the framework includes five types (or cycles) of value.

- **Immediate** value is realized directly through community activities and interactions. This is the value that educators experience immediately by participating in the community.

- **Potential** value is the accumulation of knowledge and social capital that can result from participation. This value could prove useful in the future, including new knowledge, skills, resources, or relationships.

- **Applied** value manifests itself in changes in practice. This value is generated when teachers apply what they have learned or developed to their professional practices.

- **Realized** value is improvements in performance. This value results from applying what has been learned or generated by engaging with the community.

- **Reframing** value is changes in what is valued about practice, either individually or collectively. This value is created when educators redefine what success means as a result of their collaboration.

The five cycles of value creation are strongly interrelated but not just linearly. For example, a teacher using a lesson plan that someone else has shared in the community would be an example of applied value. The educator's sharing of evidence of improvements in student work that resulted from using the plan would constitute realized value. Seeing that evidence of realized value might generate immediate value for another educator by giving him or her the courage to try something new.

In interviews with community members, researchers asked the members to tell value creation stories, narrative accounts of the value they believe the online community of practice generated for themselves, colleagues, students, and institutions. The interview protocol prompted them to consider each type of value and posit causal relationships among them. From the collected value creation stories, themes emerged about the specific kinds of value created in each cycle and how they influenced each other. These themes are largely consistent with past research on online communities of practice for educators. They also pointed to particular types of community activities and interactions that seem likely to create different sorts of value.

Table 3 summarizes the specific kinds of value that communities and networks produce for which there is evidence from the research literature and our research results. Appendix A provides a more detailed account, with examples from the value creation interviews.

Table 3. Evidence of Value Created by Community Participation by Type

Immediate Value
"At school, I don't really get the kind of support that would spur me to go on…[w]hereas on TLN, there are other teachers out there who have experienced some aspect of something I'm trying or then give enough encouragement that I feel like I can talk about my ideas and share what I'm doing."—TLN member

Research Literature	Research Results
• Reduce feelings of isolation, particularly for teachers (Duncan-Howell, 2010; Gray, 2004; Hur & Brush, 2009; Vavasseur & MacGregor, 2008). • Foster a sense of camaraderie and belonging (Duncan-Howell, 2010). • Provide opportunities to give encouragement (Hur & Brush, 2009; Vavasseur & MacGregor, 2008). • Appeal to experienced educators' altruism and their desire to help others (Gray, 2004; Hew & Hara, 2007).	• Knowing that others are experiencing similar challenges makes educators feel less isolated. • Engaging in professional conversations with other educators whom they identified energized the respondents and made them eager to continue. • Access to expertise beyond one's local context was a key draw. • Experienced educators often saw participation in community activities as a way to contribute to the profession.

Potential Value
"When people saw the picture and screen name, their face would just light up, and they would grab you and hug you and say, 'Oh, that's you!' It was an amazing experience. Most of those early friendships on the screen have become real friendships."—English Ning member

Research Literature	Research Results
• Acquire curriculum-based knowledge and resources (Duncan-Howell, 2010; Vavasseur & MacGregor, 2008). • Develop a shared collection of stories about practices that developed a sense of group identity (Gray, 2004). • Develop a personal network (De Laat & Schreurs, 2013).	• Educators often found that structured activities situated within larger informal conversations of the community led to what they perceived as the deepest learning. • Participation was a way of making teaching community property so that differences in context and style could be understood and appreciated. • Many educators felt that the communities offered them the opportunity to contribute to pedagogical content knowledge in their subject areas on a national scale. • In some cases, opportunities to convene face to face initiated relationships that were deepened through online interaction across time, whereas in others virtual connections turned into face-to-face relationships. • Particularly for teachers new to the profession or challenged to teach new content in new ways, access to resources was a key source of value. • The consistent respectfulness and quality of others' contributions made educators more likely to be frank and share information with audiences beyond the community.

Research Literature	Research Results

• Most teachers who participate in online communities report that they have made changes in what they do in the classroom based on what they learned (Duncan-Howell, 2010).
 	
• Those changes usually reflect the kinds of practices that the community activities were intended to encourage (Vavasseur & MacGregor, 2008).
	• Educators translated knowledge and relationships into practice.
	  ▪ Teachers frequently found resources through the communities, adapted them to their needs, tried them, and then reported on the results.
	  ▪ Having been exposed to new practices, educators felt negligent if they did not find ways to test out some of those innovations in their own work.
	• Educators often changed the ways in which they shared knowledge with their peers and public audiences.
	  ▪ Teachers often bring back what they are learning and the issues they are discussing to their local contexts to support the learning of their peers, taking on new leadership roles.
	  ▪ As in the curriculum development example, collections are often created in relationship to an offline need to collaborate.
	  ▪ Educators reported that they produced systematic accounts of their knowledge and experiences that arose from informal conversations and the sharing of resources on the communities. An English Ning member engaged in a book study with another member, which led her to start a similar online discussion within her local institutional context: "These conversations led to a paper and a conference paper. And that came out of how stimulating I had found conversation with Michael." The policy discussions that a TLN member engaged in helped build expertise that was useful to a much broader audience: "I've had the good fortune of having a lot of articles published this year in *Ed Week* and in the *Huffington Post* and CNN.com and other venues."

Research Literature	Research Results
Few studies to date have systematically documented realized value, perhaps because of the dual challenge of isolating the contribution of community participation from other factors influencing success and the paucity of applicable evidence in the records of community activity.	• Educators increasingly take responsibility for supporting peers' learning and producing resources that advance collective goals. • Producing knowledge products influences educational policy at district, state, and national levels.

Research Literature	Research Results
Few studies to date have systematically documented reframing value, perhaps because of the dual challenge of isolating the contribution of community participation from other factors influencing beliefs and the paucity of applicable evidence in the records of community activity.	• High-quality dialogue caused participants to rethink their views on not only specific practices but also key issues in education and its role in society. • Teachers who previously saw their professional responsibilities as limited to serving the students in their individual classrooms took on leadership roles and engaged in collaboration with other educators to support professional learning throughout their schools and attempted to influence the public policy that sets the conditions for their work.

Key Questions for Planning and Implementing a New Community

As a whole, the Connected Educators research suggests several key questions that sponsors and leaders of new communities will need to answer, as well as examples that illustrate how communities have negotiated the challenges encountered.

The process of launching a new community begins with establishing a vision. Next, careful planning and development are needed, after which implementation can begin. Through the process, it is essential to embed evaluation so that ongoing decisions informed by data can be made about what is creating value and how well that aligns with the objectives established for the community.

Establishing the Vision

Building a successful community begins with establishing a clear vision of the focus of the community and what its objectives will be, as well as who will lead, participate in, and benefit from it (Booth, 2012; Carr & Chambers, 2006; Jones & Preece, 2006). A shared vision is necessary for supporting meaningful conversations (Wise, Padmanabhan, & Duffy, 2009) and is positively associated with knowledge sharing (Chiu, Hsu, & Wang, 2006). Failure to establish a clear vision can lead new communities not to take root (Carr & Chambers, 2006), and a vision muddied across time can lead to a decline of previously established communities (Attebury, Perret, Kenyon, & Green, 2013).

Community Focus

Developers need to ask several key questions to determine their community's focus:

- **What Is the Community's Purpose?** What problem is it trying to solve? What opportunity is it intended to take advantage of? Why is this significant?

- **Who Is the Core Audience?** Which educators will need to become active in the community for it to achieve its purpose? Will the focus be on a role-alike group or a more heterogeneous collection of educators? Will the scope be local, regional, national, or global?

- **How Will Users Participate?** What kinds of activities and interactions do you envision? Where, when, and by what means will members connect with each other?

- **What Value Does Your Community Add to Teachers' Practices?** What will motivate educators to participate actively in the community? What areas of their practice that they are motivated to improve will it address and how?

- **What Differentiates Your Community From Existing Communities?** There are numerous existing means for educators to connect online, and there are likely some that address purposes and audiences similar to yours. What is distinct about your community that will provide value to educators, their students, and schools and districts that these other communities and networks do not? What kinds of collaboration with other social learning spaces might be advantageous?

Communities studied during their first year defined their focus in a variety of ways. Assess4Ed began with a clearly defined purpose: to help leaders prepare for the 2014 assessments. It was clear to SETDA that this multifaceted challenge involved not only increased technological infrastructure but also professional development and the alignment of both in the management of assessments. Doing this well would require a level of communication and collaboration across units within state education agencies (SEAs) that is unusual. Geoff Fletcher, one of the community managers, explained as follows:

> Within state departments of education, typically, there are significant silos that are established, partially because of tradition, partially because of the nature of bureaucracy,...We're trying to…get them to actually talk and work together, because they're going have to ... It's pretty important that the technology people, who have some knowledge about online and also deal directly with the school district people about technology….It's important that they talk with the assessment people who are going to be administering the assessment.

State leaders had online venues to connect with others in similar roles, but there were few opportunities to share information and experiences across them. Consequently, Assess4Ed chose to focus on building private groups for leaders of each state as a means to break through these silos and provide a venue for collaboration.

The Literacy and Learning Exchange took on the broad challenge of making literacy instructional practices public to elevate the day-to-day work of educators across the United States. The community was created based on the belief that expertise is developed in schools, not only through research, and local context matters. NCLE strongly encouraged team-based participation in the Literacy and Learning Exchange, working against the norm of individual participation that is common to most online communities of practice. At the same time, the leaders believed that inquiry into effective literacy instructional practices was needed through a collaborative, not an individual endeavor. Although other online communities and networks existed where individual educators could share their knowledge (the English Ning, for example), prior to the launch of the Literacy and Learning Exchange there was no online home for cross-subject teams of educators investigating and refining their collective practices to learn from other teams engaged in similar work. According to Sharon Roth, the head of the community management team, "It's about what groups can learn from each other." An initial strategy for helping groups learn from each other was to work with them to develop cases and vignettes with supporting materials that profiled the groups' inquiries and enabled others to adapt them.

In contrast to Assess4Ed and the Literacy and Learning Exchange, BrainPOP focused on building a community within the established user base of the company's products. The audience was preestablished, so the purpose needed to follow from it. Educators came to BrainPOP's website because of its compelling resources. Consequently, the community needed to be tightly interwoven with those resources, building a social layer on top of them akin to that offered by reviews and other customer-contributed content on e-commerce websites. Andrew Gardner, the community manager, argued as follows:

> [W]e have a brand and an understanding of this space as being a resource space, and we need to make all the resources social. So we need to say, "Hey, I'm coming here to find a lesson plan…" or "I'm coming here to find a graphic organizer. I'm coming here to listen to a webinar, and I want to be able to see what other people think about that graphic organizer, that lesson plan, or that webinar" in some sort of…not necessarily a chat room but more of like an Amazon style, like, "Here's the product and here's what people think about the product." So being able to offer meaningful feedback surrounding a resource makes a lot more sense to me.

There were already numerous communities and networks where educators could discuss general education and educational technology issues. Focusing discussion on BrainPOP content would build on what brought educators to the website initially and differentiate it from other options.

Leadership and Stakeholders

One of the strongest findings of the research on online communities of practice for educators is that effective leadership and moderation are essential to success (Babinski, Jones, & DeWert, 2001; Booth, 2012; Bourhis, Dubé, & Jacob, 2005; Farooq, Schank, Harris, Fusco, & Schlager, 2007; Gairín-Sallán, Rodríguez-Gómez, & Armengol-Asparó, 2010; Gareis & Nussbaum-Beach, 2007; Gray, 2004; Jones & Preece, 2006; Prestridge, 2010). In developing the vision for a new community, developers need to ask several key questions about leadership and stakeholders:

- **Who Are the Community's Leaders?** Will staff of the sponsoring organization lead the community? Will members of the community itself serve as leaders?

- **What Are Their Roles?** What roles will different leaders play, and what competencies are needed for each? How will leaders be supported and recognized?

- **Who Are the Key Stakeholders?** Who are the sponsors of the community? For whom might the activities of the community affect, directly and indirectly, and how?

- **Who Will Help Inform Decisions About the Community?** How will the needs of all stakeholders be determined and addressed? Are some more important than others?

- **How Will Decisions Be Made About the Community?** What role will sponsors have in directing the work of leaders and providing them with the support they need? What say will community members have in determining the community's priorities and activities?

The first-year communities each approached community leadership by establishing a paid team of community managers and then creating additional opportunities for leadership for community members and other stakeholders. Coordinating tensions between internal and external leaders and stakeholders is a challenge that all community developers will likely need to negotiate.

Assess4Ed used two SETDA staff members to provide day-to-day leadership and moderation for community activities. They embraced a collaborative approach by defining roles for key community members and experts from other organizations who played key roles in helping states prepare for the new assessments. This strategy yielded mixed results because it left the community dependent on external actors that SETDA did not control. Within state groups, SETDA envisioned that state readiness coordinators—a new role being created by many SEAs to manage the process of preparation—would assume leadership of the group. In groups that formed, this was often the case. However, several leaders recruited by SETDA needed official authorization to create a group for their states and were unable to obtain it, which slowed the process of group formation. SETDA also positioned Assess4Ed as a means for informal interaction with representatives from Pearson, who were contracted to develop a tool that measured readiness to deliver the new assessments. Although Pearson staff engaged with members through the community, the release of the readiness tool was many months later than anticipated, which provided reduced incentives for state leaders to participate in community activities.

The Literacy and Learning Exchange formed a team of paid staff from NCLE and the National Council of Teachers of English (NCTE) to provide strategic direction and day-to-day moderation of the community, an approach similar to that for Assess4Ed. Recognizing the importance of direct contact with literacy inquiry teams to stimulate participation, one team member has explicit responsibility for nurturing and match making. In recruiting community members and guests to lead activities or moderate discussions, the Literacy and Learning Exchange decided to be consistent in its focus on expertise in the field; the community needed to avoid "name" experts with traditional publication records in favor of grassroots community members with whom others could directly identify.

The Literacy and Learning Exchange also decided to enact its desired emphasis on group participation rather than individual participation by awarding groups that fulfilled certain requirements a special designation as Centers for Literacy Education. However, this approach proved challenging because of tension between the desire of the foundation providing the funding for the community to see evidence of a large number of groups engaged in the community and the community leaders' priority on depth and quality of engagement. To get the numbers the funders wanted, the Literacy and Learning Exchange had to lower the barrier to entry for groups and deemphasize the special designation.

CS10K faced a similar complex intersection of multiple stakeholders with not always aligned intentions and expectations. An AIR team developed community strategy and provided infrastructure and support for community activities. However, at the direction of the sponsor, community membership was initially limited to teachers directly involved with one of the regional professional development projects that NSF had funded. In light of this, direct interactions with current and potential community members were the responsibility of a group of part time, paid community facilitators, one for each project. AIR convened this group regularly and provided coaching on facilitation techniques. However, the degree of facilitator success in getting teachers involved in community activities and integrating those activities into their projects' core programming varied considerably across projects.

There are likely several reasons for this variable effectiveness. First, AIR assumed that facilitators, who for the most part assessed their own online facilitation skills as well developed, would take professional ownership of their roles and shape them to fit the context of their projects. In reality, the facilitators would have benefited from more formal training and more concretely defined responsibilities early on. In the first four months of the community, AIR offered training from outside experts and set very specific benchmarks for facilitators' performance, which may have been at least partially responsible for the increase in member engagement within and across projects in community activities that the evaluation revealed for this period.

Second, facilitators' access to project teachers and their ability to influence project programming depended on the buy-in of each project's principal investigator (PI). Facilitators were not always in sufficiently close communication with PIs to help them understand the value of the community, and several PIs were unwilling to commit based either on skepticism that teachers would find value in community activities or as a result of mixed signals from the community sponsor. NSF initially committed to funding the community for only one year and was unwilling to publicly state that it would continue to support it until very late in the year. Several PIs chose not to invest significantly in community-based activities and resources because of a fear that the community would not continue after the initial funding was exhausted. Strong statements by NSF's program officers about the long-term importance of the community for the success of the larger CS10K initiative late in the year also may have contributed to the acceleration of community activity during this period.

The research on what creates value in online communities of practice for educators suggests that the newly launched communities were right to seek to cultivate distributed leadership. Across the mature communities studied, providing opportunities for members to assume leadership roles within the community was a strategy most strongly associated with creating deeper value, moving beyond the immediate potential value to applied and realized value.

Three of the four mature communities studied have formally designated leadership roles for community members. TLN has moderators, who are teachers active in the community and CTQ's teacher leadership projects, who are responsible for facilitating discussions and hosting activities within the community. The NSTA Learning Center features 22 paid, part-time online advisors who moderate discussions and hold online office hours to provide real-time advice to community members. Online advisors are generally either experienced teachers who have been active in the community or university-based educators who work regularly with science teachers.

Past research also points to key competencies for community leaders. Community developers should select leaders who have these competencies; if not, they should offer professional learning opportunities so that leaders and moderators can develop them. These competencies include the following:

- Sufficient knowledge of the practice itself to demonstrate credibility (Gray, 2004; Jones & Preece, 2006)

- Technical competence and the ability to teach members how to use the technology in an effective manner (Bourhis et al., 2005; Gray, 2004)

- An understanding of how to build alliances and develop social connections (Booth, 2012; Bourhis et al., 2005; Gray, 2004)

- The capacity to facilitate socially constructed meaning and reinvent it contextually (Gairín-Sallán et al., 2010)

- An orientation toward lifelong learning (Gairín-Sallán et al., 2010; Gray, 2004)

- The ability to foster trust and find innovative ways to encourage participation (Booth, 2012; Bourhis et al., 2005)

Both TLN moderators and NSTA online advisors receive formal training in effective online community moderation. All online advisors complete a two-week online course that draws on research on online teacher professional learning and the experiences of past moderators and NSTA staff. TLN moderators participate in a more extensive online course called CTQ Voice, which draws on research and community-specific experience and offers opportunities to reflect on ongoing leadership practice.

For communities whose sponsors or managers do not have the capacity to develop their own custom training programs, several organizations offer online courses that teach many of the key skills needed by community leaders and moderators. For example, EdTech Leaders Online offers an online facilitator training program that is designed primarily for teachers of online courses but covers competencies that also apply to online community moderation. Powerful Learning Practice offers a connected coaching online course that teaches essential moderation skills.

Planning and Development

After the community vision is established, community designers can progress to the planning and development stage. Connected Educators research suggests that effective planning and development needs to establish the role of resources in the community, determine the balance between public and private, and figure out how to adapt technology for effective use by community members.

Role of Resources

Resources—such as instructional materials, policy documents, videos illustrating techniques, or examples of student work—can be central to many online communities of practice (Booth, 2011; Carroll et al., 2003; Chen, Xu, & Whinston, 2011; Xie, Li, & Xia, 2010). Designers should ask several questions when planning the role of resources in their communities:

- **What Role Will Resources Play in Your Community?** Are they a means for members to learn from each other or is access to or the production of resources an end in itself?

- **How Will Resources Align With Your Community's Focus?** What kinds of resources align with the community's objectives and values? Which are likely to be useful to the community's intended audience? What genres and media are likely to be most accessible?

- **Who Is Responsible for Contributing Resources?** Will resources be developed by the sponsoring organization, outside experts, community members, or some combination?

- **How Will You Organize the Resources for Easy Access?** Will resources be organized into preset categories or will categories emerge across time? Who will do the categorization?

- **How Will You Vet the Quality of Resources?** Do community resources need to meet some external standard of quality? Will people externally designated as experts or community members determine quality? How will members' judgments be solicited?

Content played a variety of roles in the first-year communities studied, and the strategies for working with content evolved as member needs and preferences became clearer during the course of the year.

As previously discussed, BrainPOP tightly integrated its community programming with preexisting content on its website. Members were invited to extend the value of those professionally developed resources by adding their own extensions. For example, the community offers a tool for making and sharing quizzes linked to specific BrainPOP videos and the ability to upload lesson plans, graphic organizers, and other teaching tools that are displayed as user-generated content on the main website along with the BrainPOP-produced content they augment. The introduction of these tools signaled a need to develop an improved taxonomy for the site that would be equally usable for company- and user-produced content.

The situation for CS10K was quite different. CS10K supported teachers of two relatively new high school courses that employ novel pedagogies and contain broader and more rapidly changing topics than in more traditional courses. This is particularly the case with one of the two courses: Computer Science Principles. Although its centrally determined curricular framework defines learning objectives for which an Advanced Placement test will be offered beginning in 2016, multiple versions of the course are in various stages of development and implementation, and teachers can create their own customized versions. In many cases, resources that would benefit teachers do not yet exist, and those that do exist often require ongoing revision. Overall, research on teaching computer science is still in its infancy, so who has expertise to judge quality is contested.

In this new and fluid domain, organizing resources is challenging, and addressing gaps in the available resources had to be a priority. In the absence of existing resources, the developers of the community's content taxonomy had to guess what kinds of classification would describe the content variations that would be useful to community members looking for the resources they needed. It was only near the end of the year when NSF-funded projects and community members had contributed a sufficient volume and diversity of resources that an empirically driven redesign of the taxonomy could be done. In addition, rather than simply locating and making available existing resources, community leaders focused on encouraging community members to collaboratively develop and share resources to address needs identified through community activity. Doing so proved challenging because of issues of confidence and privacy, which are examined in the next section.

During its first year, the Literacy and Learning Exchange also had to reexamine its approaches to generating and classifying content based on the emerging needs of its members. The community set out to focus on supporting the generation of knowledge in schools through teachers' collaborative inquiries. At its launch, the Literacy and Learning Exchange focused on case studies and vignettes that provided representations of how teacher teams organized their work, plus knowledge and improvement in outcomes that this work generated, with resources that the teams used and developed attached to the cases using free tags. These complex representations proved difficult to produce, and feedback from school leaders suggested that they were not proving as useful as anticipated in supporting the formation and growth of additional teams. During the course of the year, the community shifted its focus to more fine-grained representations of team practice and results and centralized resources to a general library less tied to their original context. This required shifting from free tagging to a global taxonomy.

The value creation research on mature communities suggests that the new communities' careful attention to the role of content is likely to yield long-term rewards. In addition to leadership opportunities for members, two other community features most strongly associated with creating value are the availability of resource repositories with robust associated tools and opportunities to participate in activities that create tangible products. Community members need to be able to find and work with existing resources that meet theirs needs plus create and share their own resources.

Members of the NSTA Learning Center and TFANet reported that having easy access to high-quality resources in a variety of genres—ranging from lesson plans, to research summaries, to self-paced online courses—were key to rapidly addressing the most time-sensitive needs for professional learning. The NSTA Learning Center notably offers its members the opportunity to build digital portfolios that help them plan and document their individualized professional learning through the community and create and share their own collections of resources from the library of NSTA-produced and member-contributed content.

Collections are simple examples of tangible products of community activity that create value, for both the creators of the collections and other educators who used the resulting resources within the community and in local, offline contexts. TLN featured more extended, structured activities that yielded tangible products. For example, TLN members participating in CTQ's TeacherSolutions process within the community developed potential solutions to key educational policy challenges and collaboratively authored multimedia artifacts that they could use to participate in policy debates from the local level to the national level.

Benefiting from the success of these activities, the Dropout Community engaged its member teams in developing asset maps that documented each team's partnership model and its fit to the local context. Team members reported that they benefited from the collaborative reflection that composing these maps entailed. Through a virtual gallery walk and a series of case clinics during community meetings, teams shared and compared their maps, and community managers wrote a brief report to the U.S. Department of Education that summarized the partnership models to inform future efforts in supporting dropout recovery.

Public Versus Private

Learning entails experiencing and examining failure as well as sharing and building on success. However, sharing failures and not yet fully developed ideas and content in public forums can be very uncomfortable, particularly for those who anticipate that such representations might be used against them. Deciding what should happen in public and what is private is therefore a key decision for online community designers. Key questions about public versus private include the following:

- **What Types of Privacy Issues Might Be Encountered?** How sensitive are the experiences and the artifacts that members will likely need to share advance the community's purpose? How comfortable is your intended audience about sharing practices in public forums?

- **What Is the Appropriate Balance Between Making Practices Public and Fostering Trust?** How much of the knowledge shared and produced through community activities needs to be made public to achieve the community's goals? What level of privacy do members need to feel comfortable participating frankly and authentically? How can private activities be structured to build confidence in public sharing?

Several of the newly launched communities studied grappled with issues of public versus private. Based on what proved to be an accurate judgment that state leaders would be unwilling to share their practices in open forums for fear of criticism by public and political foes, Assess4Ed focused its initial engagement strategy on forming private, invitation-only groups at the state level or on specific issues. These groups proved to be the most active. However, because activity in these groups was invisible to those who had not joined them, potential members of the community as a whole and external observers who visited the Assess4Ed website often came away with the mistaken impression that the community was stagnant and empty.

The Dropout Community, launched with the benefit of Assess4Ed's experiences, explicitly defined the community as closed to the participating groups of school-based practitioners and community partners. However, it held network engagement events with a broad, public audience that shared knowledge generated through community activities that members felt was robust enough to be shared beyond the group. Private activities within the community were often structured to parallel possible designs for public events, giving members an opportunity to become more comfortable with sharing their practices, an approach previously used successfully in online communities of practice designed to promote higher education reform (Cambridge, 2004).

Making conventionally private practice public was central to the mission of the Literacy and Learning Exchange, but because university-based scholars were involved in documenting that practice, it struggled to negotiate with institutional review boards that mandated anonymity based on norms for conventional research that were at odds with the model of inquiry that the community sought to cultivate. This slowed down the process of sharing practices and contributed to the decision to shift the content strategy.

Adapting Technology

Online communities of practice are possible because of technology that enables online communication and collaboration. The range of technology options available to community designers is extensive. Technology that is well adapted to other components of a community's design can empower learning and engagement, but a poor fit also can become a serious obstacle to success (Ardichvili, 2008; Barab, MaKinster, & Scheckler, 2003; Farooq et al., 2007; Jones & Preece, 2006; Lin, 2006; Preece, 2000). Key questions that designers need to answer about technology include the following:

- **How Can Technology Be Leveraged to Support Your Vision?** What needs for communication, resource exchange, collaboration, and relationship building can technology help fulfill?

- **What Constraints Will Affect the Platforms, Tools, and Features Being Used?** Are there policies about privacy or technology development and use that affect managers or community members that must be considered? What are the budget and the time frame for implementation?

- **What Limitations Does Technology Place on Your Community?** How will the chosen tools constrain as well as enable community activities? How will technology shape members' perceptions of what the community values?

- **What Is the Learning Curve for Members? For Managers?** What is the comfort level of members and managers with learning new technology? How much time are they likely to be able and willing to devote to it?

- **What Technology Issues Might Be Encountered? How Will You Negotiate Them?** When the technology does not work as expected, what will you do to ensure that the community can continue its activities effectively?

Many online communities of practice rely on a central platform, an integrated online environment that provides most or all of the needed functionality to support community activities. All but one newly launched community studied chose to implement open-source platforms, either Drupal or WordPress, customizing them to meet their distinctive needs. In the case of CS10K, EPIC-Ed, and Assess4Ed, this choice was at the direction of the U.S. Department of Education, the sponsor of each community. For BrainPOP and the Literacy and Learning Exchange, a general-purpose open-source platform seemed to offer the high level of customizability needed to address their distinctive community designs. The Dropout Community, in contrast, employed what Wenger, White, and Smith (2009) call a technology configuration, in which multiple tools are used in a coordinated fashion to support the community but are not integrated into a single platform.

Open-source platforms on which significant developer communities have been built offer myriad possibilities for supporting community needs. However, the out-of-the-box functionality of these platforms is generally minimal, and a good deal of extension and customization is likely needed to meet the needs of an online community of practice. Some of this work can be abbreviated by using a more specialized distribution that includes a set of integrated extensions on top of the base platform. However, the design of these distributions reflects assumptions about use that may not prove appropriate to a community's objectives and audience, thus requiring further customization. Effective customization also requires careful attention to quality assurance. Because developers customizing the platform or the distribution are building on the code of others, new functionality can break existing features in ways that are difficult to predict.

Customization and quality control issues proved challenging for many of the communities studied. Assess4Ed, the first Connected Educators–managed community launched, spent its first few months troubleshooting bugs that either resulted from customizations made to meet community needs or previously undetected bugs in the Drupal distribution from which the site was developed (Acquia Commons). This focus on bug detection and elimination directed the attention of community management teams away from other important things that they could have been doing to cultivate the community, thus delaying its growth. The community would likely have benefited from more testing prior to launch.

The EPIC-Ed designers put a great deal of time and effort into customization, leading to significant delays in the launch of their community. Many of these custom features were not widely used by members, perhaps largely as a result of their basis in speculation about user needs rather than direct requirements gathered in usability testing. After real user needs became evident, there was little development budget left to address them.

The Literacy and Learning Exchange was challenged by the assumption that individuals would be the primary users, which was built into the base distribution. Finding ways for teams of educators to participate in the community as groups rather than individuals required extensive customization and remained an ongoing issue at the end of the year.

To meet the sponsor's expectations, CS10K had to be launched very quickly after funding was secured. To make it possible to launch quickly, the developers decided to begin with the customized platform developed for Assess4Ed and then further modify and extend it to meet the needs of CS10K members. CS10K benefited from the prior resolution of quality control issues with Assess4Ed and was rapidly able to integrate a wide range of new functionality requested by CS10K projects. However, the complexity of the interface grew quickly as new capabilities were added, and the underlying architecture of the now updated version of the base platform made the process of addressing usability issues extremely challenging. The development team determined that addressing such issues effectively would require an upgrade to a newer version of the base platform, but such a migration would require redeveloping much of the custom functionality, a time-consuming and costly proposition that the community is now preparing to negotiate.

The Dropout Community took a different approach, selecting a collection of tools for use in different community activities. This choice was partially made feasible because the number of community members and the scope and the frequency of events were more predictable than for the other communities, which were more open in structure and designed to evolve organically. The Dropout Community used a webinar platform with an integrated conference line for real-time meetings, wiki tool asynchronous collaboration between these meetings, and a combination of a webinar platform and Twitter for network engagement events. This technology configuration approach worked well in supporting the Dropout Community's goals, but it was unclear whether it would work for larger scale communities and networks.

Implementation

At the conclusion of the planning and development phase, infrastructure should be in place to support community leaders and members in advancing the community's vision. Focus should now shift to recruiting community members and offering activities that engage them in a sustained way.

Member Recruitment

Members are the community of practice. Attracting, engaging, and retaining the right members is essential in making a community vision a reality. Some of the key questions that community designers should ask about recruiting members include the following:

- **How Do We Advertise Our Community?** What channels of communication are available and likely to make your intended audience aware of the opportunity to join? Where do potential members already spend time online? What existing relationships with potential members can you leverage?

- **How Do We Effectively Communicate the Community's Purpose to New Members?** What are the clearest and most concise and concrete ways to help potential members understand why it would benefit them to participate in the community?

- **How Do We Convert Users Into Members?** What are ways to begin participating in the community that have a low barrier to entry and will be appealing to your audience?

- **How Big Can and Should the Community Be?** How many members can the community leadership and infrastructure effectively support? Is there a critical mass necessary for the community to serve its purpose?

The newly launched communities used a wide variety of techniques to recruit members, often successfully. Assess4Ed benefited from existing relationships of community managers at SETDA and face-to-face access to the community's target audience. Community leaders invited state leaders to join the community by directly contacting individuals, publishing articles in the SETDA newsletter, posting to social media, and holding information sessions at face-to-face events that state leaders already attended. These techniques, combined with the fact that the community had a clearly defined purpose that addressed a real need, proved effective in getting a large number of leaders to join the community. The bigger challenge proved to be sustaining and deepening that engagement.

Similar to Assess4Ed, EPIC-Ed used a combination of online and face-to-face strategies to recruit members, with a particular focus on social media. The EPIC-Ed team used tracking mechanisms, such as QR codes on print materials and shortened versions of website addresses for each social media and newsletter campaign, combined with Google Analytics to track which recruitment strategies were yielding the best results. Also, sustaining engagement proved a bigger challenge than recruiting members.

BrainPOP had the significant advantage of having a very large existing base of users of the primary BrainPOP website on which to draw. Some resources on the BrainPOP site are free, but users have to register for an account and share contact information to access them. Paid members of the site also receive a newsletter through which BrainPOP highlighted community features and content. Exposing user-generated content on the main BrainPOP website also resulted in a significant increase in traffic to the community sections.

In contrast with the other communities, the initial goal of the Literacy and Learning Exchange was not to attract a large number of members. Because the community sought to emphasize a collaborative and inquiry-based approach to professional learning in the service of improved literacy instruction, the community focused its initial recruitment efforts on teams with which NCLE had already begun working that exemplified that approach. Sharon Roth, who led the community management team explained,

Our goal is not about getting just sheer quantities of people in there but thinking about who are the people that care about group learning and team and schools, and therefore when they come to the site, they will be looking and talking with that lens.

These early members would likly be best positioned to respond effectively to the initial content of the community that NCLE had developed, seeding and establishing norms for discussion so that

[W]hen we do begin to invite those [who] don't have close relationships with us, and they go to the site, it will be very clear from not only the content but the community part of the site what the site is about.

As discussed earlier, when the funder's desire to see larger numbers of teams using the site became a priority, the Literacy and Learning Exchange had to broaden its focus and lower the barriers to entry.

Sustaining Engagement

Recruiting members to join the community is a first step, but making their membership meaningful requires deepening and sustaining their engagement in community activities. Some key questions about sustaining engagement include the following:

- **How Do You Encourage Members to Participate?** What kinds of communication will you continue beyond initial recruitment? What incentives for participation can you offer?

- **How Do You Sustain Engagement?** What will motivate members to participate regularly across time? How can activities be designed to encourage regular and substantive contributions from members?

- **How Do You Support Members in Achieving the Community's Goals?** What tools and services do you need to provide to members to enable their collaborations to bear fruit? How will you work to clarify and modify the community's purpose across time?

- **How Do You Engage Users Who Vary Widely in the Time Available to Commit?** What are reasonable expectations about how often and for how long members will be able to participate? How do you ensure a high-value-to-time ratio for that participation?

Compared with the initial recruitment of members, the newly launched communities studied found sustaining engagement a more significant challenge. Assess4Ed was successful in getting many state leaders to join the community and, in many cases, establishing groups for their states, but convincing members to make regular use of those groups to collaborate about preparing for the next-generation assessments proved more difficult. Community managers found that the need for one-to-one outreach did not end with recruitment. To stimulate engagement, community leaders reached out to specific members or stakeholders when it became clear that they had a contribution to make. In addition, the community managers added new functionality to groups to make it easier to focus the discussion of resources within the community not specific to the particular group and met with group leaders to help them understand how members can benefit from community collaboration. SETDA also produced several reports and hosted well-attended public webinars on key issues that SETDA hoped would provide material for discussion within the community.

The Literacy and Learning Exchange also continued targeted outreach to particular groups, explicitly tasking one of its managers with nurturing groups and matching together groups with commonalities that might serve as a basis for collaboration. In addition, it developed resources for less experienced groups that scaffolded the process of collaboration, such as an asset inventory (which had some similarities to the template for the asset maps developed by the Dropout Community), which were designed to stimulate more meaningful conversations.

BrainPOP, in contrast, is moving in the direction of using gamification to incentivize sustained participation. Members will be able to earn "mobi-badges" and "mobi-points" based on their contributions to the community. During the first year, BrainPOP offered certificates to members who attended webinars and then posted comments about them on the community; however, in some cases, members have "gamed the system," making perfunctory comments that do not advance collective knowledge. Consequently, community managers have tied earning certificates to more substantive contributions, such as contributing lesson plans that build on webinar content.

BrainPOP's embrace of gamification builds on work of another mature community studied: the use of badges and leaderboards by the NSTA Learning Center to incentivize and recognize participation.[1] Members earn points for using tools and participating in discussions, which lead to the award of badges. Other badges require deeper and more sustained engagement, such as completing defined sequences of professional learning activities. The points that educators earn are displayed on leaderboards, for both the community as a whole and individual districts. Community managers report that local leaderboards, in particular, have created a healthy spirit of competition, which has increased engagement.

A key strategy for sustaining engagement that the research on mature communities found to be strongly related to creating value is the incorporation of structured activities. TLN, the NSTA Learning Center, and the English Ning all invited members to participate in structured activities that members reported yielded particularly strong and deep value. Structured activities were characterized by having a predefined focus and guidelines for participation, being actively moderated, and being conducted during a bounded time period. TLN engaged members in structured activities through CTQ's TeacherSolutions model discussed previously. NSTA Learning Center members participated in short courses; English Ning members participated in book clubs led by authors. As discussed earlier, activities also were particularly likely to create significant value when they produced tangible products. Such products turn participation into resources that can be used by those who did not participate directly in the activity itself, as an aid to collective memory, and as tool for communicating with audiences beyond the community membership.

On the basis of these findings, two newly launched communities led by the Connected Educators project incorporated structured activities into their programming in an effort to deepen and sustain engagement. CS10K offered two structured events that produced tangible products focused on issues that had emerged as important to teachers of the two high school computer science courses that the community was designed to support. EPIC-Ed leaders offered a more extensive structured activity called COBALT (Collaborating to Build Action plans for Learning Technologies), which convened a cohort of role-alike educational leaders to work on collaborative structured tasks that resulted in a tangible outcome relevant to the participant's practice. Initial evaluations of both activities point to mixed but promising results.

CS10K hosted two online events focused on themes identified as of interest to a large number of community members across the United States. Both events used hybrid synchronous-asynchronous structures to enable participation by teachers with varied schedules and preferences, and both produced multimedia content that was published on the community website and available for incorporation into future professional learning activities. The first event focused on teaching data and consisted of (1) a keynote presentation by an internationally known expert on data visualization and education; (2) three panels, including one featuring CS10K project leaders, a second with data scientists, and a third with current Exploring Computer Science and CSP teachers; and (3) a 72-hour moderated discussion on the community website in which the speakers participated. The second event focused on teaching reflection and writing. Three guest experts recorded 10-minute webinars published on the community website along with sets of complementary resources a week prior to the webinar discussion with all three experts, which was followed by a weeklong moderated asynchronous discussion with the experts. The data event led to a 93 percent increase in visits to the website in the weeks prior to and after the event. However, participation dropped back to typical levels afterward, so the long-term impact of these activities is not yet clear.

COBALT was designed as a form of design research; the activity was designed to both deepen engagement in EPIC-Ed and empirically determine the extent to which similarly designed and structured activities were likely to create value for participants and support the development of a learning community among them. COBALT invited teachers to engage with state and national education leaders as well as Friday Institute staff to better understand how data can be collected, interpreted, and used to inform purchasing, resource allocation, professional development, school readiness, and other technology-related decisions. It included each feature of a structured activity discussed earlier and also integrated face-to-face and online components. With the assistance of facilitators from the Friday Institute, participants used the School Technology Needs Assessment (STNA), a survey instrument that collects data to plan and improve uses of technology to support teaching and learning during an approximately six-week period. A subset of participants was offered incentives for participation, either in the form of a stipend or continuing education units. Community members participated in a series of webinars, interspersed with bridge discussions on EPIC-Ed, as well as a face-to-face event, that guided them through the process of using STNA to assess capacity and plan future actions.

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1   Al Byers, who oversees the NSTA Learning Center, explains the community's gamification strategy in more detail in a post on the Connected Educators blog.

Researchers looked at exit surveys, interviews with a sample of participants, and website usage data to determine the extent to which COBALT achieved its objectives. Participants overwhelmingly found the experience valuable for their learning and reported that it had increased their capacity to evaluate technology initiatives. However, none of the participants completed the intended tangible knowledge product they were invited to develop, an action plan based on STNA data. Participants frequently cited a lack of time as the reason for being unable to fully participate in this and, in some cases, other COBALT components.

Evaluation

The design research approach that EPIC-Ed leaders took with COBALT is an example of integrating inquiry and evaluation into the community development process. Evaluation should be an integral part of community design, implementation, and management to ensure that decisions about development and moderation are made on the basis of an accurate understanding of member needs and behavior.

Connected Educators research investigated evaluation, addressing two needs of community sponsors and managers:

- Obtaining regular snapshots of how well the community is functioning to inform ongoing decision making. Formative evaluation fills this need.

- Answering specific questions about challenges encountered by community leaders.

In addition to design research, the Connected Educators project explored applications of learning analytics techniques to address this need.

Formative Evaluation

Understanding the extent to which what is actually transpiring within a community is advancing its goals is essential to effective community management. Some key questions that community designers should ask about evaluation include the following:

- **How Do You Define Success?** What does it look like when the community serves its envisioned purpose? At what scale does it need to function? How quickly can it reach its goals?

- **How Will You Measure Success?** How does success translate into specific metrics that can be tracked? What methods for tracking them are feasible and appropriate?

- **What Data Are Most Useful?** What kinds of data are likely to yield actionable information about community activity? How much is enough to inform decision making?

- **How Will You Report Data to Stakeholders?** Which formats for presenting data are appropriate to which groups? How much time do they have to digest it? What skills do they have for working with it?

Approaches to formative evaluation varied across the communities studied on account of differences in community purpose, stakeholder needs, and available analytics capacity. A key challenge for Assess4Ed was defining success. How do you operationalize what it means to support leaders in preparing for the 2014 assessments? The Assess4Ed leaders settled on two measures of success: (1) Were individual members getting what they needed, given the specific challenges they faced in their local contexts? and (2) How could Assess4Ed play a role in shaping the conditions nationally that made things easier, or more difficult, for those members? Data about the first measure were collected through regular conversations with state readiness coordinators who participated in the community. SETDA linked the second question to the extent to which Assess4Ed-related activities influenced the two consortia developing the assessments, as well as the contractor developing the readiness tool. Influence was tracked by examining the extent to which Assess4Ed resources informed discussions outside the community in which these organizations participated and the extent of their participation within the community and their responsiveness to the needs of community members.

In addition to using design research to develop and assess targeted activities, EPIC-Ed focused its evaluation approach on tracking the health of the community, defining the extent to which members were actively engaging in the community, interacting with each other as well as community leaders, and obtaining value from their participation. To measure this, the Friday Institute developed a Community Health Report, which was produced approximately every two months. This report included an analysis of community engagement, based on Google Analytics data; patterns of connection between participants, based on community platform usage data visualized using simple social network analysis techniques; and value creation, based on interviews with a sample of members. Friday Institute evaluators performed the analysis and reported the results in a concise, visually appealing format that proved understandable by community managers without a research background and could be read and discussed in a modest amount of time. Figure 1 shows the first page of a sample report; the full report is in Appendix B.

Figure 1. Community Health Report Format
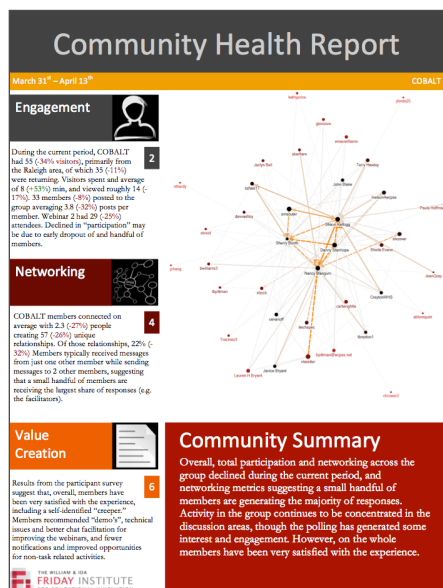
From its inception, CS10K sought to make evaluation integral to community development and facilitation. The design of the community platform was guided by periodic usability testing, which involved asking potential community members to undertake tasks they would need to complete to participate fully and efficiently in planned community activities, thinking aloud as they went along. Feedback mechanisms also were built into the website, using Web services from Usabilla and UserVoice, to collect feedback on the community platform and community content, activities, and facilitation. This testing and feedback collection was complemented by bimonthly social network analysis of community platform usage data and the tracking of Web metrics using Google Analytics to generate reports that examined the dynamics of interactions between teachers, NSF-funded professional development project staff, and community facilitators. These reports demonstrated, for example, that the projects had not integrated community-based activities into their summer face-to-face events, as the community managers and sponsor had hoped, leading to new expectations and support for facilitators and the offering of cross-project, centrally organized and structured activities that further analysis suggested would be successful in beginning to deepen and sustain engagement.

In addition to the research findings reported in this report, community designers may benefit from reviewing two additional resources developed through the Connected Educators project, a brief on evaluation (U.S. Department of Education, 2011b) that provides a more detailed overview of evaluation methods and approaches, and the Evaluation Tool, a component of the *Moving Toward the Goal Toolkit* (Rasmussen, Cambridge, Perry, & Perez-Lopez, 2014). Designed to support district leadership teams in integrating communities and networks into formal support for professional learning and collaboration, the toolkit also is likely to be useful for individuals and organizations launching and managing online communities of practice.

Social Learning Analytics

In addition to understanding related to vibrancy of the community across time and how well it is addressing its goals, community managers also may benefit from evaluation that seeks to offer solutions to particular challenges of community development and moderation. One approach to such targeted evaluation is the use of learning analytics, an emerging field that applies data mining and information visualization techniques to data about learning in as close to real time as possible and makes the analysis of that data rapidly available to educational decision makers to help them better support learners (Bienkowski, Feng, & Means, 2012; Buckingham Shum, 2013). The use of learning analytics to support learning through online communities and networks is in its infancy, but Connected Educators research suggests it will play an increasingly important role across time. Online interactions within community platforms and tools automatically generate a great deal of data—which some have called "data exhaust"—that can be used to shed light on community management challenges.

Some key questions that community designers might ask about social learning analytics include the following:

- **What Challenges Might Be Addressed by Analyzing Community Data?** What patterns in community activity might community leaders miss as a result of the volume of activity? What kinds of complex problem solving might benefit from computational assistance?

- **How Can Computational Guidance Be Used More Efficiently?** Where could computational analysis and visualization allow managers to see potentially important patterns more efficiently? Where might it suggest starting points to solve problems that could jump-start the process of developing solutions?

- **Which Tools and Techniques Can Community Managers Use Directly and Which Require Specialized Analysts?** How much computational and quantitative analysis capacity does the management team have? Are there any low-cost and easy-to-learn analytics tools that are sufficient to the community's needs?

Connected Educators researchers for AIR partnered with NSTA leadership to explore applications of social learning analytics to address the community management challenges identified by the NSTA Learning Center team.[2] A first challenge that NSTA Learning Center managers identified was finding important patterns of participation in the large volume of conversations and interactions among community members within the platform. NSTA Learning Center members post hundreds of messages to scores of online forums on a daily basis, and even with a team of community managers and online advisors regularly reading and participating, it is very difficult to get a handle of the community conversation as a whole. AIR used social network analysis to visualize the long-term relationships among community members and topics.

Figures 2 and 3 show two bimodal social network diagrams produced using the free social network analysis software NodeXL, each representing one fifth of the posts to the NSTA Learning Center over the course of a year (Cambridge & Perez-Lopez, 2012; Hansen, Shneiderman, & Smith, 2011). The triangles on the left represent community members, sized and arranged vertically based on how active they were in the forums overall. The diamonds on the right represent forum topics. During the period captured in Figure 2, a number of members who are only moderately active overall have begun to post intensively to a set of topics represented by the pink diamonds on the right-hand side of the diagram. In Figure 3, which focuses on a period following that in Figure 2, these same members have begun to post fairly frequently in a much more diverse set of forums.

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2   AIR also applied some of these same techniques to analyze social media conversations during Connected Educator Month, a massive, highly distributed monthlong online event sponsored by the U.S. Department of Education. Perry, Perez-Lopez, and Cambridge (2014) summarize the findings from that analysis. The general approach of the Connected Educators project to applying social learning analytics is presented in Cambridge and Perez-Lopez (2012).

Figure 2: Third Quintile Posts
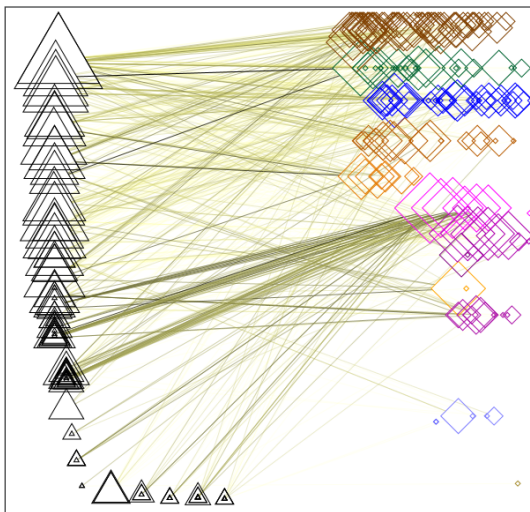
Figure 3: Fifth Quantile Posts
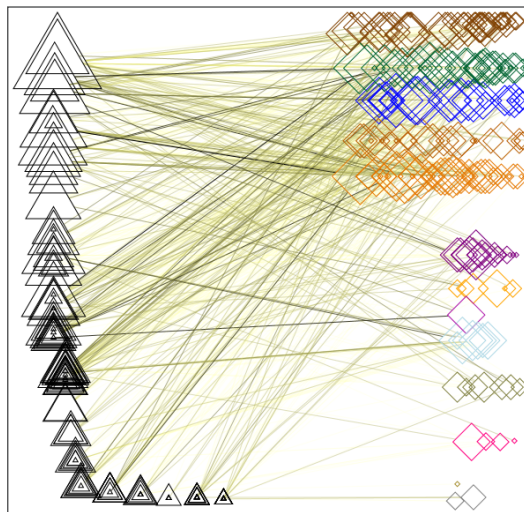
Moving members from engaging in a single topic or group to sustained engagement in a broader cross-section of the community's domain is well aligned with NSTA's goals. Community managers would therefore benefit from being alerted when this appears to be happening so that they can determine why and replicate the conditions that led to their positive development. The pattern revealed by the visualizations in Figures 2 and 3 might easily have been missed if managers looked only at individual forum posts or overall usage statistics.

A second challenge that NSTA Learning Center managers faced was understanding the content of conversations globally across the site. AIR researchers used Leximancer, a textual analysis package, to extract key concepts through natural language processing from forum posts and looked at associations between those concepts. For example, Figure 4 presents concepts associated most strongly with the concepts of favorable and unfavorable.

Figure 4. Co-Occurrence of Concepts With Favorable and Unfavorable
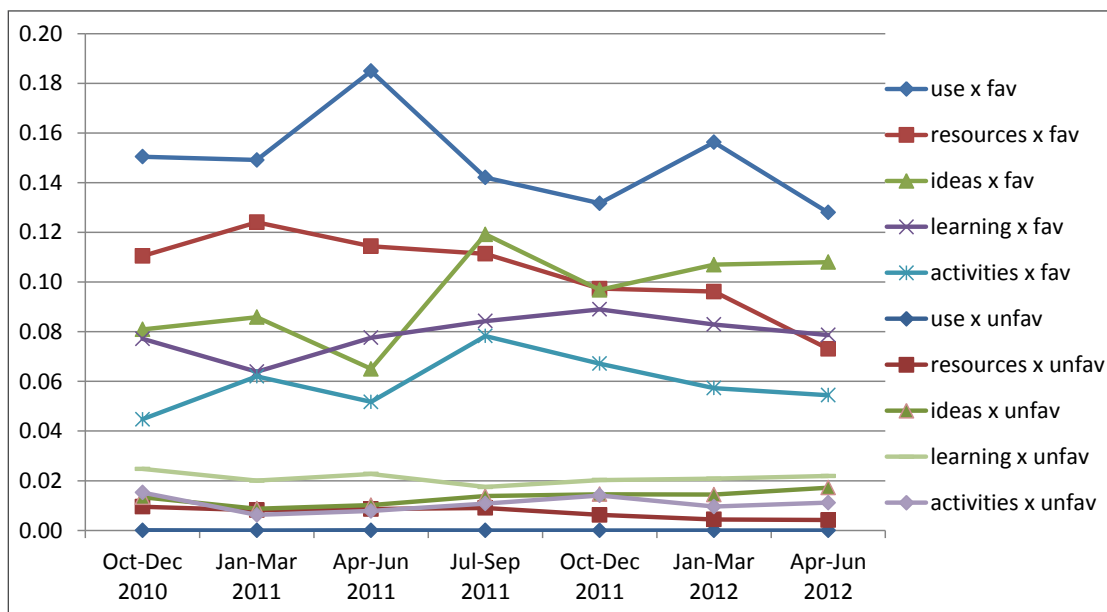
There are several findings that NSTA Learning Center managers reported as being potentially useful:

- The concept of "use" is strongly associated with both favorable and unfavorable. This suggests that how well ideas and resources work when applied in their own practices is key to the sentiment of community members. Judgments expressed in the forum appear to be made on the basis of perceived applied value.

- The other concepts most strongly associated with favorable—"learning," "activities," and "resources"—reinforce this finding, which also is consistent with the value creation research on the NSTA Learning Center. Members seem to find value in the community when they locate or develop instructional materials and approaches that contribute to student learning.

- Some concepts that one might assume would be important to members' sentiment do not appear to be based on forum content. For example, it seems like common sense that activities that are fun for students would be more likely to motivate them to learn. However, the concept of fun was not even one of the top 50 concepts associated with either favorable or unfavorable.

On the basis of this analysis, NSTA Learning Center managers might conclude that their emphasis on providing and soliciting content that can be successfully applied in the classroom is proving to be a winning strategy for serving the needs of community members.

The third and most complicated challenge that Connected Educators researchers worked with NSTA to address was how to make forum topics to which members contributed many messages during an extended period of time accessible to newcomers and of enduring value to established members. Many threads grow so large that those new to them found it difficult to make sense of or even enter the conversation; even active participants in those conversations find that key insights and references are difficult to locate when a need to return to them arises. NSTA needed a way to reorganize forum topics so that the volume of posts was more manageable but in a way that did not balkanize conversations. Under a new organization, members should be as least as connected to each other (as measured by joint participation in the discussion of particular topics) as they were under the original organizational scheme.

AIR used Pajek, a social network analysis tool with more sophisticated capabilities than NodeXL, to generate two networks: a topic network in which two topics are related if the same member posts to them, and a member network, in which two members are related if they post to topics in the same forum.[3] Researchers then applied various clustering algorithms to both networks, trying to derive new groups for the topics that would be more conceptually coherent and distinct from each other compared with the original forums, which had grown unwieldy. That is, the goal was to minimize the number of relationships between topics in different clusters, enabling members to more easily find the information they needed. This goal was to be achieved, however, while maximizing the number of intercluster relationships between people within the member network induced by the new topic groupings. This would ensure that as many people as possible were connected to each other within the overall community conversation. This approach yielded a proposed alternative organization that reduced the number and the maximum size of topic groups while increasing the degree to which they were self-enclosed and only slightly decreasing the extent to which members were connected across member groups. This alternative organization offers a starting point for NSTA community managers undertaking forum reorganization.

The application of social learning analytics to the NSTA Learning Center was purely exploratory. Of the three example applications, the community leaders themselves, without assistance from external analysts, could plausibly have executed only the first. However, if the applications prove genuinely useful to community management, each could be partially automated, and the tools for analyzing and visualizing data could be integrated with the community platform itself, making the learning analytics processes much more accessible.

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3   For a more detailed and technical explanation, see Perez-Lopez, Cambridge, and Byers (2013).

Conclusion

The Connected Educators research supports and extends earlier findings that suggest that active participation in online communities of practice can produce significant value for educators, students, schools, and districts. Researchers documented the value being created in communities focused on a range of subject areas and professional roles, a range of sizes and ages, and varied purposes and organizational sponsors.

The researchers also made clear that generating this value is not a sure thing. Effective online communities of practice take time, thought, and skill to develop, and designers must both plan extensively and be willing to adapt strategies as ongoing evaluation points to what is and is not working. All of the newly launched communities studied experienced significant challenges that required rethinking and retooling. The key questions detailed in this report, as well as the findings about design elements strongly associated with value creation, should be powerful tools for community designers and managers negotiating this challenge.

The chances that the potential impact of online communities of practice for educators will be realized also can be increased through policies at the building, district, state, and federal levels that ensure educators and students have access to the social learning tools they need, when they need them, and that professional learning through active participation is recognized and supported as legitimate professional development and continuing education.

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Appendix A. Value Creation Research in Detail

Immediate Value

Prior research demonstrates that participation in online communities of practice produces immediate value. Specifically, it has shown that participation can do the following:

- Reduce feelings of isolation, particularly for teachers (Duncan-Howell, 2010; Gray, 2004; Hur & Brush, 2009; Vavasseur & MacGregor, 2008).

- Foster a sense of camaraderie and belonging (Duncan-Howell, 2010).

- Provide opportunities to give and receive encouragement (Hur & Brush, 2009; Vavasseur & MacGregor, 2008).

- Appeal to experienced educators' altruism and their desire to help others (Gray, 2004; Hew & Hara, 2007).

The Connected Educators research confirmed these findings. The most common themes from value creation stories related to immediate value were as follows:

- **Feeling Less Isolated.** A TFANet member related the following: "Teaching is sort of a lonely experience. You don't know exactly what you're doing, and you feel, at times, lost.…It helps to know that other people are struggling with the same types of things that you are." Many teachers shared this sentiment.

- **Engagement in Professional Conversations With Other Teachers.** One English Ning member said, "As soon as I got into the community, I discovered kindred spirits, people I really wanted to talk with and listen to.…They were fascinating discussions conducted by tremendously articulate and thoughtful people, and I just love it." Most respondents were energized by their participation and eager to continue.

- **Receiving Help and Support.** A TLN member stated,

  > At school, I don't really get the kind of support that would spur me to go on…[w]hereas on TLN, there are [other] teachers out there who have experienced some aspect of something I'm trying or then give enough encouragement that I feel like I can talk about my ideas and share what I'm doing.

  Access to expertise beyond one's local context was a key draw.

- **Providing Advice or Encouragement.** An English Ning member said the following:

  > Teaching is very difficult work for most of us, and it can be devastating work for young teachers.…I've read posts on the Ning from young teachers [who] are just about ready to quit…and so I try to offer some encouragement.

  Experienced educators often saw participation in community activities as a way to contribute to the profession.

In Dropout Community discussions of what members were getting from their participation, they shared many of these same themes. Dropout recovery work, in particular, is often very isolating, and it is difficult to find others with whom to share challenges and appropriate audiences with which to share successful practices that others might employ. Having a regular opportunity to share practices and build relationships with other practitioners through community activities was highly valued.

Potential Value

Relationship building is an example of generating potential value. Earlier research on online communities of practice for educators provides evidence of several kinds of potential value. Participation can lead to the following:

- Acquiring curriculum-based knowledge and resources (Duncan-Howell, 2010; Vavasseur & MacGregor, 2008)

- Developing a shared collection of stories about practice that developed a sense of group identity (Gray, 2004)

- Developing a personal network (De Laat & Schreurs, 2013)

Of the five types of value, potential value was discussed in the most detail with interview subjects. The most common themes of the four communities' value creation stories related to potential value are as follows:

- **Deepened Knowledge Through Structured Processes of Engagement.** An NSTA Learning Center member said,

  What I like about the NES [Nasa Explorer Schools] web seminars is that…they don't just tell you, 'You can do this and this would be great' and move onto the next thing. You actually work through it step-by-step. And then you're on board with all the other teachers who are all looking at the same activity and going, 'Wow. What do you think? Could we change this and do this instead? How about if we did this?' And that interaction is very powerful.

  Educators often found that structured activities situated within larger informal conversations of the community led to what they perceived as the deepest learning.

- **Gained a Broader Perspective by Deprivatizing Practices.** A TLN member remarked as follows:

  Being a part of the community helps you interact with other teachers and see what they are doing in other spaces and with different student populations and different neighborhoods. They may be doing the same work, but doing it at a much higher level or in a much different way. So much of teaching is a private act and it shouldn't be because it is so critical to learn from seeing what other people are doing.

  Participation was a way of making teaching community property so that differences in context and style could be understood and appreciated.

- **Increased Self-Confidence and a Sense of Professional Identity.** An NSTA Learning Center member remarked as follows:

  There's a sense of satisfaction and professionalism that you feel when providing things for other teachers that they find usefulIf you're talking to peers who can actually take some of this stuff that you've created and make use of it, there's a sense of personal worth there.

  An English Ning member echoed this sentiment: "It helps create a different identity for you. You feel like a different person because people are listening to you or people respond to you and say you've made a good point." Many educators felt that the communities offered them the opportunity to contribute to pedagogical content knowledge in their subject areas on a national scale.

- **Expanded Network of Professional Connections.** An English Ning member shared the story of attending an NCTE conference and displaying her English Ning screen name:

  When people saw the picture and screen name, their face would just light up and they would grab you and hug you and say, "Oh, that's you!" It was an amazing experience. Most of those early friendships on the screen have become real friendships.

  In some cases, opportunities to convene face to face initiated relationships that were deepened through online interaction across time, whereas in others, virtual connections turned into face-to-face relationships.

- **Accessed Resources and Tools.** A member pointed to the abundant resources on TFANet: "I have been able to download worksheets, lesson plans, and presentations that other teachers have shared and adapt them for [my] own use." A member appreciated the portfolio and library tools in the NSTA Learning Center that provide the ability to create collections of such resources and documentation of learning: "It's all there and you don't have to worry about losing it…wherever I am." Particularly for teachers new to the profession or challenged to teach new content in new ways, access to resources was a key source of value.

- **Increased Trust in Individuals and the Collective Community.** By reading blogs on TFANet across time, a member began to trust their credibility and share them with others outside the community:

  > People will post blogs about what's happening in the ed[ucation] reform movement in different states and districts. I feel like those people are a reliable source for getting that information. Because I trust them as a reliable source, I can then take those ideas back to my teachers, or even be able to have a parent night that informs parents.

  An NSTA Learning Center member felt safe sharing experiences there because of the consistent professionalism she has observed in conversations:

  > The Learning Center pretty much has been my safe haven to go to if I want to share or get new ideas without the fear of someone laughing at me or throwing stones at the ideas. The conversations are very professional, which I appreciate.

In CS10K, one of the most important first-year outcomes was the increased level of connection between the leaders and staff from the 13 professional development projects that NSF was funding during that year to support implementation of the two high school computer science courses. As in the case study communities, participants grew and strengthened their professional networks. The increase in connections across projects during the course of the year through interactions on the community platform is evident from social network analysis of usage data.

Applied Value

Potential value turns into applied value when what is learned through community activities is applied to practice. Previous research has shown that most teachers who participate in online communities report that they have made changes in what they do in classroom based on what they learn (Duncan-Howell, 2010), and those changes usually reflect the kinds of practices that community activities were intended to encourage (Vavasseur & MacGregor, 2008). The case studies identified several key ways in which educators translated knowledge and relationships into practice:

- **Used Lessons or Ideas From the Community in the Classroom.** Teachers frequently found resources through the communities, adapted them to their needs, tried them, and then reported on their results. For example, two teachers responded to the need to develop new curriculum in response to changes in standards by collecting and adapting resources from the NSTA Learning Center: "We wrote a whole meteorology unit based on information that I had collected from the Learning Center. So I am pulling materials from there and using them in my class and sharing them with other teachers in my building."

- **Changed Classroom Practices.** A TLN member said,

  > It's hard not to be affected by ideas I get from Colorado and Seattle and Florida and North Carolina about how to use assessments to help guide kids towards better learning. After those conversations and reflecting on those conversations, I inevitably end up using some of those ideas in my classroom in the next few weeks or months.

  Having been exposed to new practices, educators felt negligent if they did not find ways to test out some of those innovations in their own work.

In addition to changing their own classroom practices, teachers often changed the ways in which they shared knowledge with their peers and public audiences.

- **Initiated and Led Professional Development Experiences for Other Educators.** Teachers often bring back what they are learning and the issues they are discussing to their local contexts to support the learning of their peers, taking on new leadership roles. For example, a TLN member said,

  > This year I'm leading a book club of 10 teachers who are exploring exactly that—using assessments to guide kids towards better learning.…That is a direct result of my participation in TLN. It all started by having those conversations in the community.

- **Created Collections of Materials for Other Educators to Use.** As in the curriculum development example earlier, collections are often created in relationship to an offline need to collaborate. In the case of one TFANet member, the results of a local collaboration became the basis for a community resource:

> Last year I was a member of an elementary roundtable of people. As part of that, I actually designed solutions to solve typical problems that teachers face. I was able to post a variety of experiences, individual reflections, and video solutions showing teachers in their everyday practice to the TFANet community.

- **Collaborated With Other Members to Present at Conferences and Write for Public Audiences.** Educators reported that they produced systematic accounts of their knowledge and experiences that arose from informal conversations and the sharing of resources on the communities. An English Ning member engaged in a book study with another member, and that led her to start a similar online discussion within her local institutional context: "These conversations led to a paper and a conference paper. And that came out of how stimulating I had found conversation with Michael." The policy discussions with which a member engaged in on TLN helped build expertise that was useful to a much broader audience: "I've had the good fortune of having a lot of articles published this year in *Ed Week* and in the *Huffington Post* and CNN.com and other venues."

Realized and Reframing Value

When knowledge is applied in practice and positive results are observed, realized value is produced. Those results may have the added benefit of changing what members believe, individually or collectively, about what constitutes success. This is reframing value. There are few studies to date that have systematically documented realized and reframing value, perhaps because of the dual challenge of isolating the contribution of community participation from other factors influencing success and the paucity of applicable evidence in the records of community activity.

Similarly, as compared with other types of value, interview subjects spoke more infrequently about the direct impact of their community participation on the achievement of what matters to them and their understanding of success. Nevertheless, these two types of value were evident in several value creation stories.

One type of realized value is improved communication and learning within an educational institution. These improvements are implied in various examples of applied value through taking on leadership. One NSTA Learning Center member also asserted that a collection of resources on science and literacy created by one of her preservice teachers led to improved communication between the science and reading departments within the university's school of education.

For TLN members, a key way that the value of participation in the community is realized is by producing knowledge products that influence policy. One member related,

> TLN partnered with our state union and put together a group of teachers statewide to go through this process, thinking that our state is going to be doing performance pay. Our state keeps trying methods that keep flopping so TLN said, "Let's put teachers together and see what things they think could work for our state and for our students." The culmination of our work together was the Pay for Performance report that we wrote. So to be able to go to Tallahassee and present our tangible booklet with our ideas that were research based and produced through a conversation with teachers across the state—whether virtually or face-to-face—that's a really important thing.

Reframing value shows up in the value creation stories in two ways. First, participants in the communities reported that high-quality dialogue caused them to rethink their views on key issues in education. For example, an English Ning member appreciated and actively engaged with posts other educators made on controversial issues on the community, and she believed that these conversations influenced both her and the others' educational philosophies:

> That people take the time to write them, it means a lot to me and makes me want to do better. I think when you write reflective blog posts or post on hot topic issues, you're taking part in this global debate....Maybe you don't change their minds, but you get them to articulate their own position more thoughtfully and to really be mindful of what they think. That level of discourse is important and changes how we think about education as educators, how we think about it as citizens.

Reframing value also is implicit in several examples of applied value. As a result of participation in online communities of practice, teachers who may previously have seen their professional responsibilities as being limited to serving the students in their individual classrooms took on leadership roles and engaged in collaboration with other educators to support professional learning throughout their schools and attempted to influence the public policy that sets the conditions for their work.

Community Health Report

March 31st – April 13th   COBALT

Engagement

2

Networking

4

Value Creation

6

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Community Summary

Overall, total participation and networking across the group declined during the current period, and networking metrics suggesting a small handful of members are generating the majority of responses. Activity in the group continues to be concentrated in the discussion areas, though the polling has generated some interest and engagement. However, on the whole

| | 0 | | 30 |

Mar 31, 2013 - Apr 13, 2013: ● Visits
Mar 17, 2013 - Mar 30, 2013: ● Visits

Visits	Unique Visitors	Pageviews	Pages / Visit	Avg. Time on Page	Visit Duration	Avg. Visit Duration
-2.33%	**-33.73%**	**-19.70%**	**-17.79%**	**15.53%**	**55.00%**	**58.69%**
42 vs 43	55 vs 83	595 vs 741	14.17 vs 17.23	00:01:04 vs 00:00:55	05:44:45 vs 03:42:25	00:08:13 vs 00:05:10

Primary Dimension: **Visitor Type**

Plot Rows | Secondary dimension ▾ | Sort Type: Default ▾ | advanced

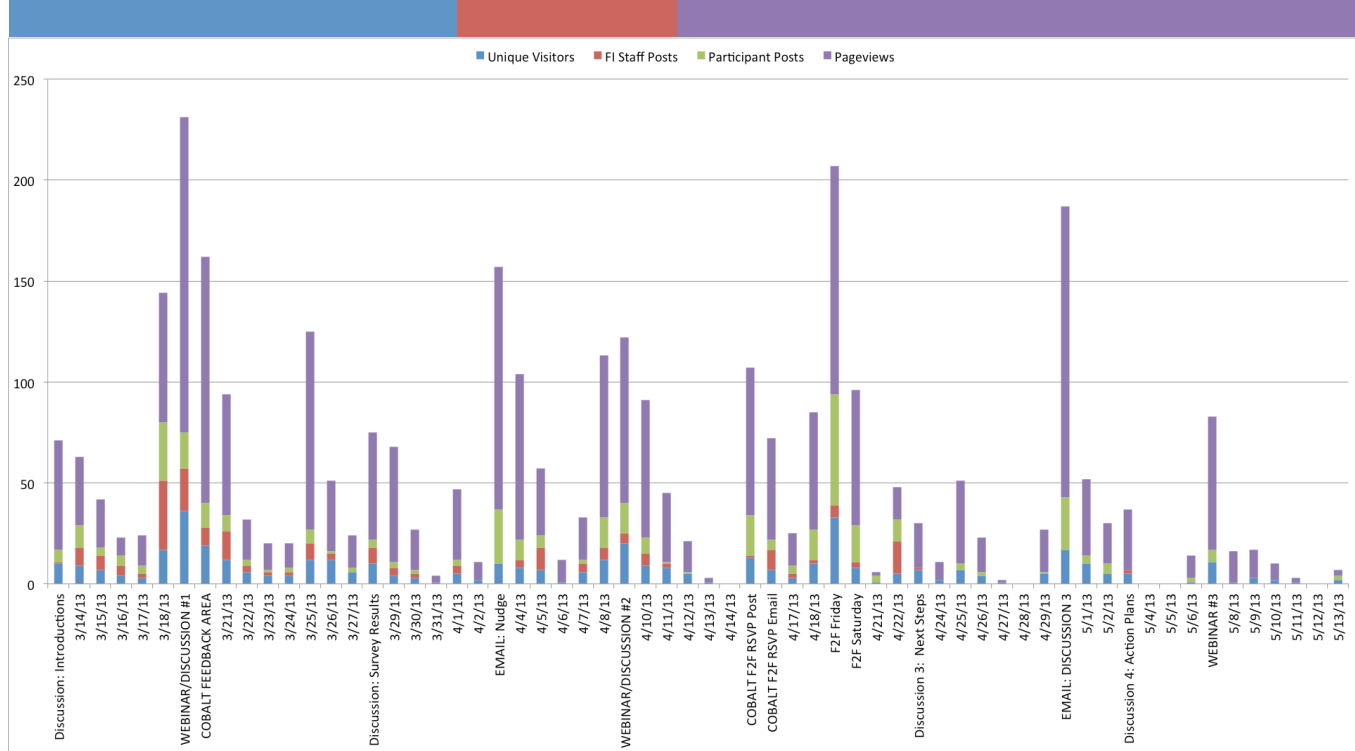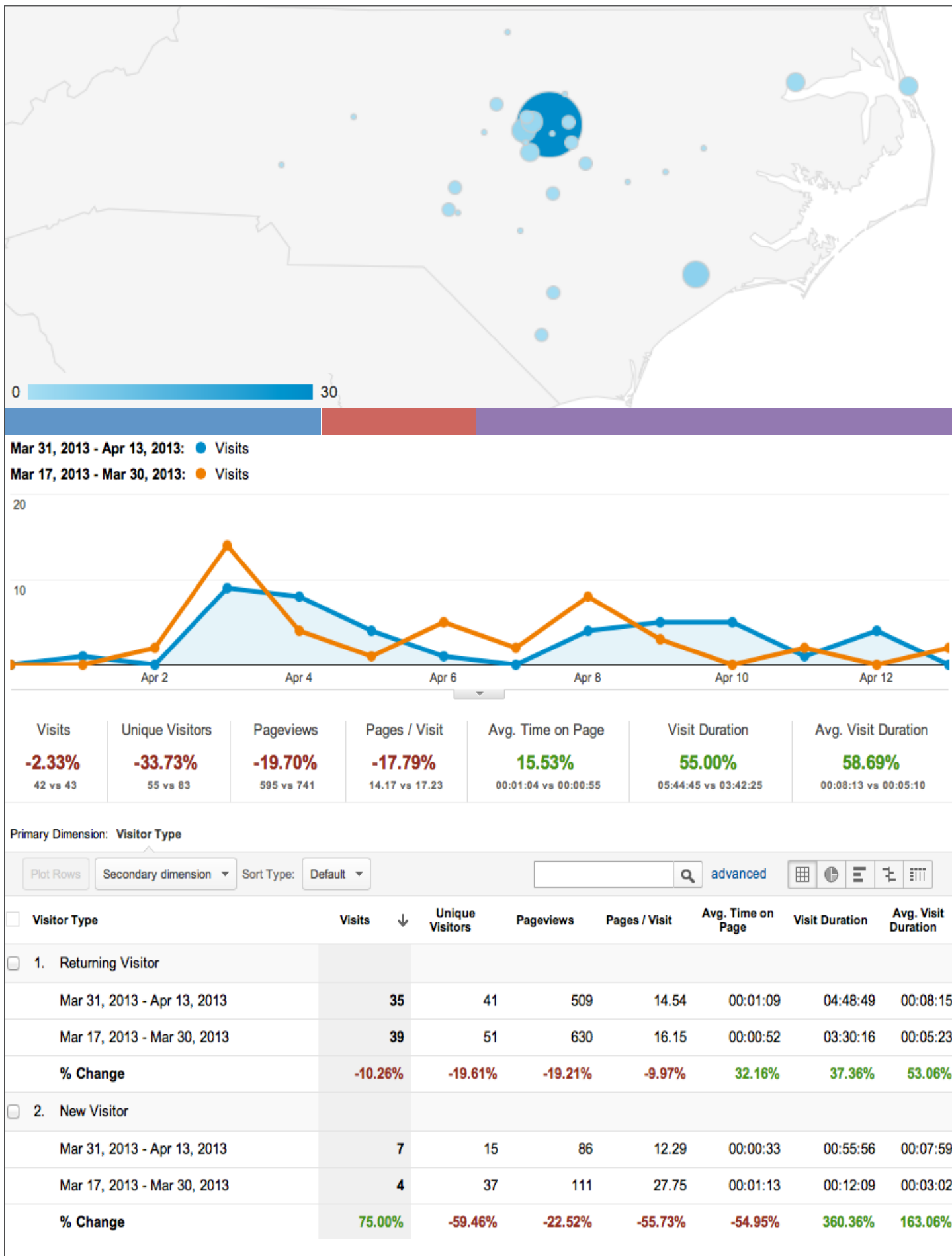|	Visitor Type	Visits ↓	Unique Visitors	Pageviews	Pages / Visit	Avg. Time on Page	Visit Duration	Avg. Visit Duration
☐ 1.	Returning Visitor							
	Mar 31, 2013 - Apr 13, 2013	35	41	509	14.54	00:01:09	04:48:49	00:08:15
	Mar 17, 2013 - Mar 30, 2013	39	51	630	16.15	00:00:52	03:30:16	00:05:23
	% Change	**-10.26%**	**-19.61%**	**-19.21%**	**-9.97%**	**32.16%**	**37.36%**	**53.06%**
☐ 2.	New Visitor							
	Mar 31, 2013 - Apr 13, 2013	7	15	86	12.29	00:00:33	00:55:56	00:07:59
	Mar 17, 2013 - Mar 30, 2013	4	37	111	27.75	00:01:13	00:12:09	00:03:02
	% Change	**75.00%**	**-59.46%**	**-22.52%**	**-55.73%**	**-54.95%**	**360.36%**	**163.06%**

Summary of FI Staff Planned/Responsive Interventions and Participant

Page Title	Unique Visitors ↓	Pageviews	Avg. Time on Page
1. Access Denied / User Login | EPIC-Ed			
Mar 31, 2013 - Apr 13, 2013	40	85	00:00:32
Mar 17, 2013 - Mar 30, 2013	17	33	00:00:12
% Change	135.29%	157.58%	173.23%
2. Discussion Forum 1: Administering STNA | EPIC-Ed			
Mar 31, 2013 - Apr 13, 2013	32	275	00:01:16
Mar 17, 2013 - Mar 30, 2013	52	350	00:00:57
% Change	-38.46%	-21.43%	33.55%
3. Collaborating to Build Action Plans for Learning Technologies - Discussions | EPIC-Ed			
Mar 31, 2013 - Apr 13, 2013	25	71	00:01:15
Mar 17, 2013 - Mar 30, 2013	62	155	00:00:47
% Change	-59.68%	-54.19%	58.69%
4. Discussion Forum 2: Interpreting STNA Results | EPIC-Ed			
Mar 31, 2013 - Apr 13, 2013	24	96	00:01:01
Mar 17, 2013 - Mar 30, 2013	0	0	00:00:00
% Change	∞%	∞%	∞%
5. What has been your biggest challenge so far in implementing STNA with your staff? | EPIC-Ed			
Mar 31, 2013 - Apr 13, 2013	24	138	00:00:43
Mar 17, 2013 - Mar 30, 2013	4	13	00:00:11
% Change	500.00%	961.54%	293.46%
6. Collaborating to Build Action Plans for Learning Technologies - Upcoming events | EPIC-Ed			
Mar 31, 2013 - Apr 13, 2013	12	18	00:00:15
Mar 17, 2013 - Mar 30, 2013	12	19	00:01:35
% Change	0.00%	-5.26%	-84.64%
7. Collaborating to Build Action Plans for Learning Technologies - Resources | EPIC-Ed			
Mar 31, 2013 - Apr 13, 2013	10	14	00:00:32
Mar 17, 2013 - Mar 30, 2013	20	46	00:00:48
% Change	-50.00%	-69.57%	-33.17%
8. Survey Reports | EPIC-Ed			
Mar 31, 2013 - Apr 13, 2013	10	14	00:00:37
Mar 17, 2013 - Mar 30, 2013	0	0	00:00:00
% Change	∞%	∞%	∞%

1. Today's webinar...

#	Question	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree	Total Responses	Mean
1	was clear and easy to follow.	54.2%	41.7%	4.2%	0.0%	0.0%	0.0%	24	1.5
2	provided valuable information for interpreting STNA survey results.	58.3%	33.3%	8.3%	0.0%	0.0%	0.0%	24	1.5
3	provided meaningful opportunities for interaction (e.g. questions, feedback, socializing).	50.0%	41.7%	4.2%	4.2%	0.0%	0.0%	24	1.6
4	was free of technical issues.	12.5%	41.7%	37.5%	8.3%	0.0%	0.0%	24	2.4

2. The COBALT group area on Epic-Ed...

#	Question	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree	Total Responses	Mean
1	has helped me to get to know other members well.	20.8%	29.2%	37.5%	8.3%	4.2%	0.0%	24	2.5
2	has provided me with useful strategies and ideas.	37.5%	37.5%	20.8%	4.2%	0.0%	0.0%	24	1.9
3	has provided me with valuable resources.	33.3%	45.8%	12.5%	8.3%	0.0%	0.0%	24	2.0
4	has resulted in meaningful discussion.	41.7%	33.3%	25.0%	0.0%	0.0%	0.0%	24	1.8
5	has me provided timely support.	41.7%	29.2%	29.2%	0.0%	0.0%	0.0%	24	1.9

3. So far, my participation in COBALT ...

#	Question	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree	Total Responses	Mean
1	has been valuable to my professional practice.	33.3%	54.2%	12.5%	0.0%	0.0%	0.0%	24	1.8
2	has met my expectations.	36.0%	44.0%	16.0%	4.0%	0.0%	0.0%	25	1.9

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