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The Iowa Communities of Practice and Innovation Pilot: Teachers' Perceptions of an Initiative to Support Blended Learning and the Integration of Technology in the Classroom

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Introduction

The integration of technology into classrooms has provided students with the opportunity to interact with peers across the globe in seconds; accessing endless sources of knowledge with the click of a mouse. With this availability of technology (e.g., computers, internet), links are seen between student internet use and academic performance (Cheung & Huang, 2005). As well, teachers are gaining access to new tools which enable them to meet the needs of a wide range of learners (Esteban-Millat, Martínez-López, Huertas-García, Meseguer, & Rodríguez-Ardura., 2014; Lewis, Whiteside, & Dikkers, 2014). Given these advances in teaching, there has been a trend in education to integrate technology and online learning into the curriculum. For example, in Iowa, the Department of Education reported that the number of schools adjusting to accommodate the use of technology and online learning is increasing: "The percent of Iowa schools equipped with 100 MB or more of bandwidth continues to grow. In 2017-2018, 89.4 percent of schools reported having 100 MB or more of bandwidth compared to just 76.2 in 2015-2016 (Pennington, 2018, p.viii). Additionally, studies have also indicated that students taught in a blended classroom may demonstrate higher levels of achievement than students from a strictly face-to-face learning environment (Smith & Suzuki, 2015). Other benefits of blended learning include: improvements in students' satisfaction and success (Means, Toyama, Murphy & Baki, 2013), and their sense of community (Rovai & Jordan, 2004). Considering these results, a strong case could be made for the integration of a blended learning curriculum to support classroom teaching and student learning. For the purposes of this study, blended learning will be defined as combining online and face-to-face instruction (Reay, 2001; Rooney, 2003).

Notwithstanding the benefits of technology integration into the classroom, studies have shown this may not guarantee academic reformation. For example, one study suggested that at-risk students did not show significant changes in terms of grades or attendance when computers were integrated into their classroom (Muir-Herzig, 2004). The authors concluded by proposing technology focused training for educators coupled with opportunities for educators to communicate and share ideas with one another would be effective for preparing them to use computers in their curriculum. These results were mirrored in a study which concluded that although computers may provide greater access to information this did not seem to impact students' achievement on standardized tests (Davies & West,

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2013). An additional concern, particularly at the high school level, is the assumption this population of students are competent technology users. According to a study by Calvani, Fini, Ranieri, and Picci (2011), high school aged students demonstrated technical competence with computers, but lacked a more conceptual and critical understanding of technology use. These studies suggest simply integrating technology (such as computers) into the classroom is not enough to enhance students' learning and academic achievement. Educators need appropriate training and learning opportunities to understand how to implement technology, rather than relying on the technology itself to make a change. The following section addresses the current state of teacher professional development opportunities situating the intervention utilized in this study to promote the integration of a blended learning curriculum.

Teacher Professional Development

Professional development (PD) opportunities for educators have often been structured using a one-shot approach, which produces limited changes to teachers' practices (Ackerson, Cullen, & Hanson, 2009; Darling-Hammond & McLaughlin, 2011). While long-term, sustained PD (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007) with on-going interactions (Keay, May, & O'Mahony, 2014) is considered more effective. Additionally, PD approaches which have aimed to support teachers' integration of technology into their classrooms, have been perceived by teachers as most effective when there are personalized components (Liao, Ottenbreit-Leftwich, Karlin, Glazewski, & Brush, 2017). Accordingly, to address these preferences and concerns, PD programs with a social learning role have become an alternative approach for providing teachers with learning opportunities (Lumpe, 2007) enabling teachers to have access to discipline specific knowledge (Stein, Silver & Smith, 1998). An example of a PD model with a social learning intervention encouraged teachers to videotape their lessons as a means to stimulate reflection and receive feedback from colleagues for their specific subject content area (Thomas, Wineburg, Grossman, Myhre, & Woolworth, 1998). Other interventions have implemented a combination of both face-to-face and online spaces for teachers from similar disciplines to engage with one another in order to access new strategies and tools to apply to their own classrooms (Luehmann & Tinelli, 2008; Vavasseur & MacGregor, 2008). Communities of Practice (CoP) are one particular social learning approach that has gained traction in professional development for teachers (Babinski, Jones, & Dewert, 2001; McConnell, Parker, Eberhardt, Koehler, & Lundeberg, 2013). CoPs provide an opportunity for teachers to participate in a community that enables the development of their practice (i.e., teaching) and identity (i.e., professional teaching identity) through interactions with peers (Wenger, 1998). Thus, the authors found the CoP method to be a suitable approach to explore the long-term impacts of a PD initiative that encouraged on-going interactions and learning opportunities to meet the teachers' specific needs.

The following section provides a brief overview of the conceptualization of this theory over three developmental phases. The theoretical framework has had an impact on a variety of fields; for example, in education (Kirschner & Lai, 2007), sport (Culver & Trudel, 2008; Stoszkowski & Collins, 2012), and health (Li, Grimshaw, Nielsen, Judd, Coyte & Graham, 2009).

Communities of Practice and the Value Creation Framework

Over the past two decades, Wenger and colleagues have developed, through experiences, critiques, and applications, the concept of social learning in phases which have gradually built on one another. In the initial phase, Lave and Wenger's (1991) *Legitimate peripheral participation*, described the richness of social learning. This text concentrated on apprenticeships in social communities which aimed to construct knowledge and competencies through participation in activities. Wenger's (1998)

Communities of Practice (CoP) marked the next phase of understanding social interactions and the co-creation of knowledge. Wenger explained that CoPs are comprised of, "… 1) mutual engagement, 2) joint enterprise, 3) a shared repertoire" (Wenger, 1998, p. 73). An emphasis was placed on the on-going engagement and negotiation of meaning by the community members to enhance knowledge of a mutually shared field or area of interest. One of the challenges, and indeed critiques of the CoP concept was the lack of explanation regarding meaningful individual learning (Cushion, 2008).
In 2011, Wenger, Trayner, and De Laat proposed the Value Creation Framework (VCF) for the assessment of CoPs and to explore the value created through community and network participation. This framework was developed in part, as a response to critiques of CoPs. Researchers expressed concerns with the retention of CoP members (Gallagher, Griffin, Ciuffetelli Parker, Kitchen, & Figg, 2011), as well as issues related to power dynamics in CoPs which had the potential to hinder members' participation in the community (i.e., Vavasseur & MacGregor, 2008). From a practical point of view, there was a need to link learning outcomes to social learning activities (i.e., the activities of the CoP). As a result, the framework acted as a tool to show learning and individual as well as collective value created through participation in CoPs.

The Value Creation Framework (Wenger, Trayner, & De Laat, 2011) comprised five cycles: Immediate Value, Potential Value, Applied Value, Realized Value and Reframing Value[1]. *Immediate Value* is the direct result of engaging in an interaction, such as the participation in an activity. *Potential Value* can be experienced in the form of human, social, tangible, reputational, and learning capital. This value explores the potential capital which has resulted from the initial interactions and may become applied to practice in the future. *Applied Value* occurs with an actual change in a member's practice. This change is the product of interactions and knowledge gained in the community. *Realized Value* is evident when there is an active reflection on the changes in practice and the impact this has created. The final phase, *Reframing Value*, represents a modification in the member's conceptualization of success and how success is achieved. In addition to these values, Wenger-Trayner et al. (2011) defined an individual's or collectives' expectations of their participation in CoPs or other learning networks as their *aspirations*. The aspirations for a network or community can be presented in different ways such as what defines success for a CoP, or their personal goals when networking. Aspirational narratives describe the value participants are expecting the CoP might produce. Time is important when considering the different value cycles. While immediate and potential value are often readily experienced, it usually takes time for applied, realized, and reframing value to occur. The following section outlines the context for the CoP developed in this project to serve as a professional development tool by creating a social learning space for teachers to co-create and share knowledge.

The Iowa Training: Contextualizing the Case

In 2010, the Iowa Department of Education received the unique opportunity to fund a professional development program for select high school teachers to participate in workshops aimed at helping

[1] A second version of the Value Creation Framework includes 2 additional cycles: Strategic and Enabling (Wenger-Trayner, Wenger-Trayner, Cameron, Eryigit-Madzwamuse, & Hart, 2017).

teachers address the newly adopted state standards[2]. Earlier that year, the State Board adopted the Iowa Core state standards. The adoption of the new Iowa Core state standards occurred simultaneously with efforts by many schools to provide every student with a laptop computer. Consequently, the Iowa schools faced the formidable task of addressing the new standards, technology integration, and the resulting changes needed in both pedagogy and school operations. This required the enhancing or redesigning of current instructional materials, and also the development of new online or blended learning materials. As a result, the Iowa Community of Practice and Innovation (CoPI) pilot was developed to help provide support and resources for teachers, while addressing both the new standards and the move toward technology-rich, digital learning resources. Nancy Movall, the grant manager for this special project, initially came across the concept of CoPs in an article written by Étienne Wenger-Trayner. He had researched CoPs in the context of geologists and their experiences learning as a collaborative group to improve their practice. In Iowa, Nancy knew the curriculum would be updated and the teachers would need to learn how to integrate technology into their classrooms. Rather than supporting the teachers in their learning independently, she saw this transition period as an opportunity to establish and build a community for learning. Nancy reached out to Étienne Wenger-Trayner and Beverly Wenger-Trayner to come in as collaborative partners in the development of the Iowa Pilot and to facilitate the cultivating of a CoP. The teachers were involved during all phases of this collaboration to ensure the CoP was built from the group up with the teachers' specific needs at the centre of all activities. Additionally, the CoP model was chosen for this project as CoPs have been effective in fostering supportive spaces for collaboration in education. According to Ackerson, Cullen, and Hanson (2009), CoPs are responsible for improving teaching practices and encouraging reflective thinking.

Iowa pilot: Communities of practice and innovation. The purpose of Iowa's Community of Practice and Innovation (CoPI) was to form a cadre of teachers willing to work together to collaboratively share in the development and implementation of high quality curriculum. Moreover, students' learning in a digital age and global society could be addressed, while at the same time developing teachers' capabilities to implement standards-based, 21st Century instruction. Considering a large number of Iowa schools are rural, the Iowa CoPI was designed to bring together teachers who were initially isolated within their individual classrooms or separated by the distance of their schools.

The project plan consisted of two face-to-face workshops, an online course, and online communication forums (Wikispace and Twitter) to facilitate discussions around the development of digital curriculum modules to be piloted during the following school year. Through ongoing

[2] The Iowa Pilot was funded by the American Recovery and Reinvestment Act of 2009 (ARRA), which was provided to the Iowa State Department of Education and was distributed to the nine Area Education Agencies, who decided to collaborate on the joint community of practice pilot.

conversations and collaboration, the intent was for participating teachers to gain access to enriched curriculum resources or eCurriculum, and share in the professional learning and growth necessary to design instruction to support all students in meeting the Iowa Core standards. The teachers participated in a two year-long program aimed at providing a channel for dialogue and discussion as to the merits and challenges of moving to a digitally dense educational environment. The initial two-day workshop (see Appendix A) provided participants with the context for the project and established priorities and commitment for the CoPI's focus: the development of the eCurriculum modules and the capacity building of the participants. During the workshop, participants were asked to select and become a member in one of four leadership groups. Each leadership group stewarded one part of the learning process for the entire group. In this way, the leadership of the CoPI was distributed over the entire event. During this time, the vision and commitment to the collaborative effort was forged and the motto "Better Together" became the driving mission of the Iowa CoPI.

A second component of the CoPI training was an online course, "eLearning in a Blended Classroom". This course afforded participants the opportunity to become familiar with the basics of blended learning and the spectrum of blended learning models available for their classrooms, as well as introduce them to the eCurriculum module(s) they were being asked to enhance and pilot. A third training event brought the participants together to collaborate in discipline specific teams around desired enhancements to eCurriculum modules. During the third event, time was provided for teachers to make digital edits and enhancements to the original eCurriculum modules to better meet the expectations of the new Iowa Core state standards. In addition to the workshops and the online course, the Iowa CoPI leveraged social media (Twitter) and an online shared space (Wikispace) to stay connected and continue their collaborative work. The ability to connect regularly regardless of time, pace, and place was critical to meeting the objectives of the CoPI. Moreover, these in-person workshops and online interactions became an important piece in identifying this group of teachers as a CoP. Wenger (1998) explains that the three dimensions of a CoP are: mutual engagement, a joint enterprise, and a shared repertoire. These dimensions were emulated by the CoPI teachers through their maintained interactions as they strived for collective learning opportunities (for as long as possible – to be discussed in the results section).

Purpose of Research

To our knowledge, teachers' experiences with professional development programs aimed to enhance their implementation of a blended learning classroom at the high school level are underrepresented in literature. Recent studies have placed an emphasis on the exploration of student success in blended classrooms (Smith & Suzuki, 2015) but seem to overlook educators' experiences with this context, especially in terms of the ongoing support that a CoP might provide to teachers attempting to change their practices. The purpose of this research was to examine the value created through the CoPI and teachers' experiences participating in this professional development program. The main research question guiding this study was: What types of learning values were experienced by the teachers participating in the CoPI? As far as we know this is the first study to examine teachers' experiences of being supported in a CoP using the framework specifically created by Wenger and colleagues for this

purpose (Wenger, et al., 2011; Wenger-Trayner, et al., 2017).

Methods

A qualitative case study of the intrinsic type (Stake, 2005) was chosen as an appropriate approach to conduct this research since we were interested in the specific case of the CoPI. An initial number of 190 individuals (including consultants, principals and administrators) participated in the Iowa Pilot. Of these 190 individuals, 136 were teachers (60 of whom agreed to partake in Phase 1 of the data collection; see Data Collection section below). Teachers were recruited for the Iowa Pilot through a website and through the state-wide Iowa Area Educations Agencies. During recruitment, there was an increasing interest surrounding technology in the classroom. This resulted in great interest in participation. Participants were accepted on a first-come, first-served basis. The CoPI was conducted over a two-year period.

Participants

The state of Iowa had adopted a common core curriculum across the following four disciplines: Algebra, English, Physical Science, or Social Studies. To align with this curriculum, educators invited to participate in the Iowa Pilot were high school teachers of these subjects and represented the full spectrum of district sizes and experience. The teachers' experiences ranged from less than five years of teaching to teachers with over 30 years of teaching experience. To highlight an individual educator's experience throughout this project, Carole (pseudonym given) who has been in education for 28 years will be referenced throughout for a more holistic account of her individual engagement with the CoPI.

Data Collection

Data were collected in two phases, once during the two-year pilot and again four years later. Following the completion of the initial workshops and online collaboration, Phase 1 of the data collection involved a Personal Value Narrative (Appendix B), and a Value Creation Story (Appendix C) which were completed by 60 of the 136 teachers in the overall Iowa Pilot project. Both of these templates are proposed in Wenger, Trayner, & De Laat's (2011) Value Creation Framework (VCF) paper to assess the value created from the participants' engagement in a CoP. A second phase of data involved 17 teachers completing an online interview (see Appendix D for questions). Thus, at this time, the 60 teachers who completed VCF templates were sent an email in which they were asked to complete the interview questions provided in the email. The response rate of 17 was considered quite good considering four years had elapsed since the original data collection mid-2011 and many teachers might have moved schools or retired in the interim. This second data collection provided an opportunity to follow-up with the growth that emerged or did not emerge in the educators' practices from their participation in the CoP pilot and through continued collaboration. All the names and locations have been changed to pseudonyms to maintain the anonymity of the participants.

Data Analysis

Braun, Clarke, and Weate's (2016) thematic analysis was used as a guide to analyze both sets of collected data. The six steps of this guide are as follows: familiarizing oneself with data, creating initial codes, looking for themes, reviewing themes, refining and naming themes, and developing a report. Upon the completion of the initial reading of the first set of data, Wenger, et al.'s (2011) five cycles of the Value creation framework (VCF) guided a deductive analysis. The authors analyzed the data for the five cycles of value (immediate, potential, applied, realized, reframing; see above for a description of each value) and examples of the teachers' aspirations. Inductive analysis was applied as well to account for any emergent themes which came through the data, beyond the VCF. The data were organized using NVIVO 11 software (QSR International, 2015). Five main themes resulted from the deductive and inductive analysis and are presented in the following section.

Results

The aim of this research was to examine the types of learning values created through the CoPI and teachers' experiences participating in this project. The findings are presented in five major themes: Aspirations, potential value, applied value, realized value, and sustainable resources. Since the two points of data collection took place over a four-year period, the teachers had the opportunity to utilize the ideas and knowledge generated through the CoPI resulting in several types of value creation. For the remainder of this paper, the term "educators" will be in reference to the participant respondents and not the general CoPI members.

Aspirations: The aspirations of the educators emphasized their expectations. The educators were quite open to the idea of bringing technology (e.g., computers) into their lessons to support student learning in a rapidly changing environment. The educators expressed their desire to participate in a professional development program to access the necessary tools for changing their teaching. Sub-themes found are related to (1) using technology to reach technology users, (2) increasing collaboration to avoid isolation, and (3) the ability to influence. Jennifer articulated the first sub-theme: "I participated in this network because I wanted to learn a new way to teach and get my students involved. Since this generation is so technology based, blended classrooms may be the key to better student performance." The second sub-theme emphasized the teachers' clear value of collaboration to enhance their teaching and avoid the seclusion often felt by educators. Tanya's quote exemplifies the sub-theme:

> I do feel that I work in isolation at times. I am always worrying that there is something better out there that I just haven't found yet. Taking part in this project will give me the community of teachers to learn from, bounce ideas off of, and inspiration to go beyond the safe box my classroom has become.

The third sub-theme of the aspirations, ability to influence, was the theme that came up most frequently. The sub-theme highlighted the teachers' hopes of becoming leaders for change and imparting their new connections and experiences with other educators and administrators from their local schools. Pam stated: "I hope I will become a leader for my district in modeling the utility and

functionality of a blended classroom approach to education." A nuance within this sub-theme is the strong emergence of latent feelings of encouragement, fun, and excitement. For example, Chris felt encouraged about the integration of blended learning:

> I believe my participation will influence colleagues who may be more reluctant to try new things or who are hesitant about utilizing more technology into their instruction. I am not a tech whiz myself but I am always looking for new ways to reach out to my students.

Tammy shared her personal feelings as a contributor to a movement that is greater than the CoP: "It is fun and rewarding to be an instrument of change! I think that our 'community' can have a tremendous ripple effect in our school districts." Stacey expressed her excitement to bring her new skills to her colleagues:

> It is amazing how much I have learned in such a short amount of time. I can say I do feel overwhelmed at times. It is a good feeling because I am excited about the possibilities this will bring to education. I am anxious to share these new things with my fellow teachers at [district]. They will love this!

Potential value: This theme was deductively analyzed and the sub-themes follow the definition of the VCF (i.e., human capital, social capital, tangible capital, reputational capital, and learning capital). All five of these potential forms of capital are present in the educators' descriptions of their participation in the CoPI. Pam discusses the *human capital* she gained through her interactions with likeminded educators: **"**I have tried creating a wiki-space but never had a group to use it with. Working with the group through the Iowa pilot wiki is giving me confidence in how to use such a tool in the future."

Taylor indicated the importance of developing relationships and gaining *social capital* which can be imperative to the changes she would like to implement:

> I have always wanted to get the word out to others of the radical but effective things I am trying. However, my personal network was too small and I had no way to jump start the conversations about change. Now I have a platform and a group who is hungry to communicate. I was starving for this.

Sophia provided a description of the resources she is now using as a form of *tangible capital*:

> I have all sorts of information resources that I am learning to use. I have had a Moodle site for the past year, but I am hoping that I will learn to do more with it. I also have a Twitter account that I am not very good at using, but can get on and see what others I have met in the class are doing.

In terms of *reputational capital*, many of the teachers alluded to the positive impact their new connections had on their positioning within their schools and districts. Jackie situated her new leadership role:

> I am helping move the math curriculum at the middle school and high school levels in a positive direction. I have had several conversations with my principal and superintendent about where we are headed and how best to get there.

Finally, *learning capital* was quite noticeable in Judy's access to new resources and knowledge:

> Participation in this project has inspired me to do more – draw on the expertise of others to help me become a better classroom teacher. I don't want to just continue to do what I've always done. I want to do a better job of meeting my students' needs.

The second round of data collection was conducted with the educators to explore the changes in their teaching practices that might have happened in the time following their participation in the CoPI. Given the time elapsed, regarding the VCF there were more instances of applied and realized value than the considerable evidence of potential value seen in the first data set. Other themes which appeared in the analysis focused on the challenges surrounding the accessibility of resources and the continuation of long-term connections between the educators. The themes introduced in this section include; applied and realized value, and sustainable resources. In addition to these results, an account of one educator, Carole's personal experience with this project has been highlighted (see Appendix E).

Applied value: The timing of initial data collection, right at the completion of the pilot, probably limited the educators' opportunities to implement changes to their curriculum and reflect on their changes in practice. By four years later, the educators had had time to further transform their practices for a blended learning environment. Pam suggested that through her interactions in the CoPI she learned of a new curriculum and could apply these changes to her classroom: **"**We are currently piloting a new online curriculum for our World Culture classes which uses the Big History Project curriculum. I was actually introduced to this curriculum from one of my cohorts in this project." Pearl, described her district's willingness to implement the new curriculum:

> My district was very supportive in my using the content produced by the community. I used what the community created as a framework and built upon that to personalize it for the needs of my students. We were a 1:1 [one computer per student] digital environment which made the teaching with the modules successful.

Realized value: Beyond the application of a new curriculum and concepts into the classrooms, the educators noted they were more reflective, empowered, and confident. Carole provided a vivid anecdote of how she became reflective and empowered by her participation in the CoPI:

This initiative changed me in ways that I never anticipated. I became empowered in my own future as an educator, was able to collaborate with others and reached out for possibilities. My teaching became more reflective, I saw multiple pathways potential, and I found myself wondering why people have the need to constantly reinvent the wheel of curriculum content over and over when they could focus the ideas of pedagogy differently to students.

A few participants mentioned the connections and relationships cultivated by the CoP extended past the walls of the workshops and the duration of the CoPI. Four years later, the educators were still discussing how these relationships played into their teaching practice. Danielle recounted the continued benefits she felt from her engagements with the other educators in terms of confidence and also the skills that lead the change:

> I gained a ton of confidence. I learned how to speak eLearning language so I can fit to any eLearning conversations. When our school went 1:1 and picked Edmodo [social learning network], I was one of the teachers who didn't need training on how to facilitate learning in a technology rich environment. My connection with the [CoPI] taught me how to do this. I knew how to create a transformational technology integration environment. My participation in this group is still on going and I continue to gain skills from them.

Sustainable resources: Until this point, the findings suggested many positive examples of the value created through participation in the CoPI. However, the end of the funding was acknowledged by many of the participants as a barrier in sustaining the CoPI. Charlie referred to her inability to access the online space, creating a barrier to implementing changes into her classroom:

> I don't think I used anything from the CoPI mainly because I could not get into the Moodle site and after inquiring for help many times, I just moved on. I mainly used things that I heard from others in my group.

Danielle elaborated further the challenges which followed the cuts in funding and how emotionally involved the participants were with the potential of the project:

> We learned … that our work was "locked" up in the state Moodle and when the funding was gone the administrator quit the project. We could not get back to what we had started; something we had been promised we could continue. I know what we had created looked like a big mess, but the judgement came too quick. I think the people who were monitoring the progress didn't realized the statewide curriculum we built was not in the Moodle, but in our hearts and we had grown faster than the technology could keep up.

Although there were indications of perseverance even with of the lack of resources, this certainly posed a challenge.

Discussion

With the rapid increase in the use of technology such as computers, iPads, and so on in the classroom, teachers need professional development opportunities to augment their capabilities to implement blended learning into their lessons in a meaningful way. The current study aimed to build on previous research which has examined online approaches for educator professional development (Prestridge, 2017), by utilizing an innovative approach to facilitate both online and face-to-face interactions to develop a social learning community. Moreover, the CoPI specifically addressed teachers' preferences towards participating in PD to support technology integration, with a personalized and situated component (Liao, Ottenbreit-Leftwich, Karlin, Glazewski, & Brush, 2017). As such, this study focused

on the value gained through teachers' participation in the CoPI and their experiences with their involvement in this project.

The development of the CoPI created a space for a social network and long-term collaboration between educators to take place. This initiated not only the exchange of knowledge but also the co-creation of knowledge through the collaborative negotiation of meanings (Wenger, 1998) for blended learning classrooms. This facilitated the efforts of the teachers to transfer this information to their respective schools. The educators described their feelings of isolation and desire to influence others was at the forefront of their aspirations for participating in the CoPI. This is unsurprising considering professional development opportunities often take a one-shot approach (Ackerson, Cullen, & Hanson, 2009), creating a barrier for collaboration and long-term learning. According to Jarvis (2009), becoming (for instance a proficient blended learning teacher) is about lifelong learning, which undermines the concept of a one-day, decontextualized learning opportunity. Through long-term, collaborative interactions in the CoPI, educators were prone to express feelings of encouragement and motivation towards their practice. Although these feelings are important, they are seemingly overlooked in more prevalent, technology specific frameworks. For example, the technological, pedagogical, and content knowledge (TPACK) framework (Koehler & Mishra, 2009) is a valuable guide for teachers to integrate technology into their classroom. Within the CoPI intervention there were several forms of knowledge gained which would likely be represented in the TPACK framework. However, the authors did not use the TPACK framework in this study as the CoPI transcended this framework in the sense that educators' feelings were elicited, providing new insight into the impacts of collaborative learning. This is important as Moon (2004) argued "emotion is probably involved in all learning" (p.45). In providing educators with access to like-minded peers, they were able to engage in learning which they deemed fun, motivational, and encouraging. Perhaps more importantly, the teachers built their sense of confidence in technology integration, which has been noted as a potential barrier in previous research (Wang, Hsu, Reeves, & Coster, 2014). Although the TPACK framework may have played an important role in structuring initial attempts at integrating technology into the classroom, we have moved to more nuanced methods of effectively supporting teachers' as the presence of technology continues to blossom in schools.

In addition to these emotional responses, the educators discussed their experiences of deep learning through their participation in the CoPI. This contrasts with typical outcomes from singular, workshop style PD in which information is often absorbed at best only superficially without deep meaningful learning (Garet, Porter, Desimone, Birman, & Yun, 2001). Such PD causes contextual barriers and poses a challenge to the implementation of new concepts by the educators (Soebari & Aldridge, 2015). The educators in the CoPI had the structural means to engage in deep learning which resulted in gained potential, applied, and realized value. According to Moon (2004) "the learner who takes a deep approach seeks the underpinning principles and endeavours to relate the material to previous knowledge and understanding" (p.59); a process reflected in the comments of several educators in the current study.

Notwithstanding, the sustainment of resources such as access to the online forum created a barrier for the continued collaboration of the CoPI members. King and Kitchner (1994) explained, "learning is a 'messy' process" (as cited in Moon, 2004, p.55), and as articulated by the educators, the online space was closed by the administration because of the "messy" and misunderstood appearance. The data collection points for the present study were separated by four years, allowing for the educators to expand on the value created from their participation in the CoPI. This supports the proposition that some values such as applied and realized can take considerable time to eventuate (Wenger,

Trayner, & De Laat, 2011). Some potential value never saw the light of day due to the administrative barriers. Previously, literature has confirmed that timing plays a key role in the cycles of value created (Bertram, Paquette, Duarte, & Culver, 2014; Bertram, Culver & Gilbert, 2017). For example, a teacher needs to be in a specific role at a specific time in her career where the curriculum she is using is conducive to implementing change to her practice. Additionally, for value to be created in a CoP, there must be mutual engagement between the community and stakeholders to enable learning (Wenger-Trayner, Wenger-Trayner, Cameron, Eryigit-Madzwamuse, & Hart, 2017) and to continue creating value in the PD community.

Trustworthiness

To support the trustworthiness of this study, a relativist approach for qualitative research was utilized (Burke, 2016). This approach includes criteria for establishing trustworthiness, which were determined by the study at hand (Gergen, 2014). More specifically, the criteria were developed in relation to time and space characteristics of the study (Sparkes & Smith, 2009). The following section presents an adapted version of a list of criteria developed by Smith and Caddick (2012) and Seale (1999). Specific criteria were chosen from the compiled list in relation to their appropriateness for this particular study. To establish a *substantive contribution*, researchers must answer questions such as "Does this piece contribute to our understanding of social life?" (Burke, 2016, p.335). As such, the researchers discussed the educators' perceived value gained from this professional development program, using a framework which to our knowledge, has not been previously used in this specific context. This provides a contribution to the literature in teacher professional development and in the field of social learning. In terms of *impact*, this study demonstrates the impact a professional development program had on the educators' identities and perceived capabilities to implement blended learning strategies into their classrooms while creating a social learning community. C*atalytic, tactical, and educative authenticity* refers to "the ability of a given inquiry to prompt first, action on the part of the research participants, and second, the involvement of the researcher/evaluator in training participants in specific forms of social and political training" (Burke, 2016, p.335). In this regard, the educators' participation in workshops developed by Etienne Wenger-Trayner, Beverly Wenger-Trayner and one of the authors stimulated and empowered them to act and change their practices, as well as exposing them to the viewpoints of other educators. The teachers also experienced first-hand the benefits of social learning. Moreover, the voices of the educators presented in the quotations might strike a chord and develop a *resonance* with other educators reading the report, leading them to be more open to the potential for social learning spaces and to the use of new technologies. Finally, two authors contributed to the analysis of the data, adding *transparency* to the steps taken to produce findings. Critical colleagues were also called on for their feedback to encourage the researchers to reflect on findings and interpretations of the data.

Limitations and Recommendations

Although the rigour of this research was enhanced by the longitudinal aspect of the data collection, some limitations were present. In this study, data were collected through the Value Creation templates, an online interview with a little less than one third of the participants, and archival material. However, there were limits to the researchers' capabilities to deeply probe the participants' responses. As well, the evidence was based entirely on the participants' perceptions. Had the researchers been able to visit the school classrooms to observe the educators' post-workshop behaviours and verify students' academic achievements, we could have presented a more thorough evaluation of the CoPI; realized value may have been presented. Regardless, these findings provide relevant and timely insight into innovative teacher professional development for blended learning classrooms. For a recent example of literature supporting the use of networking and educator collaboration for student success, see

(Vander Ark & Dobyns, 2018). On a final note, the researcher was conducted with a singular group of teachers in Iowa. It is possible that a similar intervention for teachers working with students at different grade levels or perhaps in a different district/state/country, or with different/other resources, may have yielded different results. As such the researchers encourage others to apply a similar intervention strategy in other contexts.

Stakeholders wishing to improve the effectiveness of teacher PD in terms of changing teaching practices should consider using approaches such as the Iowa Communities Pilot in which online platforms can feasibly be used to provide on-going to support to teachers. An important consideration for PD is the time it takes to change practices (Wenger, Trayner, & De Laat, 2011), a fact that underlines the importance of maintaining support for the online CoP over an extended period of time after the initial PD. Also, encouraging the different individuals involved in the CoP to take turns leading the online community encourages buy-in and sustainability (Wenger-Trayner & Wenger-Trayner, 2012).

Conclusion

This study aimed to provide insight into high school educators' experiences of participating in a CoP to gain knowledge and competencies for integrating a blended learning curriculum into their classrooms. The findings support previous research (e.g., Kopcha, 2012), as there is evidence of the value gained through a supportive CoP where teachers had the chance to innovate and share teaching practices, and to become users and promoters of blended learning in the classroom and in their school districts. In terms of a framework for assessing professional development, this study used Wenger, Trayner, & De Laats` (2011) VCF to illustrate value created through the CoPI participation over four years. In addition to enabling collaboration and deep learning, this framework provided the means to capture educators' feelings and aspirations (both personal and school wide), transcending the scope of more traditional frameworks for technology integration. Finally, this PD created an innovative space for teachers to access information from their peers, based on their current needs, moving away from the traditional one-shot approach to PD which has often provided minimal long-term implications for teachers' practices. As such, the authors recommend future PD developers/administrators make use of a social learning approach to address the unique needs of teachers who are trying to implement changes to their practice.

Although this study furthers our understanding of the value created through the implementation of a CoP in the educational field, the limitations indicated may have stunted our capability of exploring the effects of participating in the CoP in terms of actual classroom application. Future research with a more consistent and sustainable source of funding should be considered for replication, as well as the implementation of assessments to explore the impact of the educators' participation in a CoPI on their actual practices. As discussed earlier, time is a very important factor in the type of value gained through a CoP. A focus on sustainable CoP forums and the longevity of social learning spaces with a greater number of educator participants over the entire data collection period could provide a more complete understanding of changes in practice following the implementation of a professional development program. Individuals who plan on conducting research in the area of professional development may consider reading articles written by Wenger-Trayner, B., Wenger-Trayner, E., Cameron, Eryigit-Madzwamuse, and Hart (2017) and using the latest version of the VCF. Curricula and schools are constantly in flux, but with the development and sustainment of supportive social learning spaces, educators can be empowered to guide each other to teach their students effectively.

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Appendix A

Agenda

Day 1

Time	Activity
09:30	Registration
	Plenary session
10:00	The context of the project
	Introduction to communities of practice
	Introduction to leadership groups
11:30	Break
12:00	Stories from the field: • Fishbowl conversation with invited guests
13:00	**Lunch**
	Community session
2:00	Introduction to the new curriculum • Presentation and Q&A with community leaders
3:00	Break
	Plenary session
3:30	Café conversation: • What would effective instruction look like with the new curriculum?
4:45	Learning agenda: • Brainstorm issues that arose in the café • Vote on priorities
5:30	Leadership group reflections
6:00	**End of day one**

Day 2

Time	Activity
	Community session
8:00	Highlights from leadership groups
8:15	Small groups form around priority issues • Discuss selected issue and possible paths forward • Prepare a "booth" for gallery walk
10:00	Break
	Plenary session
10:30	Gallery walk: visit each other's booths
11:30	Leadership in communities of practice: design elements
12:00	**Lunch**
	Community session
12:45	Leadership groups work on community design • Reflect on workshop • Brainstorm suggestions for continuing the community
1:30	Reflections, suggestions, and next steps for community • Report to community • Create timeline
2:15	Break
	Plenary session
2:30	Closing • Brief feedback from communities • Next steps
3:30	**Close**

Appendix B

Personal value narrative: empty template (for any professional)

Name:	How participation is changing **me as a professional** (e.g., skills, attitude, identity, selfconfidence, feelings, etc.)	How participation is affecting **my social connections** (e.g., number, quality, frequency, emotions, etc.)	How participation is helping **my professional practice** (e.g., ideas, insights, material, procedures, etc.)	How participation is changing **my ability to influence** my world as a professional (voice, contribution, status, recognition, etc.)
Reasons for participation (e.g., challenges, aspirations, professional development goals, meeting people, etc.) +/-				
Activities, outputs, events, networking (e.g., lesson material, discussion, visits, etc.) +/-				
Value to me (e.g., being a better professional, handling difficult situations, improving organizational performance, etc.) +/-				

Note: +/- Indicates that you can provide positive / negative experiences

Appendix C

Value-creation story: empty template for any professional

Note the story does not need to start at 1, or go all the way to 5.

Name	
Typical cycles	**Your story:**
1. **Activity**: Describe a meaningful activity you participated in and your experience of it (e.g., a conversation, a working session, a project, etc.)	
2. **Output**: Describe a specific resource this activity produced for you (e.g., an idea or a document) and why you thought it might be useful.	
3. **Application**: Tell how you used this resource in your practice and what it enabled that would not have happened otherwise.	
4. **Outcome**: a. **Personal**: Explain how it affected your success (e.g., being a better professional, job satisfaction,) b. **Organizational**: Has your participation contributed to the success of your organization (e.g., metrics they use)	
5. **New definition of success**: Sometimes, such a story changes your understanding of what success is. If it happened this time, then include this here.	

Appendix D

Online interview: Semi-structured questions administered by email

1. At the beginning of this process what were your objectives for the participation in this community?
2. What potentially useful things did you want the community to produce?
3. What indicators suggest that the community was producing what you hoped it would?
4. Do you believe that your participation in the community led to changes in your teaching practice?
    a. If no, Why?
    b. If yes, please elaborate?
5. Under what conditions was it possible for you to apply what the community produced?
    a. Were there barriers that made it difficult to apply the learning?
6. By definition, transformative effects are difficult to plan. But where do you expect there was the greatest potential for surprising outcomes that could transform the teachers' practice, members' identities, or the state's education strategy?
7. What kind of support did you need ideally? What enabling factors?
   Under what conditions would this support be more likely to become available?

Appendix E

Carole's Experience

About Carole: The skills and training provided by the CoPI initiative led Carole on an educational journey navigating blended and personalized learning efforts on a local, regional, and state level. Online learning materials were one piece of the puzzle, leading students to online coursework in physical science, chemistry and AP coursework. The additional training in project-based learning and communities of practice helped Carole re-examine the need for student voice and choice, especially using project-based learning and the 7e learning model. She was recognized in 2013 as an Excellence in Science Teaching Finalist for Iowa. Currently, Carole works as a gifted facilitator and an advocate for personalization of the learning process. She has also been an active collaborator with the Center for Teaching Quality, developing micro-credentials with others in the area of Virtual Community Organizing. She also is as a part of the NEA Teacher Leadership Initiative (TLI).

What impact have you seen professional collaboration make? Professional collaboration at the beginning of my career was sitting together in groups at faculty in-services, and then walking back to a room where I was the only teacher of my content room. CoPI happened as social media was gaining steam, and allowed me to connect and discover solutions for diverse topics that related to school culture and student learning needs via the power of Twitter and other social media platforms. Ideas from across the globe were as close as a digital device, in educational chats and during open moments in the day. This capacity building led me to see teaching in an entirely new way, and inspired an entire generation of teacher leaders in Iowa. Leadership in policy structures like the Department of Education resulted. So did personalized learning for teachers via a state online platform. Most importantly, our collaboration and camaraderie all built a synergy that resulted in new innovations for student learning.

How did you share with others your belief in Communities of Practice? I see communities of practice as a best-practice for future learning. Interested stakeholders build robust networks, share ideas, provide a safe space for learning, and evolve solutions through a crowd-sourcing. Even better, they tap their natural skills as organizers, social media reporters, or content mavens in a way that helps us distribute the leadership. After participating in such a powerful environment, I worked with the Center for Teaching Quality and their VOICE curriculum, reflected on different models of such community development, and participated and facilitated Twitter chats. On a local and state level, I worked to model such communities through participation in a variety of spaces. The work yet to be done is immense, because we still are redefining leadership in our rapidly changing world, but I continue to blog and share ideas with others, participating in the creation of a world where learning how to think is as important as what to think.