

## Twitter: A Tool for Communities of Practice

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This study explores an online chat to determine how the dimensions of communities of practices (CoP) are reflected in participants' interactions on Twitter. The educational discussions, or Twitter chats, take place in an online microblogging platform. The CoP framework offers an approach to understanding the dimensions of mutual engagement, joint enterprise, and shared repertoire, which can be found in constructivist learning environments among educators (Wenger, 1998). A content analysis was conducted on a sample of archived educational Twitter chats to determine how often the attributes associated with CoP dimension(s) were present in the sampled chats. The findings from this study indicate Twitter chats exhibit elements of CoPs and benefit teacher professional development.

Professional development for educators consistently emerges as an important topic (Pollard, 2015; Powers, 2013). Professional development that impacts teacher's knowledge, ideas, and practices can impact learning outcomes for students. The best professional development takes place when the knowledge distribution occurs collaboratively with other teachers (Burns, 2013; Pollard, 2015). When teachers work and think collectively as a group, the greater community of learners reaps the benefits. An increasing number of educators realize the benefits of social constructivist frameworks, like Communities of Practice (CoPs), which offer richer and deeper learning experiences (Burns, 2013) due to interactions with colleagues. CoPs are formal learning groups (Burns, 2013) in which "people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger-Trayner, 2015, p. 1). The members of a CoP subscribe work together through legitimate participation,

beginning at the periphery and moving toward the center while gaining more expertise (Burns, 2015; Wenger-Trayner, 2015).

Concurrent with the emphasis placed on professional development to improve teacher effectiveness and student achievement, advances in technology have revolutionized education (Pollard, 2015). Web 2.0 technologies disrupted the conventional approaches used for connectivity using the web, (Pollard, 2015). Approximately 69% of all Americans use social media (Pew Research Center, 2016). During the past decade, the number of connected educators using social media platforms increased (Poore, 2015). Social media platforms, like Twitter, remove barriers for learning found in traditional professional development models (Burns 2013; Hirsh, 2009; Pollard, 2015). Contemporary social media as a professional development platform may be undervalued compared to traditional professional development for teachers. Online modes of

learning provide ways to deliver just-in-time, personalized, communal learning opportunities (Pollard, 2015). The purpose of this study was to explore Twitter as a form of professional development, specifically a Community of Practice.

### **Professional Development**

Traditional professional development is problematic for the ever-changing demands of today's educators. Traditional professional development formats may limit teachers' abilities to maintain and sustain newly learned skills and content knowledge (Dufour, 2015; Pollard, 2015; Shemberger & Wright, 2014; Stewart, 2014; Ziegler, Paulus, & Woodside, 2013). Passive learning does not change teachers' practices (Stewart, 2014). Effective professional development is "active, consistent, based in the teaching environment, and supported by peers in a learning community" (Stewart, 2014, p. 28). Researchers suggested that workshops and conferences with "explicitly stated, often codified, pedagogic knowledge promoted by such events and systems of formal certification, lack depth of tacit knowledge gained in practice" (Amin & Roberts, 2006, p. 14). Therefore, utilizing a CoP framework for teacher professional development has potential to remove some of the existing limitations, such as geographical location and time (Amin & Roberts, 2006). Communities of practice (CoP) offer a framework for learning that has the potential to maximize teachers' growth and professional development (Wenger, 1991) and provide teachers with opportunities to learn from other professionals in the field. CoP practitioners network together to share or provide knowledge about a subject or issue related to their field of expertise (Lewis & Rush, 2013). Three dimensions must be present to form a CoP: mutual engagement, joint enterprise, and shared repertoire. These principles are referred to as domain,

community, and practice (Wenger-Trayner, 2014).

Networking today often occurs in an online environment. Web 2.0 tools provide school leaders and teachers the ability to remove time, cost, space, and geographical constraints that remain barriers in most conventional professional development methods (Amin & Roberts, 2006). This premise lies at the heart of this study. Can social platforms like Twitter be used for effective teacher professional development? Educational chats moderated by educators on the social media platform, Twitter, may have potential to provide teachers with an optimal learning experience. Online twitter chats begin with an inquiry to prompt discussion between participants (Powers, 2013). Participants from various geographical locations join the chats voluntarily to answer the chat questions and to share resources with other chat participants (Wesley, 2013). Researchers support the importance of learning communities in building, maintaining, and sustaining practice (Amin & Roberts, 2006). Communities of Practice and Twitter chats are described in more detail in the next sections.

### **Theoretical Framework**

The ideologies of socio-constructivism frame this research. Instructional strategies tied to principles founded in socio-constructivism resulted in higher levels of learning (Muragaiah, Thang, Azman, & Nambiar, 2016). A socio-constructive experience occurs when learning is collaborative, connected, and personalized. Higher levels of learning occur in schools where educators support and model behaviors that exemplify the principles found in social constructivism. Collaborative environments and the formation of communities positively influence teacher and student learning (Dufour, 2015; Lave & Wenger, 1991;

Shemberger & Wright, 2014; Muragaiah et al., 2016).

The notion of CoP arises from the socio-constructivist theory of learning by Vygotsky (Lave & Wenger, 1991). Communities of practice form when individuals with common interests or issues collaboratively share ideas, resources, skill sets, and knowledge (Lave & Wenger, 1991; Muragaiah et al., 2016). Collaborative communities offer practical, real-world experiences, which often lead to deeper levels of learning (Muragaiah et al., 2016). Learning that occurs on a collaborative virtual platform aligns with successful socio-constructivist practices, which are founded in Vygotsky's socio-constructivist (Lewis & Rush, 2013). Web 2.0 tools assist and facilitate learning in a CoP framework (Muragaiah et al., 2016). Social constructivists link high levels of learning to socially constructed practices (Wenger-Trayner, 2014).

### **Communities of Practice**

Communities of practice, a learning network of professionals, provide support in many ways. Communities of practice make up a formal learning group (Burns, 2013). "Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger-Trayner, 2015, p. 1). CoPs focuses on three social dimensions of situated learning: mutual engagement, joint enterprise, and shared repertoire (Wenger-Trayner, 2015). First, the interactions of members through developing norms and relationships produce a mutual engagement. Second, group members understand the joint enterprise established between the members. Each member contributes innovatively in a participatory format. Finally, members create and utilize a shared repertoire of resources and artifacts over time to help

improve the practice (Wenger-Trayner, 2015).

Pioneers of the concept of "community learning" (Amin & Roberts, 2006, p. 20) understood that knowledge generation occurs through social activities. Theorists believe learning also happens in situated environments with interactions between members of a co-located community. However, rapidly growing technologies bring new ways to communicate, causing pioneers and new researchers to explore how social interactions transform with Internet tools and other technologies, as well as their impact on "spatially dispersed" (Amin & Roberts, 2006, p. 21) communities. Contrary to initial beliefs, Wenger-Trayner (2015) showed a significant relationship between learning and distance. "Although communities reach out across much greater distances than ever before, participation within them has become richer and more meaningful despite limited face time" (Amin & Roberts, 2006, p. 21). Technologies complemented communities with well-designed and appropriately managed formats.

Although CoPs traditionally implied face-to-face meetings, the adoption of virtual communities for professional learning has increased among educators to improve efficiency, quality, and cost of professional development (Amin & Roberts, 2006). Networked communities are one way for professionals to bridge the gap between research and practice. Online communal formats allow members to access and disseminate information without geographical or time constraints through social ties of the group (Amin & Roberts, 2006). People who gather and disseminate information form social ties in learning groups (Seraj & Toker, 2012). Researchers noted a strong correlation between a professional community's social ties and its ability to acquire new knowledge and skills

(Amin & Roberts, 2006). Virtual communities do not allow members to readily observe other member's body language, facial expressions, intonation, and personal interactions, which weaken the social ties associated with online communities. However, once individuals reach a professional status in a field of work, the strength of the social ties did not directly affect learning (Amin & Roberts, 2006). In this study, the content of a Twitter chat was analyzed to determine how the three dimensions of a CoP were reflected in the online chats. In order to examine mutual engagement, joint enterprise, and shared repertoire, a CoP matrix guided the analysis.

### **Twitter**

Twitter is the universal microblogging platform (Wesley, 2013) that, along with other social platforms, helped transform the way users communicate, collaborate, and deliver online information (Jones, 2014). The social site debuted in 2006 and quickly gained popularity. The free messaging platform allows users to send and receive messages called "tweets." Each tweet may contain up to 140 characters in length. Twitter's short, defined character length classifies the platform as a microblogging site (Shemberger & Wight, 2014; Wesley, 2013), allowing users to send and received bite-sized communication via text (Wesley, 2013).

The hashtag (#), Twitter's iconic symbol, along with the little blue bird made it an easily recognized social media platform (Jones, 2014; Vasek, 2015). A hashtag is Twitter's way of synchronizing similar information. For example, #CelebrateMonday, a well-known hashtag in the educational Twitter world, stores all tweets with the same hashtag together. When a tweet includes #CelebrateMonday, Twitter will automatically connect other tweets with the same hashtag. By searching

#CelebrateMonday, all tweets will be compiled in a single feed by the descending date. By clicking on "Top" tweets, the hashtag will expose the tweets with the highest engagement (Ross et al., 2011; Vasek, 2015; Wesley, 2013). All content tweeted during a chat must include a hashtag preceding the name of the chat (Vasek, 2015; Wesley, 2013).

Users (tweeters) with similar interests agree on a time, a date, and a hashtag to connect and chat on a particular topic. A moderator, or facilitator, leads the chat by tweeting questions or prompts to the group. Participants collaborate by tweeting answers to predetermined questions by the chat group moderator (Wesley, 2013). The tweets flow in chronological order, which makes a chat simple to follow (Wesley, 2013).

### **Methods**

The purpose of this content analysis is to explore a Twitter chat to determine how the dimensions found in a CoP are reflected in the educational online chat. The members of this potential CoP would have no face-to-face meeting. In content analysis, researchers focus on how to construct meaning from latent (hidden) and conceptualized (theorized) data (Drisko & Maschi, 2016). The question posed in this study sought to find how the dimensions of CoP are reflected in virtual educational chats on Twitter. The findings prompted by this research question may provide evidence to support virtual chats as a way to provide CoP experiences.

R1: How are the dimensions of a CoP reflected in an online Twitter chat?

Twitter's #edchat is a forum for educational topics through which educators participate in an inquiry format (Powers, 2013). The creators advertise topics on the social media platform preceding the chat to attract a larger participation group. Advertising helps pool educators with like

interests together to study the topic (Davis, 2015). As field practitioners, the participants provide the researcher with organic responses and shared knowledge needed to answer the research question by analyzing the #edchat discussions (Drisko & Maschi, 2016; Powers, 2013). Each transcript may represent different participants since the pool of participants depends on the educators involved in the chat for that particular week based on availability of the participants and topic choices. Participant knowledge of the discussion may also vary with each chat (Powers, 2013).

This study focused on an online Twitter chat for educators called #edchat. The population of participants varied from week to week but reflected school educators, ranging from early childhood through higher education, represented the general population, along with other professionals in the educational field (<http://edchat.pbworks.com/w/page/219908/FrontPage>). The sample size included eight weeks of collected data gathered from archived Twitter chats, which surpassed the data saturation point (Elo et al., 2014). Each weekly chat averaged about 270 participants and over 470 tweet posts. Specific sample sizes for content analysis differ in volume since the optimal size depends on the research questions and purposes of the study (Drisko & Maschi, 2016). Chats retrieved for this study occurred on Tuesday evenings at 7:00 PM EST between November 2016 and January 2017.

In a recent study, researchers found dimensions of CoP existed in online teacher professional development (Murugaiah et al., 2016). The researchers created a matrix (See Figure 1) that represented the three dimensions of a CoP. The matrix included a breakdown of each dimension into categories and indicators. Since the indicators, categories, and dimensions are

predetermined, the content analysis will be deductive in nature (Drisko & Maschi, 2016). *Figure 1*. Matrix of dimensions of communities of practice. (Murugaiah, 2016, p. 96). Copyright 2016 by IGI Global. Reprinted with permission.

Dimensions	Categories	Indicators	
Mutual engagement	Sustaining mutual relationships – harmonious or conflicting	Agreements and disagreements	
		Answer requests	
	Sharing information, knowledge or experience on practice	Advise	
		Share news about profession	
		Provide examples to explain	
		Draw implications from messages	
		Correct a message	
		Collective problem-solving	
	Joint enterprise	Presenting issues	Revise collaboratively
		Mutual accountability	Find a solution collectively
Shared repertoire	Presenting issues	Define key issues/problems to be addressed	
		Propose ways for novice to learn domain	
	Mutual accountability	Respond to criticism of practice/domain	
		Commending messages that contribute to domain	
		Know what others know	
	Knowledge of members' traits	Know what they can do	
		Know how they can contribute to group	
Shared sense of community	Express feeling of belonging		
Shared repertoire	Shared criteria	Standards of ethical conduct, regulations	
	Shared practice/routines	Common procedures	
	Shared artefacts	Common jargon, tools, language	

The primary data collection strategy involved accessing archived discussions of #edchat, an online chat on Twitter. Twitter's #edchat uses an inquiry model to create a collaborative online experience for educators. Each week, participants with an educational background come together to learn from one another during the hour-long chat about topics related to education (Powers, 2013). Archived #edchat transcripts found on Participate Learning's website, made chat retrieval from Twitter easily accessible by date and chat titles. All archived chats are publicly accessible (Front Page, 2010; Powers, 2013) and included participant interactions in sequential order. Since this study related to teacher professional development, the retrieved chats specifically relate to teachers and their practices.

The chat moderators lead the online discussion by creating five to six questions focused on an educational topic to engage participants in the chat by using the same hashtag. The moderator begins the chat with a welcome tweet asking all participants to post a brief introduction. Most participants include their professional role in education

on the introductory post. The moderator follows the introduction post with the first question and subsequent posts every five to six minutes. Participants respond to questions by directly answering in a post, questioning in a post, and posting resources related to the questions. Others may retweet or like a post instead.

The systematic process involved analyzing eight weeks of #edchat discussions and analyzing the raw data using the matrix. The content analysis was deductive in nature since the matrix guiding this study included predetermined categories and variables (Altheide, 1987). However, interpretations of data determined how each Twitter post reflected the dimensions found in a CoP according to the matrix. A co-rater served to validate the analysis by establishing data accuracy and trustworthiness (Creswell, 2012). A simultaneous comparison of the data set showed similarities in researcher and co-rater extractions (Powers, 2013).

A non-categorical theme was needed for coding purposes since some Twitter posts did not pertain to the CoP dimensions. The researcher read the first transcript thoroughly while taking notes from observations made from the raw data (Merriam, 2009). Open coding began with the construction of categories (Merriam, 2009) which were also verified by a co-rater.

## Findings

The eight #edchat sessions included 3,700 tweet posts. The content was analyzed to indicate how the CoP dimensions were reflected in each tweet. Analysis involved coding each tweet using the dimensions, categories, and indicators on the matrix. From the total posts collected, 67% ( $n = 2,481$ ) of the tweets reflected at least one or more of the dimensions used to identify CoPs. These tweets were relevant since their content helped to answer this study's research question. Table 1 contains the

summative data representing the eight chat sessions.

Table 1

*Frequencies of Tweets Representing CoP dimensions.*

<b>Dimension of CoP</b> Categories related to Dimension	Frequency (N)	Percent
Total Tweets reflecting a CoP dimension	2481	100
<b>Mutual Engagement</b>	1567	63
Sustaining mutual relationships	476	30
Sharing information, knowledge or experience	866	55
Collective problem- solving	225	15
<b>Joint Enterprise</b>	699	28
Presenting issues	143	21
Mutual accountability	247	35
Knowledge of members' traits	194	27
Shared sense of community	115	17
<b>Shared Repertoire</b>	215	9
Shared criteria	36	16
Shared practice/routines	100	47
Shared artifacts	79	37

The attributes identifying the mutual engagement dimensions were reflected in more than 63% ( $n = 1,567$ ) of all relevant tweet posts. The mutual engagement dimension had the strongest presence of all three dimensions. The shared repertoire dimension presented attributes in only 9% ( $n = 215$ ) of all the relevant tweet posts

collected. “Sharing information, knowledge or experiences on practice” category showed the highest number of tweet posts ( $n = 866$ ).

### **Mutual Engagement**

Sixty three percent ( $n = 1,567$ ) of all tweets analyzed in this study reflected the mutual engagement dimension. According to the literature, the indicators describing the mutual engagement dimension represent important behaviors of group members (Gau, 2013). Mutual engagement, according to Gau (2013), “means not merely participating in activities, but also triggering continuing opportunities for further interactions” (p. 449). The dimension is crucial since it is the motivational force for CoP sustainability (Murugaiah et al., 2016; Gau, 2013). The initial motivation to participate is important. However, the motivation to continue to remain an active member is even more crucial (Gau, 2013). Mutual engagement involves the CoP members’ active participation in learning discussions. Often, CoP members do not perceive their communal activities as conceptual learning opportunities but, instead, interact with others in negotiated activities and conversations with common purposes. Agreeing or disagreeing with other group members, giving solicited or unsolicited advice to other group members, sharing news about the profession, and giving corrective feedback are all examples of indicators found in the mutual engagement dimension (Murugaiah et al., 2016).

“Sustaining mutual relationships” was evident when participants had comparable or contrasting viewpoints with other members. Both complementary and conflicting views about tweets were found in the data. Building knowledge and a deeper understanding of the practice requires members to question and practice applicably together (Murugaiah, et al, 2016). Participants demonstrated agreements or

disagreements in chat conversations. Members of CoPs discussed viewpoints, with both similar and opposing viewpoints:

*Nope! It should be interesting to watch all of us struggle a bit to find the way. #edchat*

*Are we seriously indifferent because of the posts we make- shouldn't we model for kids? If not, who will? #edchat*

Throughout the analysis of data relating to mutual engagement, the category “sharing information, knowledge, and experiences” appeared more often than any other category on the CoP matrix. Participants shared ideas between each other in a mutual way:

*Lesson plans created through Google Docs! Collaborative. GREAT IDEA!!*

*The mind is like a parachute; it doesn't work unless it's open.*

*Constructive criticism is good between teachers! #Edfound*

*If students are sharing troubling info, it's a cry for help.*

The category, “sustaining mutual relationships,” ranked 2nd highest in frequency. Participants shared issues they faced. Solving problems and finding solutions collectively helps the members of a CoP build a mutually engaging relationship, which motivates members to return.

*If a student borrows a device and violates the Acceptable Use Policy, who's to blame?*

*A student who often doesn't cause trouble shouldn't be disciplined less than a student who is trouble often. #edchat*

### **Joint Enterprise**

Joint enterprise had the second largest presence, 28% ( $n = 699$ ) during all eight-chat sessions. The joint enterprise dimension defines how CoPs sustain and maintain their existence (Murugaiah et al., 2016). Members make a conscious effort to remain engaged in the CoP and work together for the greater

good of the group. Together, members negotiate ways to work toward the group's shared goals and enterprise (Murugaiah et al., 2016). Indicators found in the joint enterprise dimension include responses to criticism, expressions showing that others' contributions to the group are relevant expressions of belonging (Murugaiah et al., 2016).

Participants showed "knowledge of member traits" with supportive comments about the domain or practice. For joint enterprise to flourish, there must be motivation to form close relationships.

*Do you have any specific ideas on how to do this? #edchat*

*I like how you talk about the reflection of the students and not about punishment. I believe this is a great idea #edchat*

*Let's welcome our newest member #edchat moderator #edchat*

"Mutual accountability" between members validates the domain. Category indicators representing the joint enterprise dimension include messages about the domain, learning new ideas, and responding to criticism. It appears that exchanges of mutual feelings and validating the domain through commending messages are reflected in the tweets.

*I don't think others outside of education understand the value of time #edchat*

*If you are going to make decisions that have an impact on the classroom, you need to be in the classroom often. Don't decide from afar. #edchat*

*You got that right! This work is not easy, my friend. Glad we're on the same ship. Carry on. #edchat*

### Shared Repertoire

Shared repertoire had the lowest presence, 9% ( $n = 215$ ), during all eight chat sessions. The shared repertoire dimension is the element that embodies the shared criteria,

and artifacts found in a CoP (Murugaiah et al., 2016). This dimension contained the resource pools created, contributed, or renewed by the groups' members. Emails, written plans, and books are examples of tangible resources. Online discourse, methodologies, language, common jargon, procedures, and ethical policies are examples of intangible resources. Sharing common beliefs and rights owned by a practice, sharing procedural information, or sharing informing about common tools used in the practice serve as examples that are reflective of the joint enterprise dimension (Murugaiah et al., 2016).

"Shared criteria" was represented by content that presents ethical considerations or organizational procedures.

*I have several students follow me on social media so they can connect with me, but I won't follow them back since it's their page. #edchat*

*Great relationships matter...must keep it professional even on SM (Social Media)...I'm concerned with some kids and parents on SM #edchat*

The common language, jargon, and tools teachers use are all attributes of the "shared artifacts." The acronyms often used in schools fit this category of the "shared repertoire" dimension. The example below shows the hashtag #ELAR and #Backtoschool. Tagging on social media has become a shared language experience online.

*Teacher friends, please share with your students as you start the new semester #ELAR #Backtoschool! <https://t.co/TM7VmHUoBW> #edchat*

### Other Themes

Tweets with content unrelated to the topic of discussion were coded non-categorical because the content was miscellaneous in context. About 9% ( $n = 346$ ) of all tweets in this study ( $n = 3,700$ ) did not pertain to the dimensions of CoPs.

Miscellaneous messages, surveys, political propaganda, and spam appeared in the chat feed and were analyzed through open coding. For example, a participant placed a birthday tweet (name removed) on #edchat. Another example appears to be spam, which may be a link to a harmful website or inappropriate content.

The tweets, labeled as non-categorical, underwent subsequent analysis to determine if these 1,219 tweets represented other themes. Approximately 69% ( $n = 840$ ) of the posts represented two new categories: Advertised resources and job postings. Most were advertisements for educational resources, including products, conferences, and invitations to other educational chats.

*Color the Cube Connectors is ready! Watch the video & Download the pages. #edchat #mathchat #math #maths <https://t.co/K71nm1RQ5w> New to Twitter? Follow these inspiring #101Educators on Twitter by TeacherToolKit #edchat #AsisaEd #AfricaEdER3Job Postings.*

## Discussion

Face-to-face CoPs are a growing trend in school settings to focus collaboration. The findings revealed that the dimensions of CoP found in #edchat may potentially provide a medium for purposeful professional development. This study, among others, provided evidence that Twitter is not just a venue to share daily life occurrences. Like Vygotsky's 1978 theory of socio-constructive learning, Twitter offers a learning environment that promotes collaborative practices. The professional development on Twitter chats can be negotiated and new knowledge co-constructed with other participants.

Successful professional development can only be measured by participants' implementation of the newly learned or refined skills or knowledge. Knowledge

gained through professional development must be maintained and sustained over a time period to determine the effectiveness (Guskey, 2002). A recommendation for educators using social networking sites for professional development is to offer chat times with periods of reflection. Perhaps facilitators could invite all the participants back to the platform during a date and time to follow-up and reflect on the practice. Members of a CoP consistently and routinely come together to discuss the practice (Murugaiah, 2016). In face-to-face conversations, reflective discussions happen naturally. Online discussions, like Twitter chats, have a limited timeframe and the conversation focuses around a topic. The opportunity for reflection is limited unless the communication is intentional.

The mutual engagement dimension had the strongest presence throughout the findings. When people get emotionally involved in their learning, thought processes increase, including thinking and imagining (Izard, 2014). Some chats showed high emotion with contradicting opinions and arguments from participants. Although respectful, the participants did voice their own beliefs about the relationships between students and teachers and use of social media. Individual opinions and beliefs were strongly held by participants regarding this particular subject. The topic raised debatable issues about ethics, like principals "friending" students, and posting photos while drinking alcoholic beverages (shared repertoire dimension). Defensive comments arose in some tweet responses, revealing the sensitivity of this topic. *Don't need government telling when & where to drink. I'm over 21 y.o- don't worry 'bout my personal posts! #edchat.* This tweet was in response to another member's post about being careful to not post personal pictures with alcoholic beverages on social media. The point the member was making was to set

a good example through modeling. The sensitivity in the original post added energy to the feed, as a variety of personal viewpoints surfaced.

The mutual engagement dimension defines the strength of the CoP, according to the findings. Sustaining mutual relationships and sharing information, knowledge, and experiences drive the motivation behind membership. The collective problem-solving questions generated by the session moderator are extremely important because the type of question also drives participation. The depth and complexity of the learning is dependent on the responses of the participants, which again is driven by the question. Based on this data, chats should focus on robust topics, such as those that bring emotions to the conversation. Facilitators must introduce well designed topics and questions.

In joint enterprise, collaboration takes place through mutual accountability of the members, recognition of what each can contribute, as well as what they themselves can bring to the group. The joint enterprise dimension encompasses the “sense of community” through commended messages and expressions that make others feel a part of the group (Nickols, 2012; Murugaiah, 2016).

The joint enterprise dimension is reflected in the actions of group members, who are simply always “up to something” (Nickols, 2012, p. 2) related to the practice. One chat contained a question that triggered responses, “*How does the maker movement cross-over all subject areas in an academic schedule?*” The maker movement is a trending topic in education and of high interest to teachers. The participants recognized one another’s knowledge, skills, and contributions. The following tweets are examples the interdependence on other members’ knowledge to help solve issues: “*How does your school integrate the maker space into the math content? #edchat*” and

“@w\*\*\*\*\* can assist you with the collaborative space issue you’re bringing up. #edchat. Mutual accountability appeared in messages about the domain or responses to criticism. For example, one participant said, “*I don’t! I just believe maker-spaces should not be limited to just new spaces. #edchat.*” The participant was responding to criticism from another participant: “*You seem defensive. You must have something against spaces for maker movements.*”

In one #edchat session, 36% of the tweets reflected joint dimension attributes, and 56% reflected the mutual engagement dimension. The closer the percentages between the mutual engagement and joint enterprise dimensions indicated more active and collaborative participation. Both opening questions were open-ended. Joint enterprise is also important, as it is the work and purpose of the group (Nickols, 2012; Murugaiah, 2016; Wenger, 1998). However, the mutual engagement dimension is stronger. Therefore, the researcher implied that when there is strength in mutual engagement and joint enterprise, the chat has potential for greater collaboration. When the gap between the percentages of the mutual engagement dimension and joint enterprise dimension was smaller, the strength between participants increased.

Based on the findings, the opening question should be of high interest to participants. Trending topics or practical topics are relatable, and teachers will likely engage more collaboratively. The joint enterprise is the work of the CoP, therefore, having issues to solve facilitates the work. Finding relevant topics and issues to solve is essential to provide opportunities for members to value, commend, and recognize the strengths and knowledge each member contributes to the domain. Knowing how and what each member contributes is a critical component of a successful joint enterprise.

Members in CoPs not only share common work but also common methods, tools, strategies, jargon, and stories. People outside the CoP would not understand the significance of shared criteria to the practitioners (Nickols, 2012). The attributes depicting the shared repertoire dimension were reflected the least number of times in all eight chat sessions. Three categories portray the shared repertoire dimension: shared criteria, practice/routines, and artifacts. Almost half of the tweets in this category contained content related to shared practices or routines.

Shared repertoire was not as frequent in CoPs as the other two dimensions. However, without that dimension, the CoP does not exist. Finding commonalities in a practice between professionals in a CoP is important to maintain group cohesiveness. This dimension ties the other two together with attributes that only the members of a CoP share. For instance, only other educators can understand the jargon, stories, and humor of educators belonging to a CoP. Shared repertoire brings a sense of unity to the CoP. In online CoPs, opportunities exist for members to share the criteria, routines, and artifacts of their practice.

Finally, attrition poses a real threat to online CoPs. Unlike face-to-face conversations or CoPs, virtual members may come and go without sensing a mutual responsibility to the group. However, since the chats are online and text-based, introverted people are more apt to take a bigger role and share more with other members. Twitter platforms offer a safer environment for most people than traditional face-to-face formats (Powers, 2013). Asynchronous chats may also help reduce attrition. The speed of the chats and the lack of time for reflection in synchronous chats may intimidate participants. Another recommendation to decrease member attrition is to be intentional about increasing

the types of tweet posts that commend, validate others, or make all participants feel a sense of strong belonging. Although most of the tweets in this study represented the mutual engagement dimension, the importance of building a stronger presence in joint enterprise is important. The joint enterprise dimension creates a shared sense of belonging and contributing (Murugaiah, 2016).

## **Conclusion**

Content analysis revealed that the mutual engagement dimension appeared most frequently in each of the eight chats. Joint enterprise and shared repertoire were consistently less prevalent than mutual engagement, but these CoP dimensions existed in each chat. The high occurrence of mutual engagement is consistent with the literature. Researchers found the dimension of mutual engagement as having critical attributes needed as the basis of a CoP in both face-to-face and virtual environments (Johnson, 2001; Murugaiah et al., 2016). The attributes and dimensions of CoP were present in all chat sessions, but the mere presence of joint enterprise and shared repertoire may indicate a need for further exploration.

The findings from the study indicated that professional development demonstrated the active engagement of participants in the phenomenon of Twitter chats. The dimensions of CoP were present in all sessions of #edchat. The reflection looked different in all chats and was highly dependent on the lead-in question. This implies that the facilitator of online professional development has great control on the outcome of that experience. Online teacher professional development has gained popularity around the globe (Murugaiah et al., 2016). Virtual professional development for teachers may benefit all practitioners in education since it removes many of the

barriers found in traditional professional development delivery methods (Murugaiah et al., 2016).

We did not measure the effectiveness of the #edchat sessions in terms of accomplishing a learning outcome, but the components of the CoPs were present. Limitations of an online, digital platform exist, just as limitations to face-to-face platforms exist. For example, participants can not observe unspoken communication through body language or tone of voice. Tweets are limited in character length where other digital platforms allow more written, or even audio, communication. However, the application of online collaboration overcomes the confines of geographical proximity.

Web 2.0 tools help members of society stay connected in ways never before available (Discovery Education, 2009). Social media platforms allow people to create, share, collaborate, and communicate on the web without geographical constraints (Hsu, Ching, & Grabowski, 2013). Users of social Web 2.0 platforms collaborate with other online users on both personal and professional topics. Together, like-minded individuals become an online learning community. Professional learning networks (PLNs) often facilitate continuous growth and online professional development with others in the same professional field (Duncan-Howell, 2009). Many teachers join a PLN (Trust, 2012) within a CoP (Saldana, 2012; Wenger-Traynor, 2014) as a way to continually connect, grow, and learn. Web 2.0 interactions between networked educators lead to meaningful, quality, in-depth learning through virtual collaboration (Pan & Franklin, 2011). The popularity and accessibility of web applications make social sites a convenient way to develop as a professional. Online teacher professional development using Web 2.0 applications is

popular because of convenience and efficiency (Vu, Cao, Vu, & Cepero, 2014).

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