

Young People's Engagement in Content Creation: An Analysis of Outliers

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ABSTRACT

As online communities become more important in young people's lives, it is important to consider who the active users are in these digital environments. Previous research has looked at the way leaders emerge in adult communities, but scholarship on young people's participation patterns has been less robust. This paper looks at the phenomenon of "super-users," or the leaders and vocal participants, in a specific online community populated by eleven and twelve year olds (tweens) and run out of an after-school program at two urban middle-school libraries. We ask why these particular young people participate more than their peers and identify these users' characteristics. We also look at the relationships between these characteristics and the young people's use of the site. Answers to these questions help us understand why some tweens' participate more than others and could help facilitate how to better engage all users.

Keywords

SNS, Participatory Culture, User Engagement, Young People, School Libraries.

INTRODUCTION

In most communities, whether physical or virtual, some individuals emerge as leaders or vocal participants. An important research question materializes from this phenomenon: Why is it that some people step to the forefront? Moreover, how does this process play out with participants in online communities? The emergence of leaders in online communities has been studied in adults (Butler, Sproull, Kiesler, & Kraut, 2007; Koh, Young-Gui, Butler, & Bock, 2007; Preece, 2001; Preece & Shneiderman, 2009), but has rarely been examined in the context of young people's behavior. Furthermore, a dearth

of research exists about youths under the age of 13, which is the age at which most social media sites and online communities have a nominal cut off (Grimes & Fields, 2012).

In this study, we examine the digital participation of young people between the age of eleven and twelve (commonly referred to as tweens) in a weekly after-school program that uses new media and school libraries to engage youths in science, technology, engineering, and math ideas. This program is run in collaboration with school librarians at two inner-city middle schools in the mid-Atlantic. The participating schools are known to be highly impacted by poverty, based on the respective schools *Free and Reduced Meals* (FARMS) rate - 55% in one school and 99% in the other. FARMS is a common indicator of poverty rate in schools in the United States. We consciously did not request specific socio-economic status information from the program participants, honoring privacy and the terms of our agreement with the school system. In this program, the participating tweens create science infused stories (often science fiction) in various forms of media and share them both in person during the weekly sessions and on a closed social network site, Sci-Dentity.org. Tweens can also participate in the social network site, at any time, outside of the program. During the past two years of implementation of the program, we noticed some trends in participation, including some tween participants who emerged as *super-users*, creating far more content in more diverse modes than other participants. Who are these *super-users*? What are their characteristics? Are there lessons to be learned from their participation that might facilitate greater participation on the part of others? This paper explores these questions by closely examining the online participation of these *super-users* in Sci-Dentity. It is important to note that this is a preliminary study as it only focuses on a subset of the users in *Sci-Dentity*. Future work will address the non *super-users* and look at their characteristics and motivations to participate.

In the following, we first develop a conceptual framework that integrates prior research on young people, their engagement with online communities and learning, and the developing traits of young people we call *super-users*. Building from this framework, we present a qualitative study of four students who exhibited extremely high engagement with the website (super-users) among the 22 students in the program. The study explores several research questions:

- What are the characteristics of *super-users* in the Sci-Dentity.org site?
- What are the relationships that exist between these super users' characteristics and their involvement with the site?
- What are the lessons that can be learned from the *super-users*' participation that might facilitate greater participation on the part of other users of the site that are less active?

We examine the relationships that exist between these tweens' characteristics and their involvement with the Sci-Dentity online community. Their experiences and modes of engagement shed light on how young people come to be avid members of online communities, and may also suggest avenues for non *super-users* to be enticed to participate further.

RELATED WORK

Online communities are a mature phenomenon and are an everyday part of many people's lives. Like most communities, online and offline, some participants typically emerge as leaders or avid contributors, whether because they are the most vocal, the most prolific or the most present. While the changing media landscape has been studied from many angles, even spawning the term "digital natives" for young people raised immersed in media, it has seldom been examined from the perspective of tweens, those young people between ten and 13. Further, current research does little to examine those young people who are the *most* engaged.

Popular narrative suggests that young people are skilled navigators of the Internet. However this assumption that all young people are equally skilled in Internet use and content creation is beginning to be challenged (Agosto & Abbas, 2012; Correa, 2010; Hargittai, 2007, 2010).

The nuance of *how* young people are accessing and using the Internet and online communities is an emerging area that requires more study. As mobile technologies are becoming more ubiquitous within people's everyday lives, participation in online communities is also becoming more pervasive among young people. Recent research from the Pew Research Center's Internet & American Life Project illustrates this point: 80% of teens now use social network sites, 78% of teens have cell phones, 34% have smart

phones, and 74% are mobile internet users (Lenhart et al., 2011; Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013).

Although there are more substantive studies on the use of online communities by young people over 13 (Agosto & Abbas, 2012; Agosto, 2002; boyd, n.d.; Correa, 2010; Hargittai, 2007, 2010; Ito et al., 2010; Jenkins, 2006), there is a scarcity of research on tweens use of online communities, especially with regards to its potential benefits in building new media literacy and benefitting educational attainment (Fields & Grimes, 2012). Particularly for parents of tweens and scholars that investigate the behavior of young people, there needs to be more substantive research on what tweens are doing in the online communities that they participate in (Ahn, 2011a).

While we have some sense of what site and program characteristics can foster successful groups, such as forming groups with a shared focus, on- and off-line engagement between participants, degree of usability or "user friendliness" of a site and ready access to the technology (Butler, Sproull, Kiesler, & Kraut, 2007; Koh, Young-Gui, Butler, & Bock, 2007; Preece, 2001; Preece & Shneiderman, 2009), we have little understanding of how these characteristics play out with young people.

We have some sense of how and why teens participate in online communities. There is a clear relationship between adolescent developmental tasks and their participation in communities (Ahn, 2011b; Agosto & Abbas, 2012; Agosto & Hughes-Hassell, 2006a, 2006b). Young people have a desire to connect with their peers and will often use social networks sites (SNSs), such as Facebook, for these goals. Young people connect across media, incorporating a range of information and communications technologies (ICTs) including SNSs, cell phones, and email into their communications. Increasingly young people will use cell phones to access SNSs or email, further blurring the lines (Agosto, Abbas, & Naughton, 2012). Their choice of media is driven by the convenience, information needs and accessibility of the media in relation to the person with whom the young person is communicating.

Young people in online communities use SNSs for friendship-based practices (Ito et al., 2010). They use these tools to engage in everyday life information seeking to gather information ranging from the mundane to the profound. The earliest work in everyday life information seeking (ELIS) suggests that people seek information primarily in areas related to their own work or school related tasks, but also search information that relates to daily needs, that may fall outside of the formal work/school context (Savolainen, 1995). Typically though, this work has focused on adults, or when addressing young people, has largely focused on more suburban, affluent populations. Agosto and Hughes-Hassell (2006a, 2006b) extended beyond these typical contexts to include urban teens and found that the ELIS needs of urban teens are quite similar

to their suburban peers, although they note that further research is needed to confirm this finding.

Further, there is an emerging trend of online communication that is not centered on personal relationships or even information seeking. As Lange and Ito (2010) note, many online communities are genre-based, creative communities. They are formed and dominated by young people who share a passion for a specific topic, hobby or interest. Youths may congregate on figment.com, or fanfiction.net discussing their favorite *Harry Potter* scene or an alternate ending to the *Twilight* saga. Young people engaged in video production might develop a channel on YouTube focused around their topic, hobby or interest.

Often leaders will emerge in these genre-based communities, perhaps more than in the friendship-based communities that are more in line with developing social relationships and with ELIS behavior. In a genre-based community, participants are there with the purpose of sharing their creations, working collaboratively, or sharing information. As such, there are numerous roles open to a participant who is more engaged. As Ito and colleagues observe, “the core participants occupy the roles of creator, viewer, and critic” (Ito et al., 2010, p. 276).

Over time, we have observed these qualities emerge in our own program with young people (Sci-Dentity), which has been designed as both a social, or friend-based program and as a genre-interest driven program focusing on building Science, Technology, Engineering and Math (STEM) identities through creative projects.

All this time spent by young people online has made some adults nervous, while others see opportunities. Jenkins (2006) outlines some of the possibilities, pointing out that new media create new opportunities and a need for new skills. Jenkins is particularly interested in how new media literacy skills foster creativity and encourage collaboration, and notes that the time has come to shift the conversation to providing opportunities for participation and skill development. He states, “in such a world, young people need skills for working within social networks, for pooling knowledge within a collective intelligence, for negotiating across cultural differences that shape the governing assumptions in different communities, and for reconciling conflicting bits of data to form a coherent picture of the world around them” (p. 20). He notes that there are participation gaps - some young people have more opportunities to be a part of participatory culture, and some students are more engaged once they are there. Young people who don’t have opportunities to engage in participatory media, or who are not active, miss opportunities to build these new media literacy skills.

Embedded within analysis by Jenkins and Ito et al. (2008, 2010) is a call for schools to engage students directly in participatory culture through a variety of means, many of which are present in Sci-Dentity (Jenkins, 2006;

Subramaniam, et. al, 2012a). Incorporating Web 2.0 and the ideas that are fundamental to Jenkins’s participatory culture into education has given rise to numerous studies suggesting options and best practices (Ahn et al., 2012; Greenhow, Robelia, & Hughes, 2009; Subramaniam et. al., in press) and an increased use of online resources by educators (Purcell, Heaps, Buchanan, & Friedrich, 2013). Likewise, some theoretical articles link the school library (the setting for Sci-Dentity) to effective STEM learning (Subramaniam, Ahn, Fleischmann, & Druin, 2012a, 2012b; Subramaniam et. al., in press).

Current research addresses many aspects of online communities, participatory culture and teens, but leaves open the question of how the younger cohort is engaged and how their deeper engagement can be facilitated in a positive way. In this study we attempt to close that gap by closely examining the leaders, or as we call them *super-users*, in one online community to determine their characteristics and experiences, and possible avenues for developing these traits in other users.

METHODOLOGY

Our study is rooted in ethnographic methodologies for data collection, where the researchers actively compile field-notes after each weekly, hour-long, after-school session, audio and video-record sessions and capture all activities in the social media site in the form of activity logs and content posted on the site. We began our identification of *super-users* by examining the field notes produced by the team of eight researchers who organized and led the 2012-2013 after-school Sci-Dentity sessions, and activity logs on the Sci-Dentity.org site. Specifically, we analyzed the number and types of posts on the Sci-Dentity.org site by the 22 Sci-Dentity participants created both during and outside of sessions from September 2012 to February 2013. From this participation frequency data, we identified the “*super-users*,” a group of four students (Adam, Kevin, Lauren and Sarah – all are pseudonyms) who participate far more than the rest of the group (see Figure 1), after removing outliers such as participants who posted multiple times in only one session.

For the purpose of this paper, these four participants make

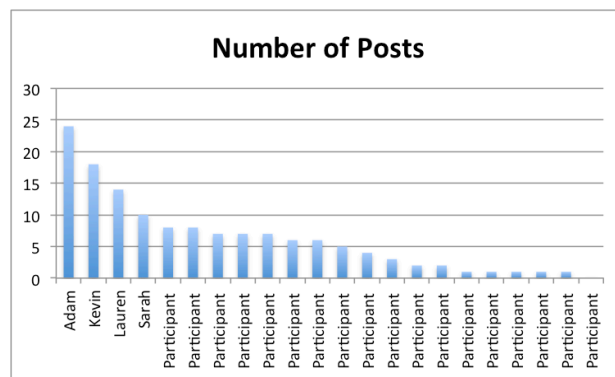


Figure 1: Sci-Dentity.org Participation by Number of Posts

up the cases that we examined more closely. We found that an in depth analysis of the characteristics of these users' behavior and content, yielded a unique look at why their participation might be so much greater than that of their peers. The deep analysis allowed us to study not only the raw figures, such as number of posts, but how such data relates to their participation in the in-session meetings and the actual content they are contributing. This type of deep analysis is a technique used in many studies when in-depth description can aid in a better understanding of participation and motivation (e.g. Bonderup, 2011; Bowler, 2010; Dimick, 2012).

Sci-Identity participants have a number of options for interacting with the site and their peers in the in-person weekly sessions. Researchers and librarians running the program encourage students to post written stories produced during or outside of sessions, create other types of media, including video stories using iPads or the school's computers, post relevant links to STEM content to inspire their peers, and to comment on other participants' stories and posts. Thus, when studying the content created by these *super-users*, we wanted to find a way to uniformly describe the content types. We primarily used the site's identification scheme to guide our categorization. This typology included stories, updates, replies, revisions, and inspirations (media posted to "the brain," a section of the site devoted to outside information the students find about STEM-related topics). We also examined each engagement the participant had with the site and categorized this content as to whether the participant offered design suggestions for the site or credit to other users (see Table 1).

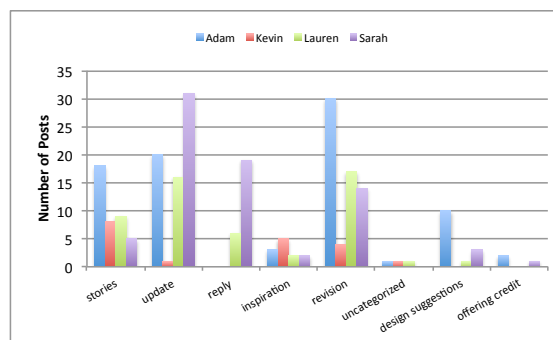


Figure 2: Super-Users' Sci-Identity.org Contributions by Content Type

Figure 2 shows the four *super-users*' contributions in each of these categories.

From the literature, we were able to identify various characteristics of users in online communities that we could relate to the characteristics and interactions that happen in Sci-Identity.org. A list and description of these characteristics is found in Table 2. While the emergence and prevalence of these characteristics are supported by research and literature, we found there was little research into this unique population of middle school students from high poverty schools, as such, we sought to adapt these available characteristics for the purposes of this preliminary analysis.

Stories	Original content in any medium, including video, image or text
Updates	Similar to Facebook status updates - e.g. a participant posting "yay we got sci today"
Replies	Responses to updates and comments on work
Inspirations	Content posted to "the brain," a section of the site where students post STEM-related links or information from around the web
Revisions	Edits made to stories
Uncategorized	Derived from the Wordpress organizational structure; posts that are not filed under stories or the brain
Design Suggestion	Content within the above categories that researchers have identified as suggestions about the site
Offering Credit	User makes an intentional recognition of another user's contribution within his or her own post

Table 1: Content Types

Characteristic	Description	Related Research
Long range focus	Participant works on a story or project for more than one session.	Ito et al., 2008, 2010
Prolific	Participant posts or interacts in-session more than his or her peers.	Ito et al., 2008, 2010
Independent	Participant is willing or desires to work on his or her own.	Ito et al., 2008, 2010
Attention seeker	Three different layers: 1) Participant calls attention to his or her work; 2) Participant has a sense that attention validates work; 3) Participant is especially outgoing with the group.	Butler, Sproull, Kisler & Kraut, 2007; Ito et al., 2008, 2010
Performer	Participant likes to act in front of the group.	Preece, 2001
Educator	Participant teaches peers new fact or skill.	Butler, Sproull, Kisler & Kraut, 2007; Grimes & Fields, 2012
Leader	Participant takes the initiative to speak out or participate before others in the group.	Butler, Sproull, Kisler & Kraut, 2007; Grimes & Fields, 2012; Ito et al., 2008, 2010; Preece, 2001; Preece & Shneiderman, 2009
Social	Participant focuses on interacting with other students and/or using the social features of the site (replying, commenting); Social interactions are not necessarily centered on growing the Sci-Dentity group (as in “community-oriented” discussed below), but are more individually motivated.	Butler, Sproull, Kisler & Kraut, 2007; Grimes & Fields, 2012; Ito et al., 2008, 2010; Preece, 2001; Preece & Shneiderman, 2009
Community-oriented	Participant shows an allegiance to the Sci-Dentity group, demonstrated by adding new features to the Sci-Dentity site and/or the sessions and encouraging other participants to interact with the site and face-to-face sessions.	Butler, Sproull, Kisler & Kraut, 2007; Grimes & Fields, 2012; Hargittai, 2010; Ito et al., 2008, 2010; Preece, 2001; Preece & Shneiderman, 2009
Self-efficacy	Participant believes that her or she has the power to change/impact a situation	Grimes & Fields, 2012; Ito et al., 2008, 2010; Bandura, 1977
Makes Connections	Participant shows evidence of having the ability to make new connections and/or provide new ideas	Grimes & Fields, 2012
Technical skill	Participant shows evidence of technical skill	Hargittai, 2010; Ito et al., 2008, 2010
Seeks mastery	Participant shows a determination to understand and succeed at projects	Butler, Sproull, Kisler & Kraut, 2007; Ito et al., 2008, 2010;
Identifies as a storyteller	Participant ties the idea of being a storyteller in some way to his or her personality	Butler, Sproull, Kisler & Kraut, 2007; Grimes and Fields, 2012; Ito, 2008, 2010;
Table 2: Characteristics of Users		

After identifying the users to be studied, we went back to the field notes written by researchers after each weekly

session. During this stage of analysis, we conducted axial and selective coding of the notes (Strauss & Corbin, 1998).

Two researchers went through two weeks of notes, paying attention to references to *super-users* in these notes and coded for evidences of characteristics observed based on Table 2 above. For example, a researcher noted in her field notes that Kevin, one of the four *super-users*, “was singing ...throughout the session, often in attempt to get someone’s attention and thanked [her] for commenting on his video.” This would represent characteristics of both performer and attention-seeking. After this, the researchers consulted with each other, further refining their coding strategies. This process was repeated with five additional weeks of field notes and two additional coder consistency tests (Richards, 2009, 108) between the two researchers. A memo with an audit trail was carefully maintained and documented changes in the iterations. The final codebook of characteristics was then applied to the rest of the sessions, as well as the content created on the Sci-Dentity site. For example, instances of multiple revisions on the site were associated with the code found in the field notes for “long range focus.”

FINDINGS

As mentioned in the methodology section, we identified the four *super-users* - Adam, Kevin, Lauren, and Sarah. The following narratives illustrate their characteristics and the different ways they interact with other participants and the site. In each of the *super-user* descriptions below, we elaborate on the first two research questions - the characteristics of *super-users* and the relationships that exist between these *super users'* characteristics and their involvement with the site.

Adam

Adam is both **prolific** and persistent in **seeking mastery**. He has the most stories on the site and by far the most revisions. He is always the first to offer suggestions to change the site, to seek more information on the topic of the day and to draw **connections** to prior knowledge. Without solicitation from the researchers, he often provides suggestions and ideas for Sci-Dentity sessions, in class and/or via the site. For example, one of his posts suggests:

At the next meeting, could we possibly talk about publishing and copyright law and getting publishers to sign you up and getting your book on bookshelves at bookstores. Maybe we could do a short story treasury for an end of the year project?

One distinctive quality of Adam is his willingness to test the limits of the technology and program. He displays confidence and engagement by continually offering design suggestions, far more than his peers – even among *super-users* and is quite deliberate about offering credit to others when he is inspired by their work.

He was one of two young people who figured out how to make groups (a feature on the site that we did not highlight, letting the students discover it on their own), and has since actively used the group to promote not only his own writing, but the writing of other young people, and to

explicitly try to build the online community. As a group moderator, he posted:

If want to leave a comment with the best chance of you getting more to read in the story, use this form:

Hey, @_____. I really like this story, especially when _____ happens. But why did _____ happen? Is _____ going to happen next?

This is not the challenge of the week, just a plea of writers everywhere: constructive feedback!

He takes his role as a writer quite seriously and frequently revisits his stories to add on for as many as six weeks. This intensity occasionally leads him to dismiss other students’ work because their stories are not as long as his, or they do not post as often. While he is clearly deeply committed to building an online community, as a 12 year old, he lacks the skills of constructive commenting that could help with this goal.

Adam is notable for his strong **technology skills**, and his **self-efficacy** in navigating the site, the program, and relationships with adults. He shows persistence when **seeking mastery** of new skills. Adam maintains a **long range focus** revisiting stories over time, and is committed to the **social** aspect of building Sci-Dentity as a **community**. He has the ability to **make connections** between science content and science fiction writing, as well as prior knowledge and literature. Adam’s characteristics are summarized in Figure 3 below.

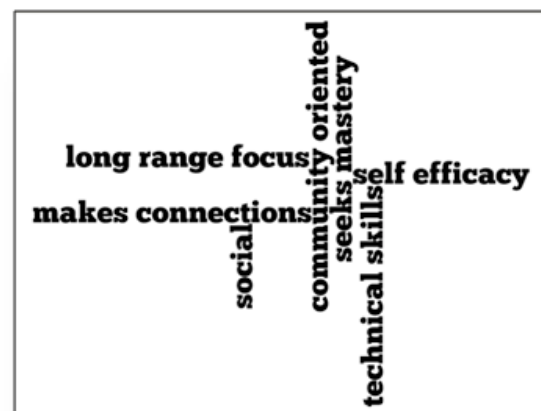


Figure 3: Adam’s Characteristics

Kevin

Kevin **seeks attention** from his peers, the researchers, and the librarian constantly, through both his online postings and his in-person interactions. He is very vocal in the in-person weekly sessions and is usually the first person to respond when the class is asked a specific question. Kevin is also one of the only young people who responded with a

specific book series when a researcher asked what the students liked to read for fun. He is generally quick to come up with story ideas and to **make connections** with his characters' traits and plot themes.

He also self-identifies as a **performer**. In the in-session meetings, he often tells his stories through video or song. In one instance, he sang his story to the tune of "Habanera" (the popular name for the aria "L'amour est un oiseau rebelle" from the opera, *Carmen*). He was very proud of this contribution, often singing his story out of the context of recording for the site and offering credit by personally thanking one of the researchers for commenting on the video. Kevin also demonstrates a certain degree of **independence** – he often begins working with his peers, but at times leaves his team if they tend to slow him down. For example, when his team had technical difficulties getting their iPads to work, he struck out on his own and began to create his own story/song.

Kevin often acts as a **leader** for his peers, educating them on various technical aspects of the site and different media. In one instance, the librarian asked him to demonstrate various aspects of the Sci-Dentity site to the group. We have also observed him teaching another participant how to use various features of PowerPoint. In the latter case, the participant he was working with continually sought his knowledge by asking questions about the program.

These in-person examples and patterns of posting, paint a picture of a young person who is a natural **educator**, **seeks attention** from peers and authority figures, has some degree of **independence**, identifies as a **performer**, and has some ability to **make connections** with outside learning. He also has a degree of **technical skill**. Kevin's characteristics are summarized in Figure 4 below.



Figure 4: Kevin's Characteristics

Lauren

Lauren displays several qualities that suggest she identifies strongly as a **storyteller**. Lauren focuses exclusively on original written stories, updates, and comments, posting no video or media to the site. She has several ongoing stories, such as one she first posted in September and has edited through late February. She also regularly posts requests to the wider community to respond to her writing (see Figure 5), which might connect to the characteristics of **attention-seeking** behavior and/or **seeking mastery**.

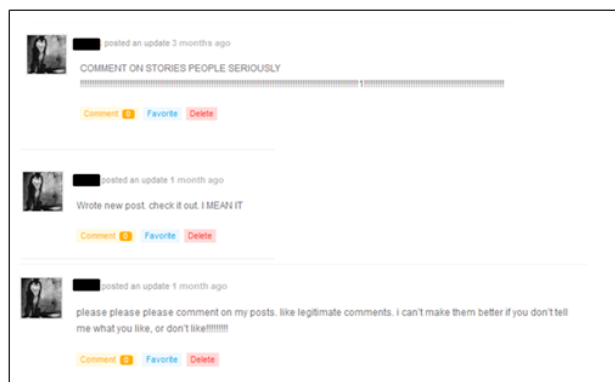


Figure 5: Lauren's request for response to her writing

Her interactions are **social**, usually involving two other students (Adam and Sarah). In several instances, after the larger group has dispersed to write or create in smaller groups, these three participants worked together. In most cases, the comments they make on the site are in reaction to each other's posts. It is unclear whether this is because they have formed a social group or because they have contributed the most content to the site, or both.

This participant has on occasion **led** her group of friends in activities. For example, in one session, Lauren gathered with her friends (Adam and Sarah) to interview each other about their characters. Lauren declined to be interviewed (she wanted her story to be a surprise to her readers), but actively involved herself in the interviewing of Sarah, insisting on several takes of the video.

Mirroring this element of **independence** (posting her work separately), in one session when all of her peers declined to post materials to the site (possibly because they were concerned that these weren't finished products), Lauren posted publicly. She has a high degree of **self-efficacy** and often seeks to work on her self-generated projects, rather than the researchers' prompts. She has the ability to **make connections** with her real world knowledge; many of her stories are inspired by ideas she has read in young adult literature.

Putting all of these characteristics together (summarized in Figure 6), we see a model of a participant who is a **leader**, is willing to work **independently**, **makes connections** with

prior knowledge, has a high degree of **self-efficacy** and is vocal about her beliefs, is **social** (particularly with a select group of friends), and identifies strongly as a **storyteller**, leading to **prolific** writing and **long-range** story focus.



Figure 6: Lauren's Characteristics

Sarah

Sociability and **community orientation** exemplify Sarah. While she is a strong and frequent writer, it is her engagement with other students, desire to share her writing and develop Sci-Dentity into a community that makes her distinctive.

While she does not have as many stories as the other three *super-users*, she far more updates and replies than anyone else, demonstrating engagement with the site as a social network. Sarah uses the update function to ask for readers' commentary and the reply function to engage with other participants, often Adam and Lauren, but others as well. Sarah was one of only two students to develop a group within the site, but has yet to use it. Instead she posts frequent pleas to read and comment on stories.

Through this sociability, Sarah has become the most active user on the site. While she often seeks commentary on her writing (see Figure 7), she is clear in session that she is looking for quality feedback; in her words, "*Comments like oh yeah, that's really good is nice and stuff, but also, suggestions to make it better, so that might be important.*"

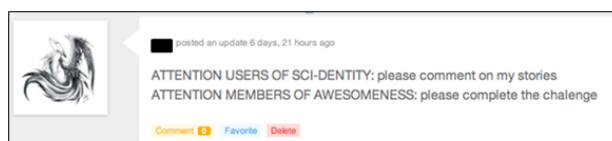


Figure 7: Sarah's request for response to her writing

She identifies as a **storyteller** and uses her avatars to reflect the stories she is working on, noting that the avatar she designed and the character she is writing about are one and the same. Her stories are long and show frequent revision.

Unlike most participants, she acknowledges that she doesn't have ready access to technology. Most of the participants' representations of their access to technology is at odds with their observed skills and representations during the school

day, in that many report having a computer and internet in their home, but later assert that they are unable to access online materials outside of school. Although she has indicated that she has a computer and Internet in her home, Sarah readily admits she doesn't "*have an i-anything.*"

Sarah is a **socially** oriented young woman who identifies strongly as a **storyteller**. She uses the site to encourage constructive commentary on her stories (showing signs that she is **seeking mastery** and/or improvement) and is a frequent commentator on others'. While she shows some **attention-seeking** qualities, they do not correspond with performance, as with Lauren, rather those qualities focus on seeking a collaborative writing **community** through constructive commentary. These characteristics are summarized in Figure 8.

DISCUSSION



Figure 8: Sarah's Characteristics

Interestingly, there was not one characteristic that described all four of the super users (see Table 3 below). This suggests that it is the combination of certain characteristics that induces participant engagement and not a single identifiable trait. For example, for the two super users that we identified with the trait of self-efficacy - Adam and Lauren - one also seeks mastery and the other identifies as a storyteller. Perhaps these characteristics drive the two to focus their self-efficacy on improving through the activities provided in Sci-Dentity. Additionally Adam is community oriented, so might be encouraged by group dynamics to engage further and Lauren is socially-driven, so might be influenced by her friends' actions.

Three of the four users do show signs of social engagement and a propensity to make connections and produce new ideas. These two areas are likely root causes of some of the other characteristics. For example, while self-efficacy is dependent on a number of influences, including "vicarious experiences" through others and "verbal persuasion" of one's worth (Bandura, 1977, p. 195), the more a student feels he or she is good at making connections and new ideas, the more he or she feels comfortable making suggestions in terms of the larger group (creating

“performance accomplishments” in Bandura’s terms). Additionally, the social element drives these users to interact with their friends both online and in person, leading

specific genre and the design of the online community itself induced the development and portrayal of certain characteristics that encourage active and sustained

Characteristic	Adam	Kevin	Lauren	Sarah	Total
Long range focus	X		X		2
Prolific			X		1
Independent		X	X		2
Attention seeker		X		X	2
Performer		X			1
Educator		X			1
Leader			X		1
Social	X		X	X	3
Community-oriented	X			X	2
Self-efficacy	X		X		2
Makes Connections	X	X	X		3
Technical skill	X	X			2
Seeks mastery	X			X	2
Identifies as a storyteller			X	X	2

Table 3: Super-user Characteristics by User

to community-oriented behavior (Adam, Sarah) or prolific posting (Lauren).

We see combinations of such characteristics relating to other studies. For example, Ito et al. (2008, 2010) touch on most of these characteristics in their research, noting that young people are motivated to participate in online communities by social needs and community building (social, community-oriented) and/or by their deep engagement in a subject (seeks mastery, identity). Hargittai (2010) also sees an orientation toward building community as a driving factor in young people’s engagement in social media (2010). Often this participation leads to development of leadership roles, teaching participants (Grimes & Fields, 2012 refer to this as “reciprocal apprenticeship”), and making connections between genres and prior knowledge (called transmedia navigation by Grimes & Fields, 2012).

CONCLUSION & FUTURE WORK

This work builds on previous analyses of young participants in online communities. In summary, we found that a combination of motivation, personality, needs, interest in a

participation among the Sci-Dentity super users. The challenge for the designers and developers of genre-specific online communities such as Sci-Dentity.org is to make sure that this combination is induced and reflected in the features and the design of their online communities.

It is clear from our study that a deeper look at all Sci-Dentity participants will be necessary to identify a more complete combination of characteristics and relationships between these characteristics that contribute to super user or non *super-user* status. Particularly, the next phase of this research will be two-fold. First, we will continue similar analysis with the non *super-users* of Sci-Dentity.org, identifying their characteristics, and comparing them to the *super-users*. Based on this analysis, we hope to solidify the salient characteristics and combination of characteristics of *super-users*, identify strategies that will encourage the development of such characteristics in online communities, and iteratively design the program and the social media site to foster the development of characteristics of *super-users*.

Secondly, we also believe that the life ecology of these inner-city youths that participate in our Sci-Dentity

program plays a pertinent role in creating and sustaining a *super-user* in online STEM focused communities. Prior research examining how young people develop interests and fluency with technology suggest that successful youths develop and leverage their ecologies of resources (information, people, programs etc.) in ways that help them develop interests and expertise (Barron, 2006). For our future work, we have identified several specific areas that need to be examined more fully, including technology access, other school activities, and home life.

In terms of technology access, although Pew data suggests that a high percentage of teens have Internet access (Madden et al., 2013), we have found through informal conversations with the youth in our program that the quality of their access varies greatly. Some young people have a computer at home, but are limited on when they can use it. For others, access is primarily through their cell phone, which limits certain activities. One of our partner librarians also reports that students often state access as a reason to why they have not completed school assignments at home. We also realize that there are several interceding factors outside of Sci-Dentity that influence user behavior. We are interested in how the students' home lives, school activities, and personal interests affect their efficacy and use of the site. Our emerging work will examine the inter-relationships between the ecosystem of influences in these youths' lives.

In the following phases of the study, we also want to examine more closely the relationship between stronger in-session attitudes and motivation and interest. Studies on adults show that in-person meetings among online community members encourage posting and participation (Koh et al., 2007; Fulk et al., 1990). We are interested to see if this extends to adolescence and also the degree to which participation in the in-person sessions translates to increased participation in the online community. In the case of Sci-Dentity we have several members who regularly attend the after-school sessions but do not participate online. Why do they engage in one environment and not in the other? This question will necessitate further investigation into the non-super users and might be addressed in individual interviews about their computer access, use, and interest. We believe this research suggests directions for classroom teachers to pursue when incorporating new media, online communities, science writing, and/or school libraries in STEM education. (Subramanian, Ahn, Waugh, Taylor, Druin, Fleischmann & Walsh, in press; Subramanian, et. al. in press).

We think that a deeper look at the impact of setting, in this case the school library, on user participation would be useful to find out how in-person environments assist in building online communities. While this issue has been discussed in the literature (Koh et al, 2007), it has largely been in the framework of the business and adult worlds. It is our hope that we will be able to further the understanding of online community participation among young people,

and make scholarly contribution to the development of active and engaged online communities of learning.

ACKNOWLEDGMENTS

We would like to thank the volunteers and graduate associates who make Sci-Dentity possible: Elizabeth Bonsignore, Jinyoung Kim, Alexandra Moses, Rebecca Oxley, Anthony Pellicone, and Claire Valdiva. This material is based upon work supported by the National Science Foundation under Grant No. 1124176. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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