

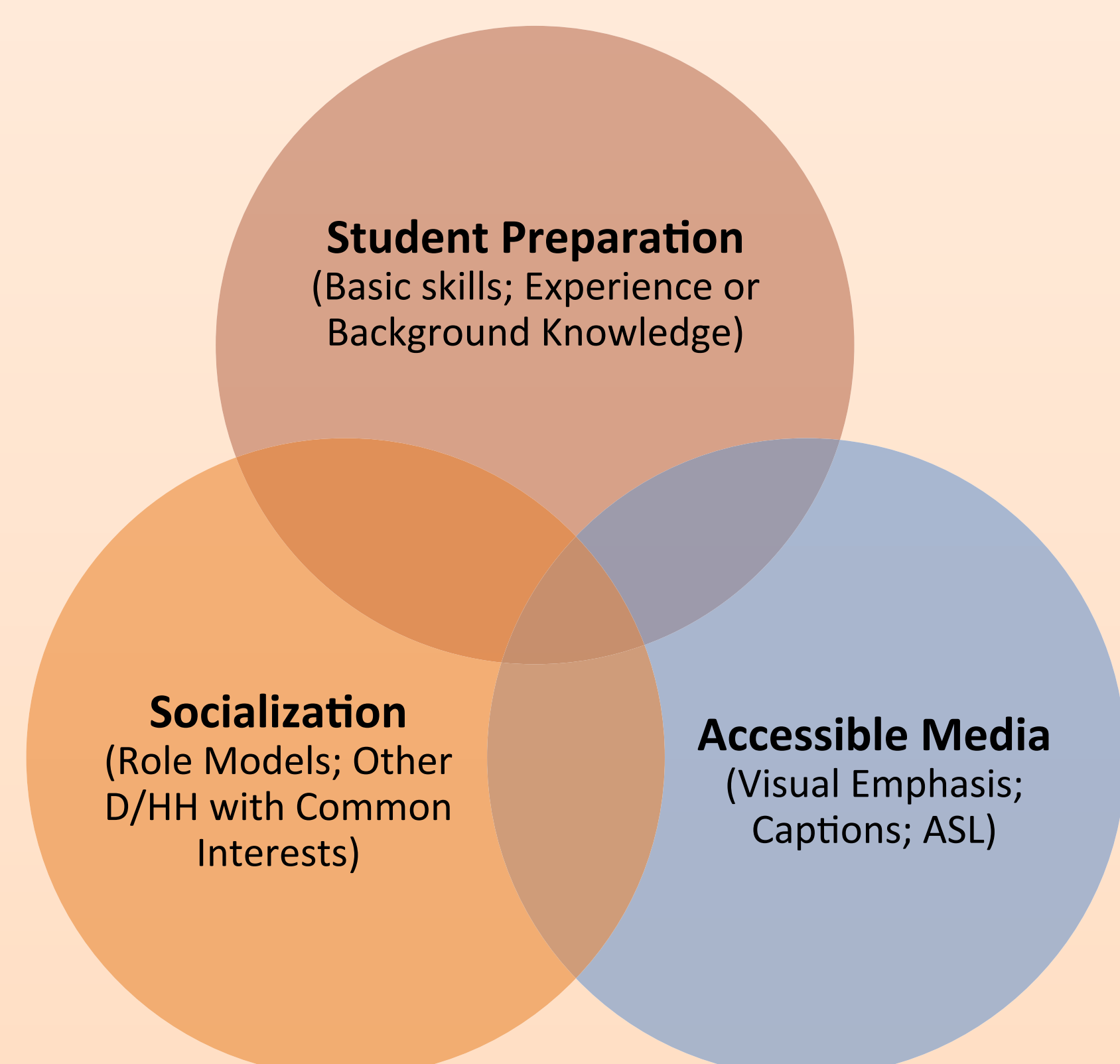


Creating an Online Community of Practice: The Deaf and Hard of Hearing Virtual Academic Community

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Problem Statement

Students who are deaf or hard of hearing (D/HH) and who are STEM majors face 3 critical barriers to educational success:

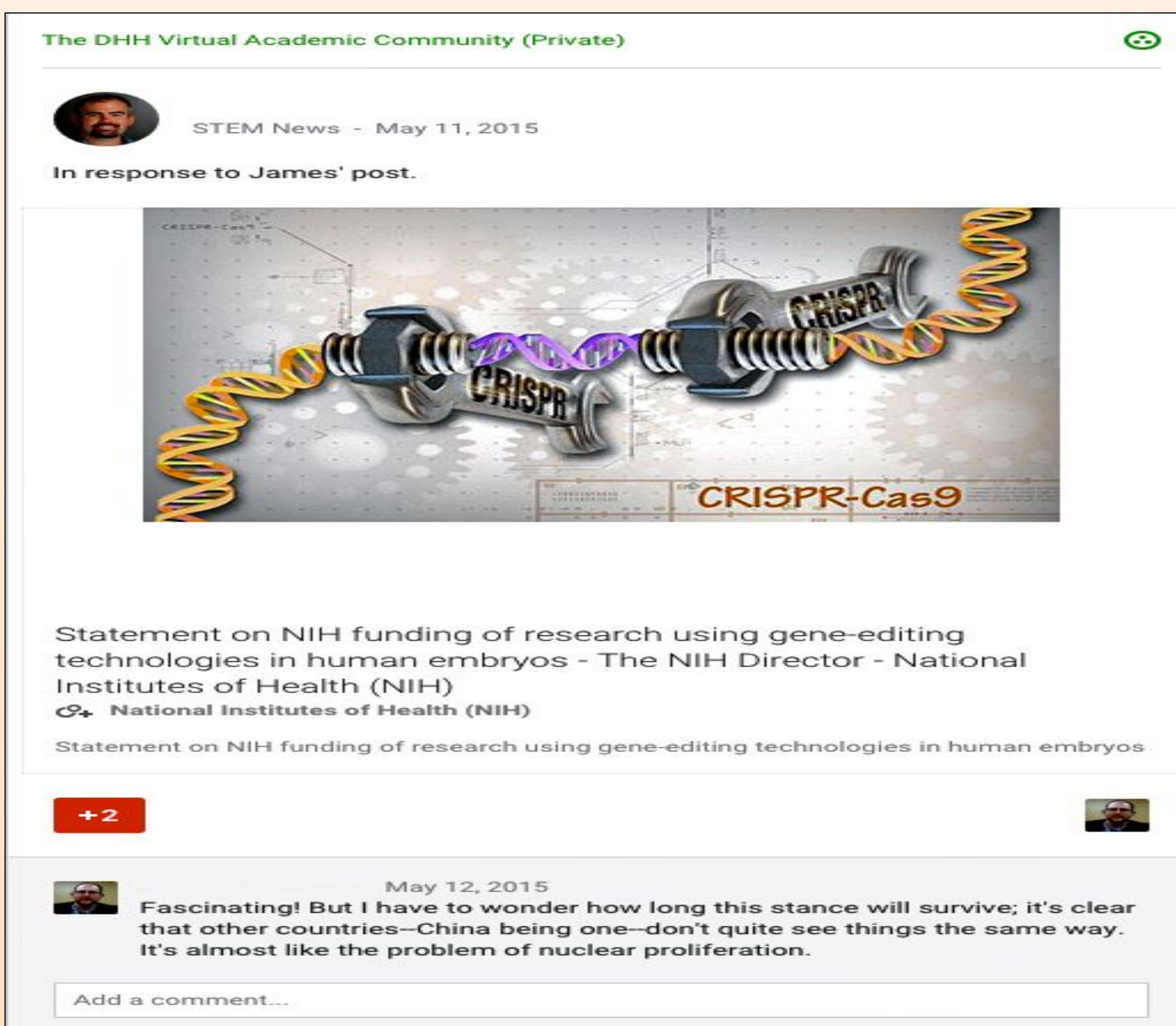


Project Design

The DHHVAC is part of a larger *iterative* and *incremental* model for an online community. The project is intended to increase retention and GPAs of student participants and to create a model that can be used by other organizations, especially with students with other disabilities.

Research Questions

- Can we use social media technology to help students overcome these barriers?
- When do posts make the most impact?
- What posts make the most impact?
- How does this closed group's activity differ from open mainstream social media?



Methods

Materials. The DHHVAC uses a Google+ Private Community as its platform to promote **socialization** and share **accessible media** with project participants. Posts reflecting participants' interests are shared 3-5 times weekly within the community.

Participants. D/HH and hearing individuals from RIT, Camden County College, and Cornell University and national and international community members:

- Students:** D/HH Students (n=48)
- Tutors:** D/HH & Hearing Faculty, Graduate Students, & Upperclassmen (n=19)
- Mentors:** D/HH STEM Professionals (n=13)
- Staff:** D/HH & Hearing Staff (n=12)

Results

Lifetime Community Activity

Posts	Comments	+1s
809	992	1594

High Impact Posts (Most +1s, Comments) February 2013-2015

Most Impactful Day	Most Impactful Times of Day	Most Impactful Themes by # of +1s	Most Impactful Themes by # of Comments
Tuesday	1-3pm; 4-7pm	Community (110)	Community /STEM (90)
		STEM Humor (81)	STEM Humor (76)
		Community /STEM (41)	Community (39)
		STEM (17)	STEM (29)

Conclusions

It is possible to create a community of practice using social media technology. Timing of posts does make a difference. Certain types of posts generate more reaction from the community than do others. Reactions to posts differs somewhat from mainstream social media. While Tuesday remains the most impactful day, our community tends to respond better to posts that occur later in the day.



National Technical Institute for the Deaf
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Abstract— This presentation describes the activities of the Deaf STEM Community Alliance project using the social media platform Google+ private community. The private community provides socialization opportunities and shares accessible STEM media with community participants. A pilot study was conducted on a segment of the community's activity. Posting frequency was analyzed for the highest impact day, posting times, and types of posts that received the most activity. Tuesdays were the most active, and the best times to post were during the afternoon hours. Posts having content related to community members received the most responses. These findings were compared to research on posting frequency in open social media platforms. Future research should investigate in greater detail the uses of social media for education and for other groups with disabilities.

Keywords—*Deaf and hard-of-hearing; social networks; socialization; accessible media*

I. INTRODUCTION

Students who are deaf or hard of hearing (D/HH) represent one group of underrepresented students in science, technology, engineering and mathematics (STEM)[1; 2]. Student success in postsecondary STEM fields is frequently stymied due to a combination of educational and cultural factors [3]. Experts in postsecondary education of students who are deaf or hard of hearing suggest three significant barriers: student preparation, socialization opportunities, and limited accessible media resources [4; 3; 5]. This presentation focuses on the use of social media technology to address socialization and media resource barriers. This solution is part of a larger effort of the Deaf STEM Community Alliance to create a model virtual academic community that is both iterative and incremental in nature [6; 1; 7].

II. PROJECT RATIONALE

A. Socialization

Students who are D/HH face several challenges with regard to socialization. These challenges may impact their choice of career and their subsequent training and success in the field. First, because hearing impairment is a low-incidence disability, many students, and especially those students who are educated in mainstream classrooms, do not grow up knowing others with hearing loss [8; 9]. This absence of peers limits students' ability to share resources, knowledge, or common curiosity in STEM fields. The opportunity to socialize with others who share common interests in STEM helps to nurture a strong STEM identity [10]. A second way in which socialization deficits hamper students' identity as STEM professionals involves the dearth of role models who are D/HH. Experts in education of D/HH students suggest that the absence of these role models inhibits students' ability to imagine themselves as STEM professionals in areas of STEM [4; 3].

B. Accessible Media

The collection of media available on the Internet that involves STEM knowledge is burgeoning. However, FCC rules for captioning only pertain to those videos originally aired on television [11], which means that videos produced for the Internet may or may not have captioning. One solution that is often offered is the automatic captioning option on YouTube. However, in many instances that captioning is inaccurate, which is especially problematic when viewing technical content with specialized vocabulary [12].

B. Social Media

Social media websites such as Facebook and Google+ have been gaining in popularity. Facebook continues to be the number one-ranked site with over 900 million estimated unique monthly visitors. Google+ estimates 120 million unique monthly visitors [13]. These social media websites serve a variety of functions such as identity management, keeping in touch with other users, and knowledge sharing [14]. One goal of posting to social media is to reach a broad audience [15]. Spasojevic et al. [15] studied the "when-to-post" problem in the open social media networks of Facebook

and Twitter. They determined that Tuesdays and Wednesdays in the late morning were the optimal times for receiving the most likes, comments, and shares.

D. Project Description

The Deaf STEM Community Alliance, funded by the National Science Foundation, created a model virtual academic community to help students who are D/HH surmount barriers commonly associated with barriers to success in postsecondary STEM majors. The primary focus of this presentation is to investigate whether community participants respond to postings in the closed social network community established by the project. The presentation reports on overall activity through the lifetime of the page (February, 2012 through the present) as well as a snapshot from February 2013-2015. Research questions include:

- Can we use social media technology to help students overcome socialization and accessible media barriers?
- When do posts within the DHHVAC make the most impact?
- What posts make the most impact?
- How does this closed group’s activity differ from that of open social media networks?

III. METHODS

A. Participants

Participants for this project include all students, tutors, mentors, and staff associated with the Deaf STEM Community Alliance since February 2012.

Students. All student participants (n= 48) are D/HH and were enrolled in STEM majors at Rochester Institute of Technology (RIT), Camden County College (CCC), or Cornell University (CU). Students were recruited through their campus office of disability studies on the Camden and Cornell campuses, and through faculty members, campus events, or personal contacts on the RIT campus.

Tutors. Individuals who provide academic support services in STEM fields to D/HH students at the three campuses are eligible to participate in the project. Tutors have both content knowledge in their particular STEM field and the ability to communicate successfully with D/HH students according to the students’ communication preferences. To date, 19 tutors have participated. Tutors include full-time faculty members, adjunct faculty members, graduate students, and upperclassmen. Tutors have been recruited by recommendation

Mentors. Mentors (n=13) are STEM professionals who are D/HH. These individuals have been recruited as volunteers through recommendations by the RIT/NTID alumni office, administration, and through personal contacts of department chairs and through personal contacts.

Staff. Staff (n=12) are associated with the lead institution (RIT), and partner institutions (CCC and CU). Staff includes both individuals who are D/HH and hearing.

B. Materials

This study used the Google+ private page established by the Deaf STEM Community Alliance project. The Google+ feature is part of a larger suite of applications used by the community, known as Google Apps for Education (REF). The private page is entitled, “The Deaf and Hard of Hearing Virtual Academic Community” (DHHVAC). All project participants (see above) are eligible to participate in the DHHVAC. Participation constitutes the activities of posting within the community, commenting on others’ posts, and “+1ing” posts or comments. Project staff members moderate the page.

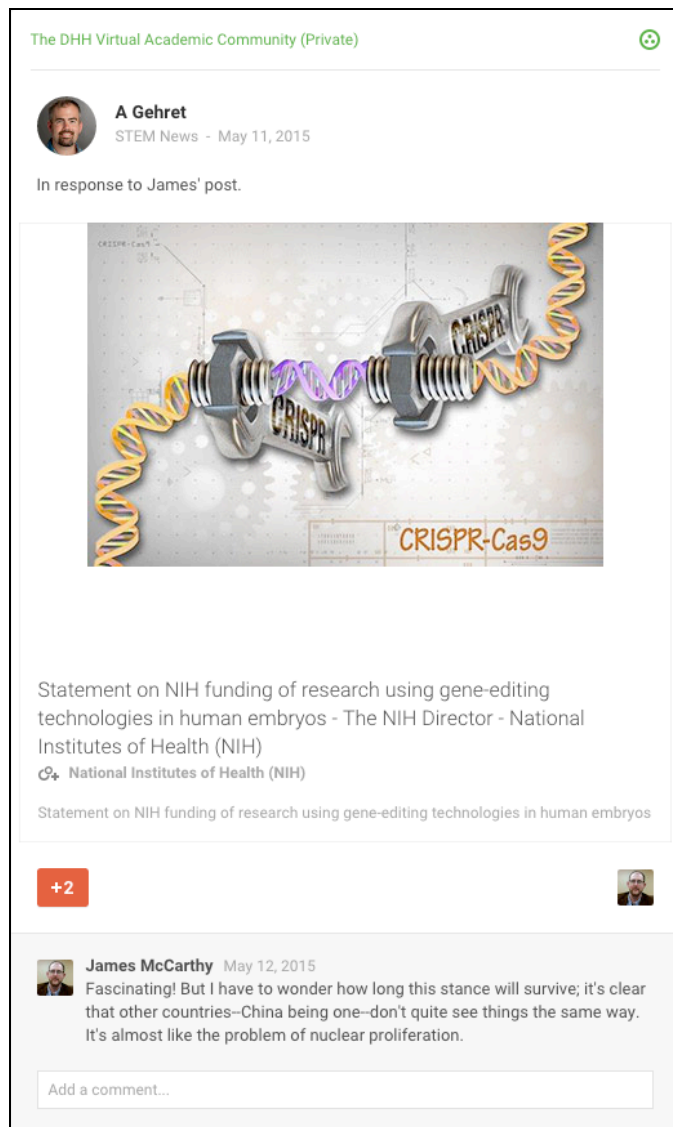


Fig. 1. Example of a post within the DHHVAC. (figure caption)

C. Analyses

User analytics for this study employ frequency counts to estimate user engagement with the project page.

IV. RESULTS

A. Lifetime Activity

Project staff maintains a weekly tally of community participation. The analytics include the number of posts for the week, the number of comments related to each post, and the number of “+1s” associated with both posts and comments. Since the inception of the community in February 2012-October 22, 2015, there have been 814 posts, 993 comments, and 1597 +1s. Students are the least active community members, and staff are the most active. The distribution of community activity is displayed in Table 1.

Table 1. DHHVAC Activity February 2012-October 22, 2015

Participant Role	Posts	Comments	+1s	Totals
Student	99	132	200	431
Mentor	46	240	328	614
Tutor	134	223	374	731
Staff	539	401	704	1644
Totals	814	993	1597	3404

B. High Impact Posts

During the period from February 2013-February 2015 an analysis was conducted to determine which posts had the most impact. Impact was determined by evaluating which posts had the most comments and the most +1s. The analysis also determined on which day of the week the posts occurred and at what time the posts were made. The themes of the posts were categorized into: Community (posts about community members); Community/STEM (posts relating to both community members and specific STEM topics); STEM (posts relating to STEM topics alone); and STEM Humor (humorous posts relating to STEM topics). The most impactful day of the week for posting was Tuesday, and the posts that received the most comments and +1s were posted between the hours of 1:00-3:00pm and followed by those posts created between 4:00-7:00pm. Posts that received the most +1s were those concerning community members (e.g., birthday wishes or special honors). Posts that received the most comments were those concerning community members and specific STEM topics (e.g., STEM accomplishments by community members). Table 2 displays the results of these analyses.

Table 2. High Impact Posts, February 2013-2015

Most Impactful Day	Most Impactful Times of Day	Most Impactful Themes by # of +1s	Most Impactful Themes by # of Comments
Tuesday	1:00-3:00pm	Community (110)	Community/STEM (90)
	4:00-7:00pm	STEM Humor (81)	STEM Humor (76)
		Community/STEM (41)	Community (39)
		STEM (17)	STEM (29)

V. CONCLUSION

As part of a larger project, the DHHVAC has created an online community, using off-the-shelf social media tools to promote socialization opportunities and to share accessible STEM-related media with its participants. The question of whether or not this task could be accomplished can be answered in the affirmative.

By studying the responsiveness of community members to the numerous posts, findings show that the day of the week and the time of the week do matter. This information is useful when considering the timing of future posts, especially posts that are of high priority to community members. The distribution of community activity is important as well. It has been noted that students are the least visibly active in the community. One possible reason is that these participants typify “lurkers” who comprise the largest group of participants in social media in general [16]. Another possibility is that these students are similar to other college students who use tend to engage in social media with people that they already know in off-line relationships [17]. Further research will be needed to understand students’ participation habits and to determine ways to increase their participation, if possible.

This study compared the community participation analytics to those of open social media networks. Findings suggest that this closed network and open networks have different response patterns. One possibility for the different response patterns is different objectives. In the DHHVAC closed network, the focus is on decreasing isolation and sharing specific content knowledge, whereas open networks functions are more directed at identity performance and consumer identity [18].

The findings presented at this presentation are limited because this is a pilot study. As the community continues, more data will be generated and more opportunities for analysis will present themselves. Future studies will provide even greater opportunities for understanding the rich resources available for exploring the functions and behaviors related to social networks, their application in education, and their use with populations that have disabilities.

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