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.
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>
<thead>
<tr>
<th>Participant Role</th>
<th>Posts</th>
<th>Comments</th>
<th>+1s</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>99</td>
<td>132</td>
<td>200</td>
<td>431</td>
</tr>
<tr>
<td>Mentor</td>
<td>46</td>
<td>240</td>
<td>328</td>
<td>614</td>
</tr>
<tr>
<td>Tutor</td>
<td>134</td>
<td>223</td>
<td>374</td>
<td>731</td>
</tr>
<tr>
<td>Staff</td>
<td>539</td>
<td>401</td>
<td>704</td>
<td>1644</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>814</strong></td>
<td><strong>993</strong></td>
<td><strong>1597</strong></td>
<td><strong>3404</strong></td>
</tr>
</tbody>
</table>

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 the most +1s. The analysis also determined 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.

REFERENCES


