STEM Education in the 21st Century: Creating a Virtual Community of Practice for STEM Learners

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New York Cyber Security and Engineering Technology Association (NYSETA) Fall Conference

October 22, 2015

Objectives

- Describe the online community

- Understand barriers for students with hearing loss

- Explore options for creating online communities on your own campus or other group

For Your Consideration

How do you:

- Regularly communicate with students?

- Coax shy or isolated students to participate in class discussions or activities?

- Foster professional awareness and identity for your students or create connections between course content and "real world" topics?

Who We Are

- Deaf STEM Community Alliance
  - Only Alliance specifically for D/HH students
- Supported by the National Science Foundation, HRD #1127955
- Multi-year project (Sept 2011- Aug 2017)
  - Now in our 5th year

Campus Partners

RIT is the lead institution for this project, with Camden County College and Cornell University as partners.
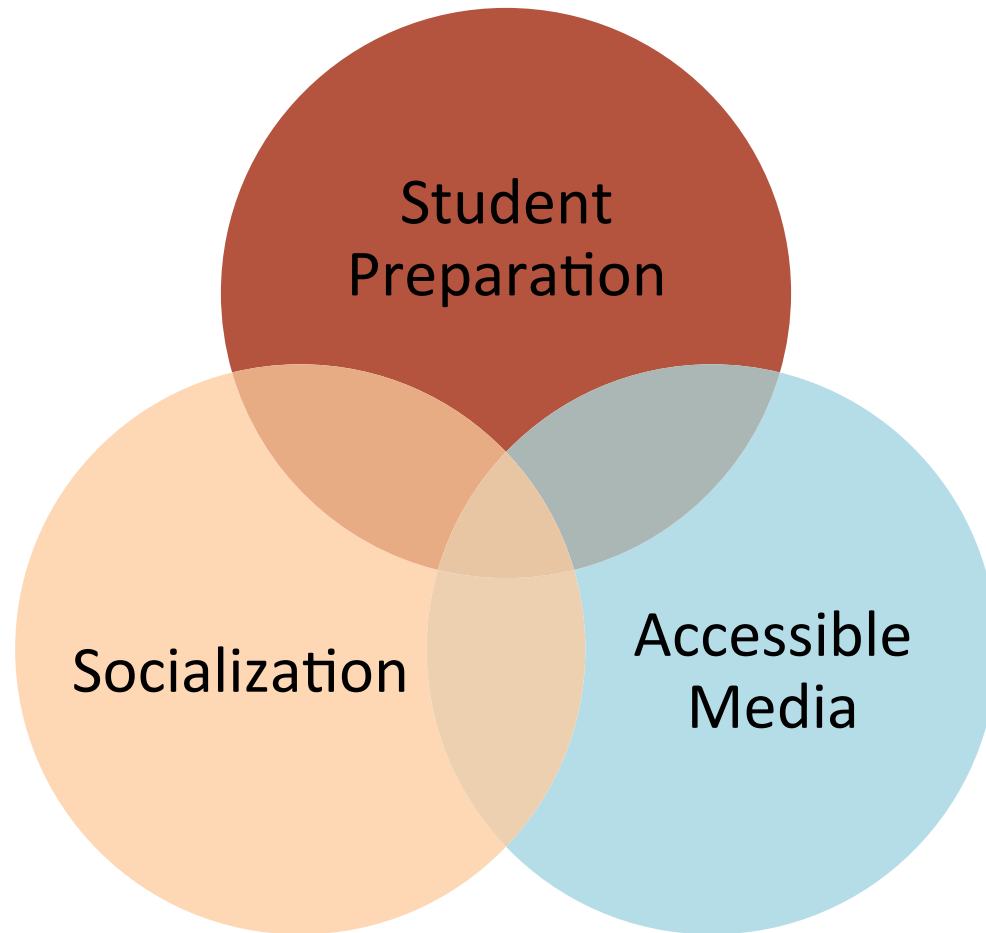
Challenges Addressed by the Alliance

- Need to add more STEM graduates

- Broaden participation of underrepresented groups in STEM, especially those with disabilities, and, in particular, those who are deaf or hard-of-hearing

- Create more cohesive cyber learning resources for students, faculty, and support service providers

Barriers to Success in STEM

Goal and Objectives

- Goal:

  Create a *model* virtual academic community to increase the graduation rates of postsecondary D/HH STEM majors in the long term

  - Iterative and incremental (Cockburn, 2008)
    - Iterative – testing what works and revising what doesn't
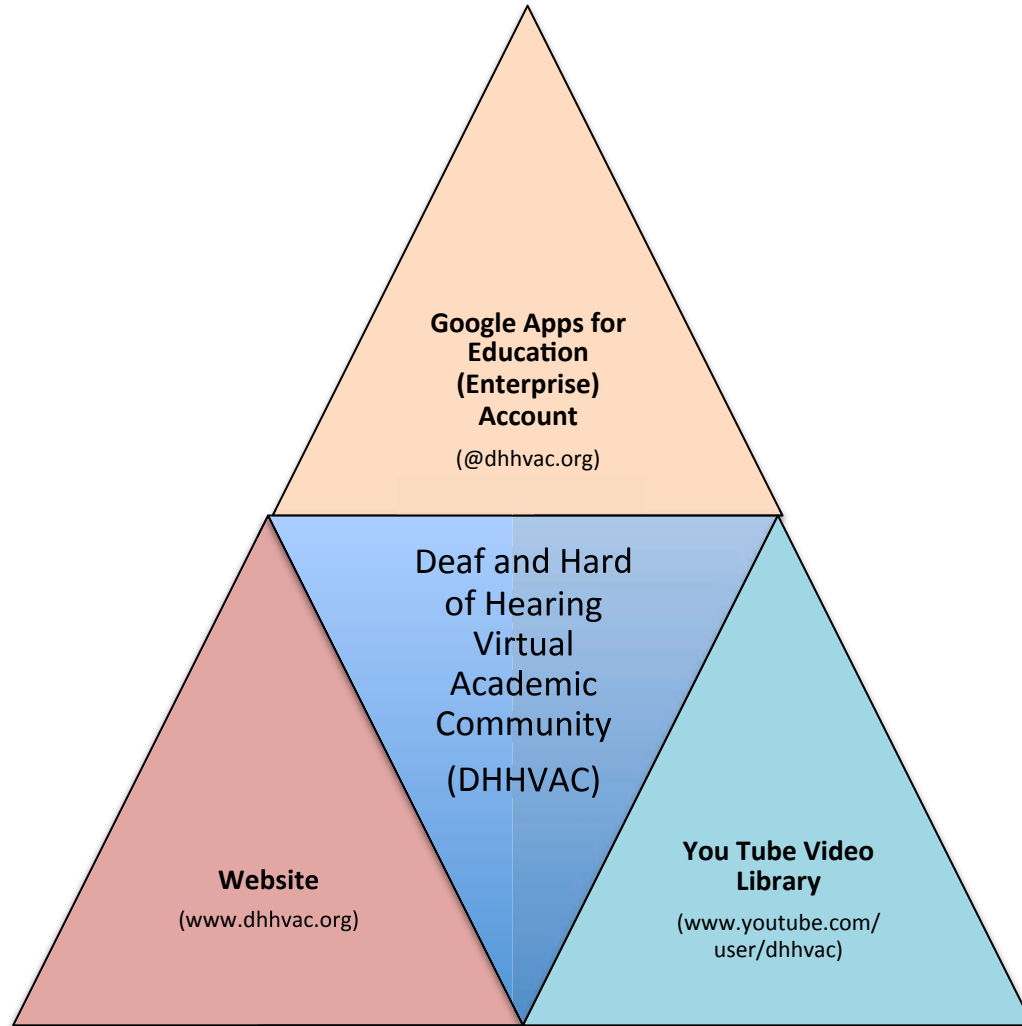   - Incremental – building model in stages instead of all at once

Goal and Objectives

Objectives

1) Document and disseminate a description of the process of creating a model VAC for replication

2) Increase the GPAs and retention rates of D/HH students in STEM majors
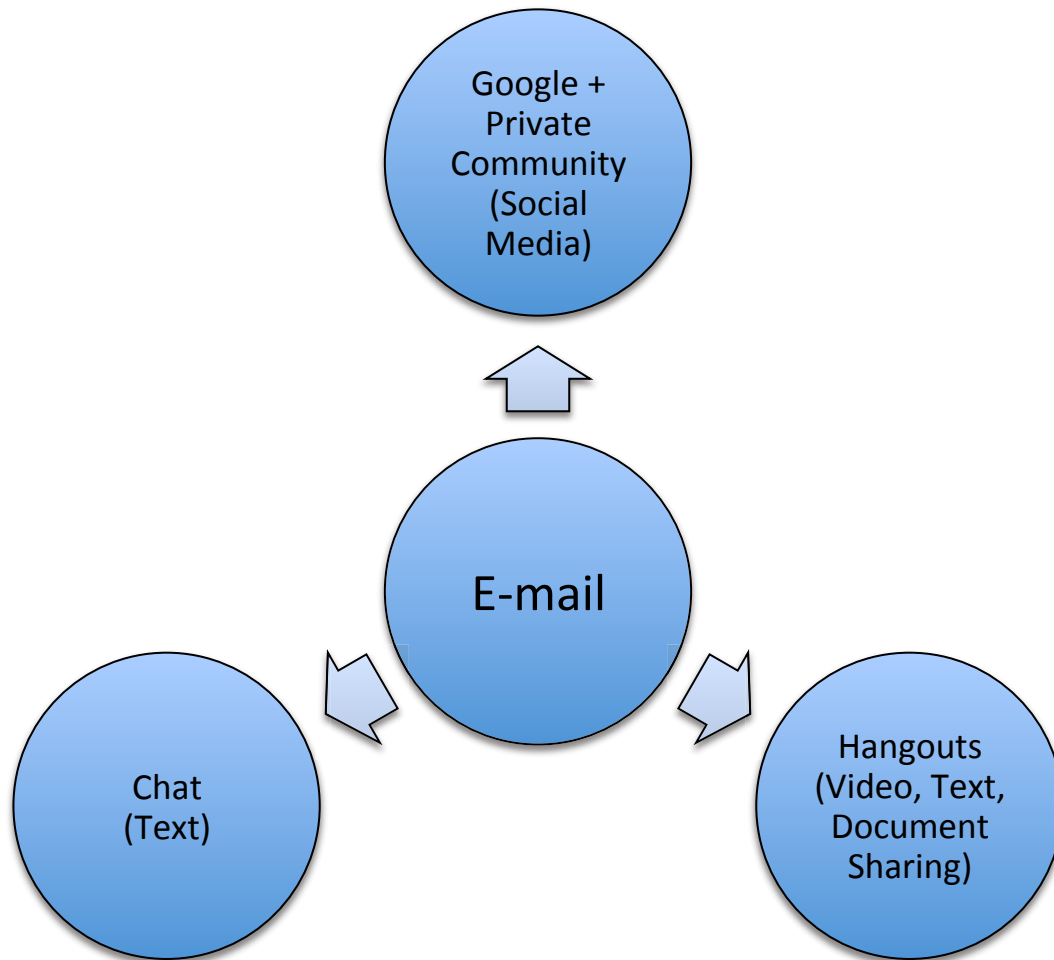
Model Infrastructure

Google Apps for Education (Enterprise) Account

(@dhhvac.org)

Deaf and Hard of Hearing Virtual Academic Community

(DHHVAC)

Website
(www.dhhvac.org)

You Tube Video Library
(www.youtube.com/user/dhhvac)

Model Infrastructure Components

- Communication

- Dissemination

- User Analytics

Communication Infrastructure
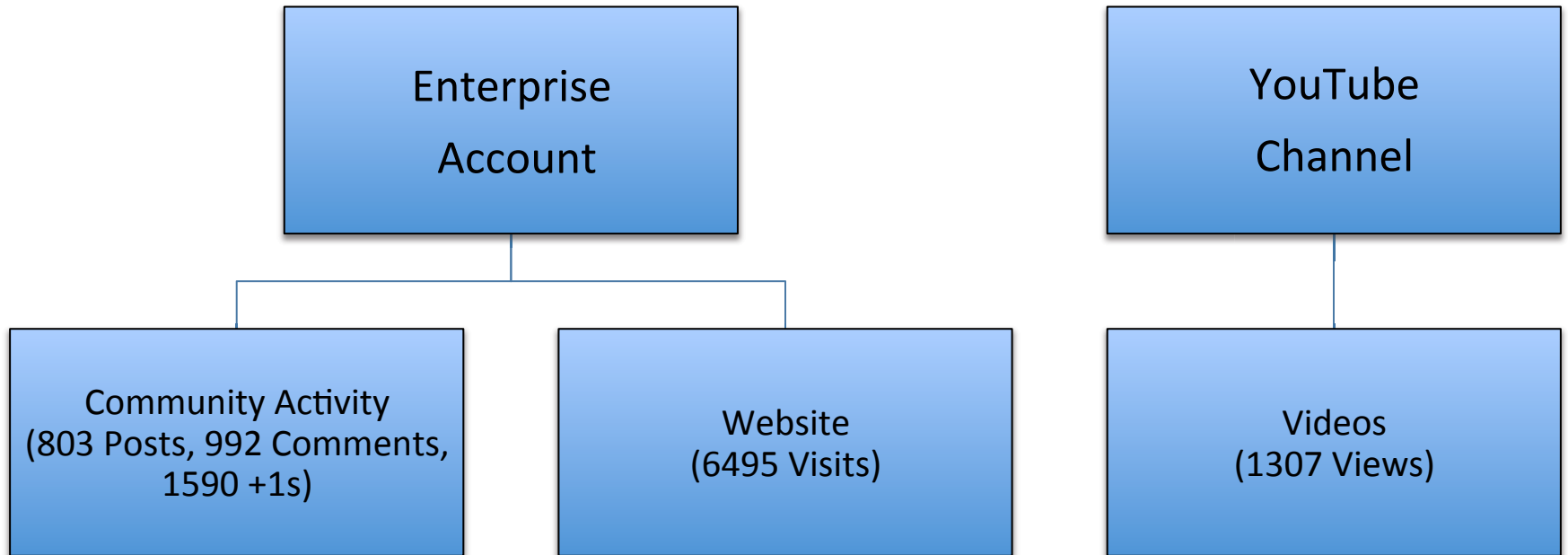# Google Apps for Education (Enterprise) Account

Google +
Private
Community
(Social
Media)

E-mail

Chat
(Text)

Hangouts
(Video, Text,
Document
Sharing)

Dissemination Infrastructure
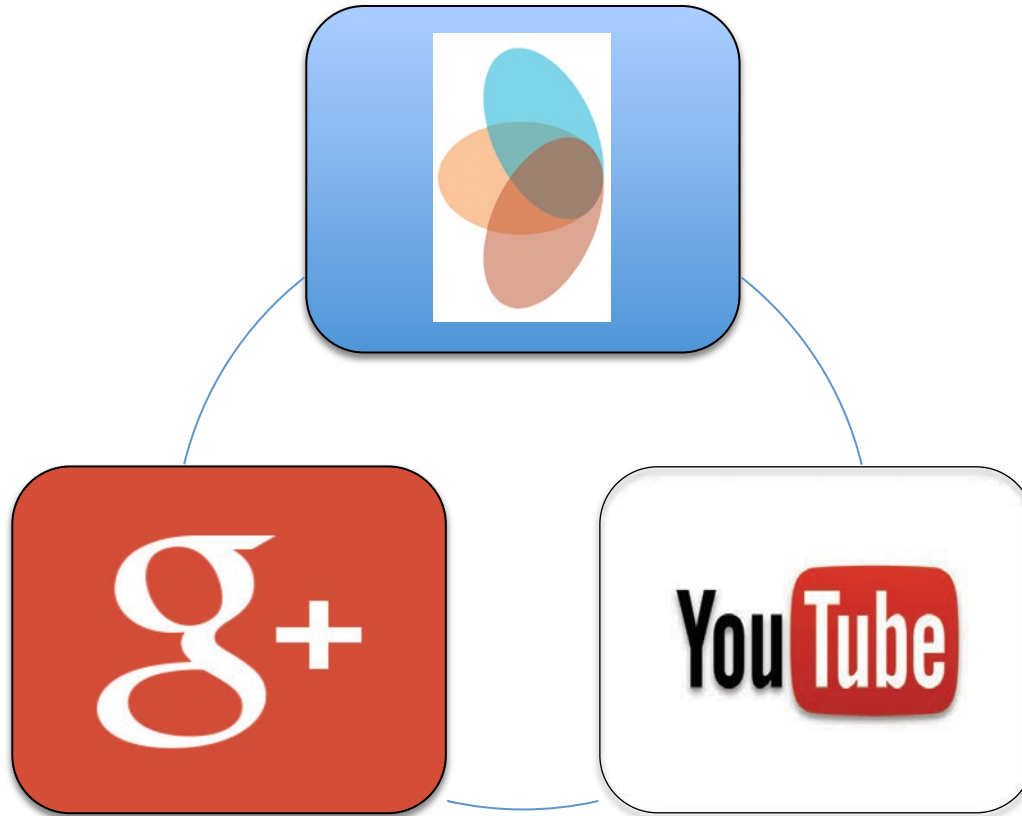
Infrastructure Monitoring
(User Analytics)

Enterprise

Account

YouTube

Channel

Community Activity
(803 Posts, 992 Comments,
1590 +1s)

Website
(6495 Visits)

Videos
(1307 Views)

DHHVAC Model
Barriers & Strategies

Student Preparation

Remote Tutoring
Remote Mentoring
Using G+ Hangouts

Remote Mentoring
Peer-to-Peer Interaction
Using G+ Private Community

Accessible
STEM Information
Using Website,
G+ Private Community,
& G+ Public Page

Socialization

Accessible Media
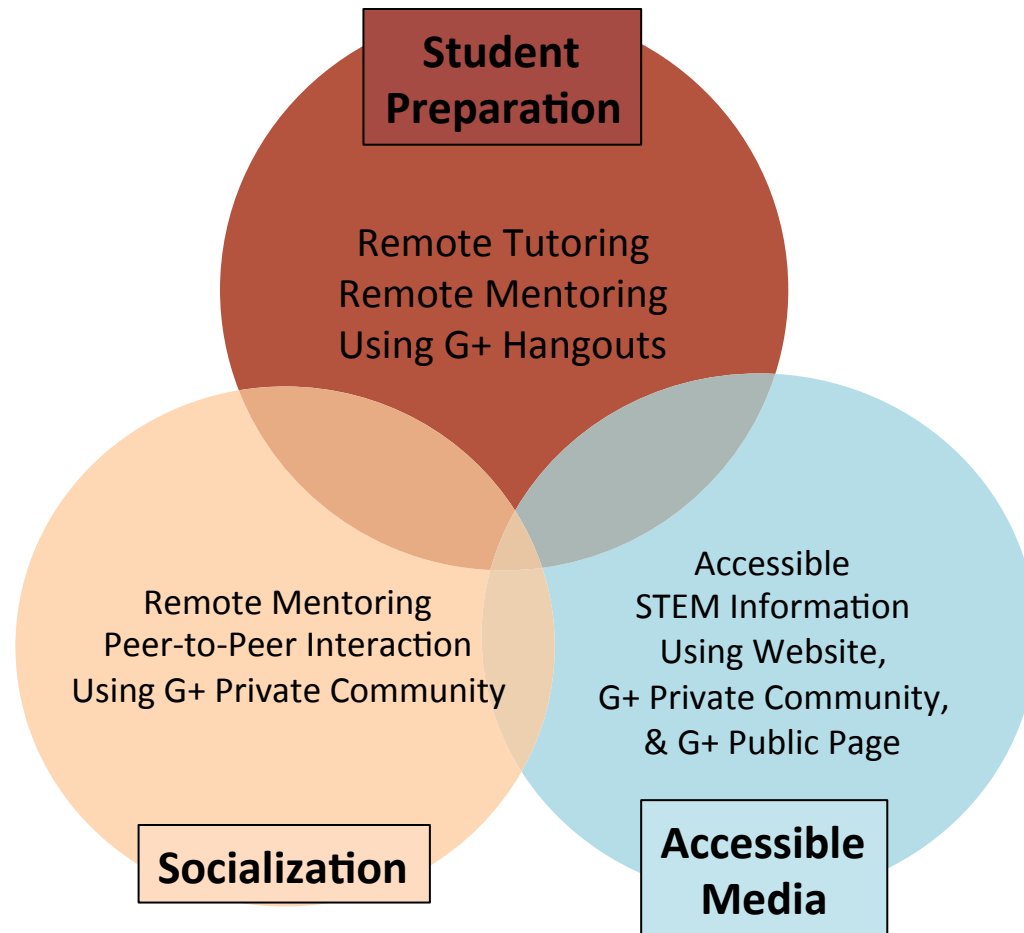
Remote Tutoring

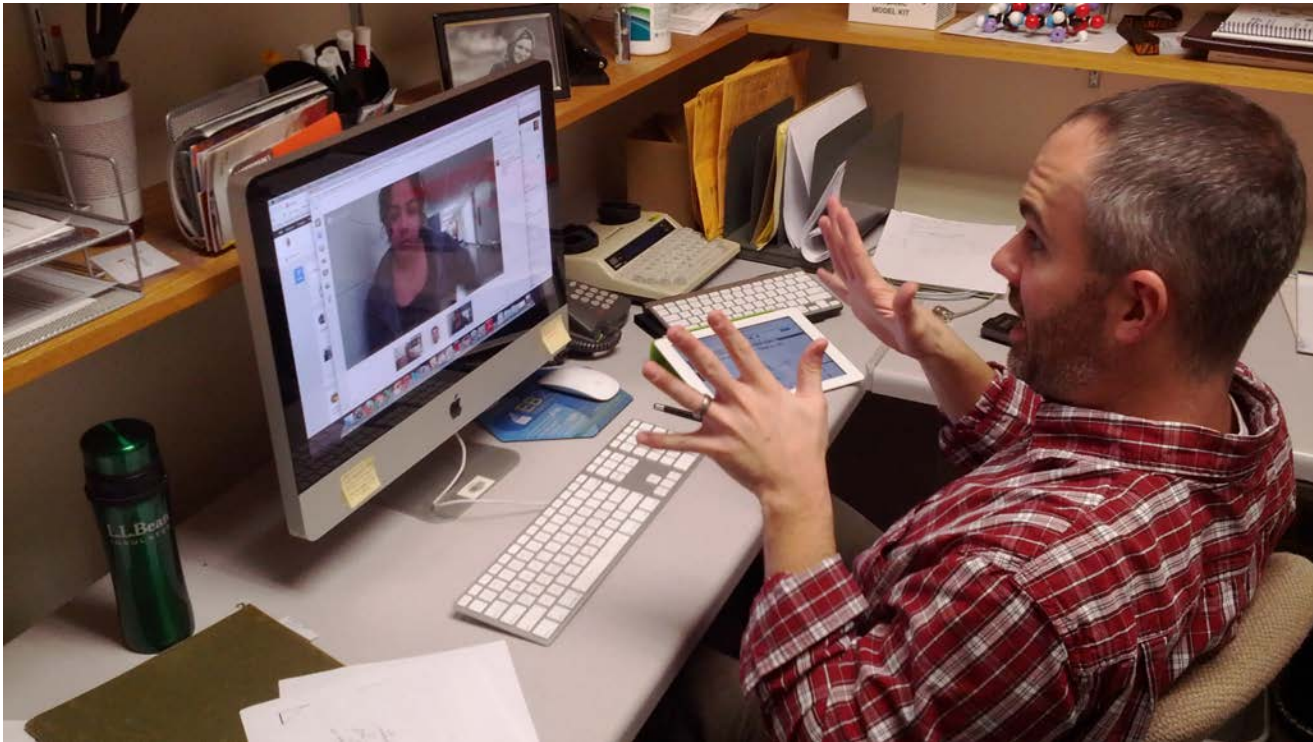Photo of student receiving tutoring. Student is seen on computer screen, tutoring professor pictured sitting at his desk in front of the computer.

Remote Tutoring Quick Facts

Modeled after RIT/NTID faculty-student in-person tutoring
Conducted ~ 130 synchronous sessions with 13 tutors, 32 students
Google+ Hangouts as web conferencing platform
Chromebooks, Macs, PCs, iPads & other tablets
On-line resources, paper/pen, whiteboards, Conceptboard (virtual whiteboard)
Asynchronous tutoring sessions

Synchronous Tutoring Benefits

- Sharing documents
- Searching & highlighting key phrases with student
- Observing students' homework, watching for mistakes, providing faster feedback
- Classes with many online resources
- Better accommodation to student schedules
- Meet multiple students simultaneously

Synchronous Tutoring Challenges

- Digital whiteboard

- Unannounced changes in Google+ interface

- Eye contact & turn-taking different online

Asynchronous Tutoring Benefits

- Provided flexibility for travel when there were time differences between tutor and student or other schedule conflicts

- Allows students to process material at their own pace

Socialization

- Remote mentoring
  - D/HH STEM professionals
    - Personalized recruiting
    - Application including background check
    - Google+ presence
  - Mentoring platforms
    - Google+ private community
    - Google+ Hangouts
    - Email
    - Face-to-face meetings
    - YouTube video interview

Socialization

- Peer-to-peer (community) interaction
  - Google+ private community
    - STEM articles of interest
    - Share student schedules
    - Announcements (events, internships, scholarships)
    - Open forum for mentors to provide 1-to many mentoring in forms of
      - Information sharing (e.g., pictures of work)
      - Job opportunities
      - Offers for assistance

Socialization
Social networking through social media

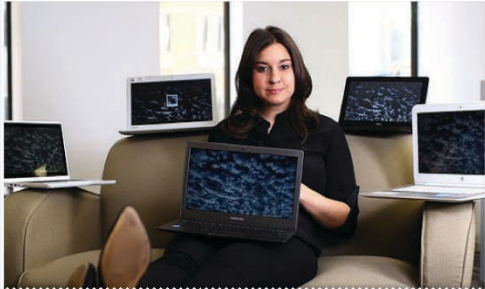This is an example of a post within the private community.

The DHH Virtual Academic Community (Private)

E Clymer
VAC News and Stories · Apr 22, 2014

#Chromebook

What is the VAC Experience with Chromebooks?

Five years after their inception, Chromebooks inch toward replacing PCs and Macs
The Wall Street Journal

Five years after their inception, the browser-based laptops inch toward replacing PCs and Macs

+5

3 comments

J. MacDonald Apr 23, 2014
It's very light compared to my PC laptop!

D Easton Apr 23, 2014
I like the screen size and how light it is compared to my old PC laptop too!

C. Brucker May 13, 2014
I once used a Chromebook, however, it lacks the programs that I need for my studies, such as Revit, AutoCAD, Photoshop, etc. I always feel that desktop is always a best option for me... I'm sticking with a tablet with a keyboard attached.

Add a comment...

Post

+1's

Additional comments

Accessible Media

- Curated STEM Resource library on our public website: www.dhhvac.org
  - Project publications and presentations
  - Relevant work by others
  - STEM ASL dictionaries (e.g., ASL-STEM Forum)
  - Links to accessible STEM resources (e.g. Khan Academy, Math for College)
- STEM-relevant articles and videos in Google + Private community

Discussion

- Which aspects of the DHHVAC would be appropriate for your campus or professional group?

Discussion

Questions?

Answers!

Contact Information

Deaf STEM Community Alliance

http://www.dhhvac.org

OR

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