

# Online Tutoring: What's Really Happening?

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## Abstract

Synchronous online tutoring activities for courses in science, technology, engineering, and math (STEM) with students who are deaf or hard of hearing are described. Since 2012, online tutoring has been offered to DHH student participants at RIT, Camden County College, and Cornell University. The project is sponsored by the Deaf STEM Community Alliance, funded by NSF.

### Research Questions

- Can a model synchronous online tutoring program be implemented for students who are DHH?
- What materials are required to provide such tutoring, especially for STEM courses?
- What interactions transpire during such tutoring sessions?
- Will student participants persist to graduation?

Literature on online learning suggests that faculty members are reluctant to teach online, due to concerns about technology and communication issues. This research suggests that technical difficulties have only occurred occasionally, and the majority of interactions focus on course content. Data suggest that tutors and their students occasionally encounter technical difficulties, but that the majority of their interactions focus on comprehension of course content. Furthermore, analysis suggests that tutoring sessions differ based on the communication preferences of students and their tutors and the topics of the tutoring sessions.

## Background

Students who are deaf or hard of hearing (DHH) are generally less prepared for postsecondary education than their hearing peers[1]. Online support for academic subjects is widely available for the general postsecondary student population. However, many of these resources are not accessible for DHH students because generic online resources do not match DHH students' communication preferences or address other academic needs [2; 3]. Furthermore, educators of the deaf harbor concerns about video communication in American Sign Language (ASL) due to its 3D use of space[4].

Outcomes of research about online learning reveal that students tend to perceive it positively but faculty are often reluctant to embrace the concept, citing a variety of concerns about the format [5]. Most of the research pertaining to online learning, and especially online tutoring, pertains expressly to satisfaction studies. Additional research is necessary to explore the effectiveness of such tutoring programs and to understand when online tutoring might be an appropriate way to address student needs [6]. The study presented here addresses these issues.



## Methods

### Participants –Institutions of higher education (IHEs):

- Campus 1 - Private, Doctoral-Limited Research IHE, ~1300 DHH students
- Campus 2 - Public, 2-year community college, ~30 DHH students
- Campus 3 - Private/Public, High Research Doctoral University, ~10 DHH students

**Students** - (n=40) deaf or hard of hearing (DHH) and enrolled in STEM majors/classes

**Tutors** - (n=17) either DHH or hearing. With the exception of 1 upperclassman undergraduate, all others have at least a bachelor's degree or higher.

### Procedures & Materials

Tutoring sessions occur on **Google Hangouts** web conferencing platform.

#### Hardware:

- Macs, PCs, Chromebooks, and iPads.
- Videotaped random sample of sessions (n=11)

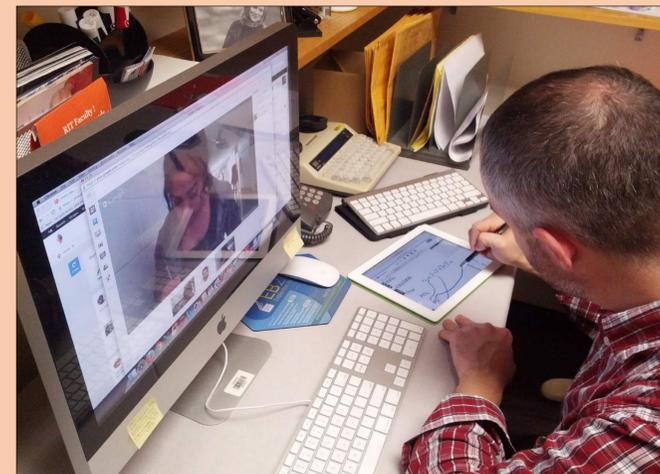
### Data Analysis

- Descriptive statistics
- Content analysis

## Conclusions

- Online tutoring can be implemented that accommodates DHH students and STEM topics
- Despite generalized concerns about technology problems, most tutoring conversations focus on content, not technology
- More students who have used tutoring are continuing towards degrees or have graduated compared to those who withdrew from school

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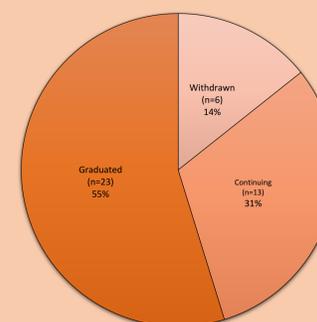


## Implementation

### 160 sessions

- Range: 15 minutes-3 hours in length
- Average length: 63 minutes
- Locations: Faculty offices, academic buildings, residences

## Progress to Degree



## Qualitative Analysis of Synchronous Tutoring Video Content

Content Trend	Student	Tutor
<b>Communication Style</b>	<ul style="list-style-type: none"> <li>• Simultaneous Communication</li> <li>• ASL</li> <li>• Facial Expression</li> <li>• Spoken English</li> </ul>	<ul style="list-style-type: none"> <li>• ASL</li> <li>• Simultaneous Communication</li> <li>• Facial Expression</li> <li>• Spoken English</li> <li>• Grab Attention</li> </ul>
<b>Conversation Content</b>	<ul style="list-style-type: none"> <li>• Providing Information or Expressing Understanding</li> <li>• Respond to questions</li> <li>• Ask questions</li> </ul>	<ul style="list-style-type: none"> <li>• Providing Information or Expressing Understanding</li> <li>• Ask questions</li> <li>• Respond to questions</li> </ul>
<b>Materials Used</b>	<ul style="list-style-type: none"> <li>• Hardcopy homework</li> <li>• Text chat</li> <li>• Online resources</li> </ul>	<ul style="list-style-type: none"> <li>• Hardcopy homework</li> <li>• Online resources</li> <li>• Text chat</li> <li>• Virtual Whiteboard</li> </ul>

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