Online learning opportunities at the high school level have increased in agreement as a teaching assistant to this class, I hosted weekly prior to the start of the intervention, these four chemistry students and ten physical science students attended in-person classes once a week, and independently completed assigned work between class sessions. Students had access to an asynchronous discussion forum for use between class sessions, but participation in the forums was low.

**BACKGROUND**

- Online learning opportunities at the high school level have proliferated in recent years, however there is a lot of variation in the design and effectiveness of these programs.
- Virtual office hours (VOH) are one way to provide additional support for online students.
- VOH were implemented for blended learning students at EMERGE homeschool group, with the intent of exploring their potential effectiveness for fully online students at UT HS, where I have taught asynchronous science courses for the past three years.
- My observations of low engagement and low passing rates for UTHS students inspired this project.

**TREATMENT GROUP**

- Initial attempts to pilot VOH directly with UTHS students did not have sufficient student participation to proceed. Instead, the treatment group was shifted to fourteen high school students enrolled in blended learning classes taught by Dr. John Graves, at EMERGE, a homeschool alternative in Bozeman, MT.
- Prior to the start of the intervention, these four chemistry students and ten physical science students attended in-person classes once a week, and independently completed assigned work between class sessions. Students had access to an asynchronous discussion forum for use between class sessions, but participation in the forums was low.

**INTERVENTION**

- As a teaching assistant to this class, I hosted weekly VOH for EMERGE students, implemented using Adobe Connect.
- At these optional weekly “webinar” sessions, students could ask questions and receive immediate feedback from myself and from each other.
- In addition, I posted discussion prompts and moderated responses on the asynchronous online forum as a lead up to each week’s VOH session.

**DATA AND ANALYSIS**

- Survey results did not reflect any significant differences in student experiences of their course pre versus post intervention. However, student and instructor comments reflected an overall favorable response to the addition of VOH to the course.
- An analysis of the asynchronous discussion forums did support that the VOH intervention led to increased engagement. This was also supported by instructor and student comments.
- The remaining data sources revealed that conditions needed for success of a VOH program include selection of an appropriate platform and student education about the benefits of participation.
- Further factors to consider, depending on the specific goals of the program, include the role of the instructor, supporting asynchronous discussion forums, and the number of students participating in weekly sessions.

**DATA TRIANGULATION MATRIX**

<table>
<thead>
<tr>
<th>Focus question</th>
<th>Pre and Post survey comparison</th>
<th>Stand-alone post intervention survey questions</th>
<th>Anonymous discussion artifacts</th>
<th>VOH videos</th>
<th>Instructor interview</th>
<th>UT HS student survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How does adding VOH change student’s experience of their science course?</td>
<td>X</td>
<td>X</td>
<td>K</td>
<td>K</td>
<td>K</td>
<td>X</td>
</tr>
<tr>
<td>2. How does adding VOH impact student engagement in their science course?</td>
<td>K</td>
<td>K</td>
<td>K</td>
<td>K</td>
<td>K</td>
<td>K</td>
</tr>
<tr>
<td>3. What has this project taught me about the conditions needed for successful implementation of VOH?</td>
<td>K</td>
<td>K</td>
<td>K</td>
<td>K</td>
<td>K</td>
<td>K</td>
</tr>
</tbody>
</table>

**INTERPRETATION AND CONCLUSION**

Overall, VOH were a meaningful addition to the blended learning courses at EMERGE, and likely could be meaningful with my UTHS students. Of particular note was the cyclical student contact through the use of VOH artifacts.

Comparison of pre and post survey responses to Likert-type questions. S = Strongly Agree, A = Agree, N = Neutral, D = Disagree, X = Strongly Disagree. Whiskers on the upper graph represent range of responses. (N=14).