

Tutoring From the Desktop: Facilitating Learning Through Google+ Hangouts

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ABSTRACT

Many studies have demonstrated the effectiveness of tutoring as a teaching strategy. Though much attention has recently been focussed on using the web to extend the reach of the university classroom to high achieving students, comparatively less attention has been paid to the potential of the web to bring personalized tutoring to at-risk students. In this paper, we describe Tutoring From the Desktop, a program in which high school students in California use Google Plus Hangouts to tutor students in Kohlapur, India. We show how a simple structured program can be used to overcome the barriers of time-zones, accents and much more.

1. INTRODUCTION

Advances in technology have impacted the way education is conceived both inside and outside the traditional classroom setting, blurring the boundaries between where and how learning takes place today. New learning technologies have had a significant effect on tutoring and mentoring in the field of education. Advances in networking, the ability to collaborate and share in a virtual environment, communication in synchronous time, and connecting online with a geographically dispersed group of people has revolutionized online tutoring opportunities. Traditional face-to-face tutoring has been freed from the constraints of location and time. It has evolved into a vibrant, diverse, and connected world of tutors and tutees.

This paper describes a pilot tele-tutoring program, Tutoring From the Desktop, that seeks to connect high school students in California with elementary students half way across the globe in Kolhapur, India. Tutoring From the Desktop is a high school student initiative that provides weekly tutoring sessions via Google Hangouts. There are three key components of the program:

1. Peer tutoring (high school students working with small groups of elementary students).

2. Online tutoring (using Google Hangouts to connect synchronously with tutors across the world).

3. Use of Open education resources.

The primary goal of Tutoring From the Desktop is to develop English language speaking proficiency and math skills amongst the students. This paper provides a progress report on this project.

2. RELATED WORK

As the seminal study by Bloom [4] showed, tutoring is far more effective than lecturing. Fig.1 from [4] shows the relative effectiveness of tutoring compared to other modes of teaching. Other studies such as [5] and [16] have also established the importance of tutoring.

The increased access to the Internet has contributed to a new breed of e-tutoring [13] and e-mentoring [15] programs. Programs such as the Electronic Emissary Project, the Tele-mentoring Young Women in Engineering and Computing Project, the International Telementor Project and the MentorNet [7] [2] [11] [10]. These programs sought to leverage the Internet to provide mentoring opportunities where face-to-face mentoring was unavailable. Easy access to technology for all participants ([3], [8]) as well as IT expertise and support infrastructure for on-going participation ([12], [14]) were critical components of the success of these programs.

In education, "tele-tutoring" has come to be defined as using technology to develop and foster tutoring between adult volunteers (with subject expertise) and students outside a traditional classroom setting. Freed from the constraints of time and space, online tutors are not confined to the local community. Tutors can be drawn from any profession, discipline or place in the world. The growth of the World Wide Web has made available a plethora of tools that are simple to use, easy to access and support tutoring that is not constrained by geographical boundaries or proprietary learning resources. The ease of connectivity as well as access to open education resources has provided a fertile ground for grassroots online tutoring initiatives. One such initiative is Tutoring From the Desktop.

3. TUTORING FROM THE DESKTOP

Tutoring From the Desktop is an offshoot of Buddies4math, a traditional tutoring program in the Mountain View School District. Buddies4math (B4M) started in 2010 at Castro Elementary school with 14 students and 8 tutors. Today, it tutors 153 students with a volunteer corps of 60 tutors. It

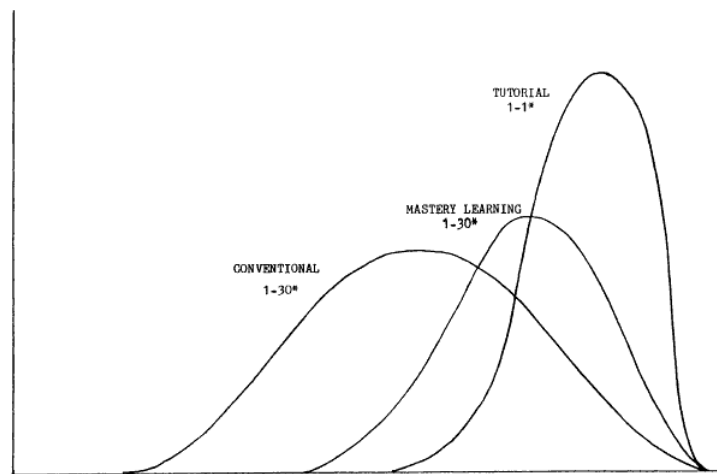


Figure 1: Achievement distribution for students under conventional, mastery learning and tutorial instruction [4]

has expanded to two schools and serves students in grades two through eight. B4M has expanded to teach Scratch programming in two schools and in Fall 2014 will be introducing Scratch in 4 additional elementary schools in Mountain View, California. The focus is on making math fun. It seeks to build self esteem, confidence and skill in math by playing math games. Students look forward to the sessions because they love playing math games with their buddies. To celebrate the success of the students, last spring B4M hosted a Family Math Night where over a hundred families joined to spend time playing math games with their children.

In 2013, we were approached by representatives of Arpan Foundation (<http://www.arpanfoundation.org/>) to create an online tutoring program for students at Helpers of the Handicapped (<http://www.hohk.org.in/>), a school in Kolhapur, India that seeks to provide education for children with disabilities.

The target group for the tutoring program consisted of 45 students (4 second graders, 15 third graders, 16 fourth graders, and 10 fifth graders) split into 3 batches of 15. Most of these students are well below 'grade-level'. Many of them found simple single digit arithmetic problems challenging. Since the students lacked fluency in English, class teachers were present to act as facilitators and interpreters during the session.

Sessions were each one hour and conducted thrice a week (a different batch each day). To account for time difference, they were coordinated so that students in India could come for the session in the morning before their school started while high school tutors in California would be online at night to conduct the sessions. Despite the 12.5 hour difference between California time and Indian time, this schedule worked in favour of both the tutors and tutees. Students would gather in a classroom with a projector, speakers, and a mike to participate in the online session. Tutors worked from their homes to tutor the session via Google Hangout. See Fig. 2 for a screenshot of the Tutoring hangout session in progress. A video of a full session can be found at [1].

3.1 Session Structure

The online sessions were structured to provide both exposure to English while building skills and fluency in math concepts. In addition, because the target group had exposure only to traditional classroom instruction, learning was structured to be fun, engaging and educational. Teachers facilitated the session by translating for students in their native language, Marathi.

In addition to the academic level of the students, there were a number of challenges. In particular,

1. None of the students were fluent in English. Most of them could understand simple English sentences, but we often had to make the same point in multiple ways. Further, the tutors all had American/Californian accents, something the local teachers had never encountered.
2. Most of the students had little to no exposure outside their community in Kohlapur, a small town in Maharashtra, India.
3. This was the first time the students were using a video conferencing system to connect outside India.

Given these challenges, it was clear that the sessions needed to have a certain structure. After discussions with the local teachers and some experimentation, we settled on the following structure. Each session was roughly an hour long.

1. Each session started with an introduction by the tutor. For example, they might say: "Hi, My name is _____. What is your name?".
2. Each student was then encouraged to come up and introduce themselves in English. Much of this was modeled, so students could take the cues from the tutor about how to introduce themselves. In later sessions, the students would say something about themselves. For example, in one session, each of them would say what their favorite color was, and in another session, they would say what their favorite fruit was, and so on.

3. After the round of introductions, an online picture book story would be read. We found the Pearson Foundation's We Give Books (<http://www.wegivebooks.org/>) a wonderful free resource to share a story online. Through Google Hangout's screen sharing, we could share the story on the screen (Fig.3), move the cursor to highlight every word we read, show the illustrations, and wait for the translations by the teacher before we proceeded to read the next page.
4. After reading the story, we moved to number counting. Since the students were not familiar with counting in English, we displayed a hundreds chart on the screen and counted from 0-20 with them. After counting, we played simple additional math and subtraction games online. Fig. 4 is a sample screenshot of one of the games. All our math games were free resources available on the web.
5. The math games were followed by an educational video on YouTube. These videos were designed to expose the students to the world outside Kolhapur and included clips of animals, the solar system and science experiments. We slowly discovered that this was the section of the session that the students looked forward to the most.
6. We ended the session with the tutor modeling English conversational sentences such as: "Thank You! Have a great day! See you tomorrow!"

Sections 2, 3 and 4 of each session took up the bulk of the time. Depending on student interest, we spent about 12-15 minutes on each of them. The video was typically 5 minutes long.

The tutoring sessions started on June 25th 2013. It was started as an experiment over the summer break, but the sessions continued through the fall semester at the request of the school till October 22nd 2013. In all, we held a total of 34 sessions of about an hour each. We started with one tutor (the author) and added two more tutors in the fall. In addition to improvements in math skills, which was expected, the most significant outcome of the experiment was a dramatic improvement in the attitude and confidence of the students. In particular,

1. In the first few sessions, the students were extremely hesitant in introducing themselves. By the end of fall, they would have prepared and would announce their answers for the factoid of the day (favorite color, fruit, etc.) with great aplomb.
2. In the first few sessions, none of them would volunteer an answer for any of the math questions. By the end, almost every question would have many of them shouting out answers.

Indeed, it was felt that one of the most important benefits of the tutoring was the increased confidence in the students and their increased interest in math and English.

The next sections cover the three critical components of Tutoring From the Desktop: peer tutoring, Google Hangouts and open education resources.

3.2 Peer Tutoring

One of the salient components of the program is peer tutoring. All our tutors are high school students, who worked from their home at night to conduct the tutoring sessions. Much of the training with our tutors focused on accent reduction, speaking English slowly and clearly, so that teachers and students in India could understand what was being communicated. We trained students in conducting sessions online, gaining familiarity with Google Hangout screen sharing, sharing YouTube videos through Google Hangout, playing online math games and reading a story online. Tutors gained an understanding of the tutoring by shadowing and observing more experienced tutors conducting a session. We used the Google chat feature to communicate among tutors logging in from different locations in order to run the tutoring session smoothly. When a new tutor ran a session by themselves, the Google chat feature was very useful in guiding them about the process and the next steps without interrupting the flow of the tutoring session. Our tutors found that despite their heavy workload, they could easily make time to tutor these sessions, as they could do it from the comfort of their desktop. We also noted tutor satisfaction in making a difference to students thousands of miles away, without making a trip abroad.

3.3 Google Hangouts

Hangouts are simple, easy to use and the nature of social interaction they engender makes it an ideal online place to come together to share knowledge and collaborate. Other Google features like YouTube, browser, email, chat and drive could be easily integrated into the Hangout session. This facilitated both a better viewing experience for the tutees and a useful tool to coordinate and plan the session among the tutors. Screen sharing allows the tutors to display their screen for the tutees to view. Hangouts on Air allow for the session to be recorded, so it can be used as a resource to track student progress as well as a training manual for tutors. The ability for tutors to join Hangouts from remote locations has provided flexibility and increased efficiency by saving time and energy commuting. It has allowed for zero cost global tutoring initiatives.

3.4 Open Education Resources

The dramatic expansion of high quality, easily accessible, non proprietary content on the Web is a critical precursor to initiatives like Tutoring From the Desktop. A volunteering initiative by high school students to tutor students across the globe could not have gone far, without access to quality content online. Pearson Foundation's initiative, We Give Books was an invaluable resource to our program. Free access to their digital library provided us with stories we could share online with our students in India. We also found the range of educational videos on the National Geographic website and YouTube a wonderful resource to showcase the depth and variety of experiences that students in India could enjoy vicariously.

3.5 Next Steps

The tutoring sessions with Helpers of the Handicapped will resume on Jan 19th 2014. Our main goal over the coming year is to both expand the number tutors and the number of schools.



Figure 2: Screen capture of a Tutoring hangout session. At left is the screen as seen by the students and at right is the screen as seen by the tutors

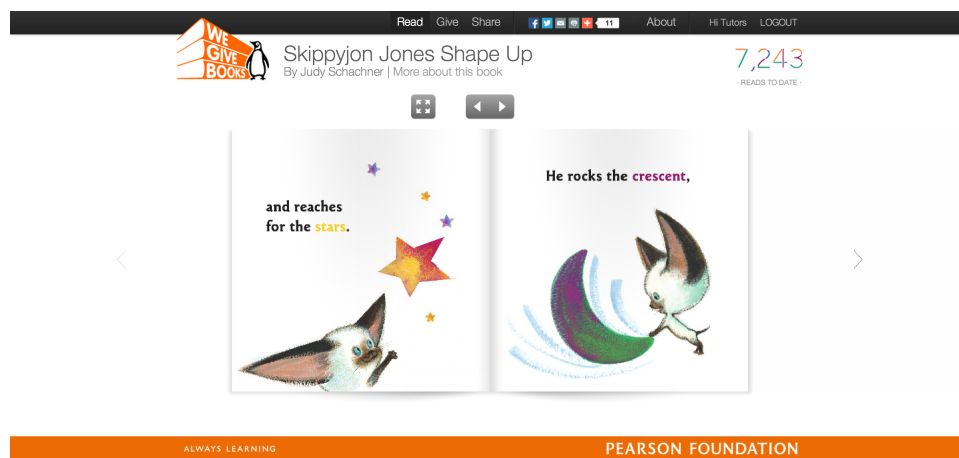


Figure 3: Sample Story Book



Figure 4: Sample Math Game

4. DISCUSSION

Though personalized tutoring has been widely recognized as one of the most effective forms of teaching, the high implied personnel costs have proved a major barrier. One promising approach to overcoming this barrier has been through the use of volunteer resources. In the US and elsewhere, the biggest blocks of volunteer resources come from high school students (trying to accumulate adequate social service hours) and from retired professionals. Given that more than 50% of the public school teachers in the US are over the age of 50, there will soon be a fairly large pool of potential volunteers.

Of course, one of the major problems is that the students who need to be tutored might not be located in the same town/city as the volunteers and that tutee's schools are often closed during the times at which volunteers (especially High School students) might be available (evenings and nights). A program like the one described in this paper offers the promise of bridging this gap. The concept of online tutoring using Google Hangouts is simple and appealing to anyone who would like to make a difference in the life of a student.

As we continue Tutoring From the Desktop, we'd like to explore the possibility of a long term mentoring relationship with our students. The value of mentoring for students has been well documented. The landmark Public/Private Ventures study of Big Brothers Big Sisters found that students who meet regularly with their mentors are 52% less likely than their peers to skip a day of school; 37% less likely to skip a class; 46% less likely than their peers to start using illegal drugs and 27% less likely to start drinking ([9]). In terms of educational achievement, a more recent study found that mentored youth have better school attendance, a better chance of going on to higher education and more positive social attitudes ([6]). In these cases, students and mentors met face to face. Google Hangouts and the methods mentioned in this paper could enable such mentoring to take place even when the mentor and mentee are not geographically proximate. We would like to evolve Tutoring From the Desktop to provide long distance mentoring.

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