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ABSTRACT

This study compared the attitudes of preservice teachers toward using online tutoring versus face-to-face tutoring with K-12 students. California Lutheran University (CLU) developed a service learning, tutoring project within the teacher preparation foundations of education course in the summer of 2000. The CLU school of education purchased an Internet video-conferencing system, Clearphone, to provide student teachers with the capability to connect with their K-12 magnet schools in real time. Clearphone partnered with Educationtalk.com, a Web-based educational service, to develop the concept of online tutoring for K-12 students. A group of 16 preservice teachers participated in the service learning project, with 6 using online and face-to-face tutoring, 6 using online tutoring only, and 4 using face-to-face only. All 16 participants completed pre- and post- intervention surveys on their attitudes toward online and face-to-face tutoring. Data analysis indicated that there were no significant differences among the groups regarding attitudes and feelings of success. Participants were comfortable with both types of tutoring. Comfort levels and attitudes toward both types of tutoring increased after participation in the project. Strong relationships were established through the online tutoring. (Contains 13 references.) (SM)

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Online Tutoring:
Networking Preservice Teachers and K-12 Students

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Abstract: This study compares the attitudes of preservice teachers towards online and face-to-face tutoring with K-12 students. *Clearphone,* an Internet video-phone, and Educationtalk.com, a web-based educational service, are developing the concept of online tutoring for K-12 students. In order to pilot preservice teachers with this online technology, a service learning tutoring project was developed in California Lutheran University's teacher preparation foundation's course in the Summer of 2000. This paper identifies the attitudes of preservice teachers towards the use of this online tutoring technology and compares it to the attitudes of preservice teachers towards the use of face-to-face tutoring. Through analysis of pre/post survey data, results indicate no significant differences in attitudes of preservice teachers between groups. Qualitative data reveals strong relationships established through online tutoring and the value of tutoring in preparing teachers for teaching.

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Introduction

In an effort to Prepare Tomorrow's Teachers to Use Technology (PT3), California Lutheran University's (CLU) School of Education received a federal grant from the United States Department of Education in order to infuse technology into their preservice teacher preparation program. As part of this MAGNETIC CONNECTIONS grant, the CLU School of Education purchased an Internet video-conferencing system, called *Clearphone*, that provides them with the capability of connecting to their K-12 magnet schools through real time.

One of the goals of this grant is to observe preservice teachers and cooperating teachers in these K-12 technology magnet schools through the use of a real-time video conferencing system. *Clearphone* has partnered with Educationtalk.com, a web-based educational service, and is developing the concept of online tutoring for K-12 students. In order to pilot preservice teachers with this online tutoring technology, a service learning tutoring project was developed in one of the teacher preparation foundations' courses in the Summer of 2000.

This paper identifies the attitudes of preservice teachers towards the use of this online tutoring technology and compares it to the attitudes of preservice teachers towards the use of face-to-face tutoring. Results indicate no significant differences in attitudes of preservice teacher between groups.

Research indicates that technology is changing the way we teach. Many have predicted that technology has the potential to change education in dramatic ways. (Hertzke & Olson, 1994; Kent & McNergney, 1998). Through such grants as PT3, the United States Department of Education is funding programs to do just that, prepare tomorrow's teachers to "change education in dramatic ways". Arthur Wise, President of NCATE (1998) suggests that the models provided for preservice teachers are inadequate for today's technological demands on the teaching profession.

> Despite the technology changes in society, being a teacher in American schools too often consists of helping children and youth acquire information from textbooks and acting as an additional source of expertise. Teachers are provided role models of this approach to teaching from kindergarten through graduate school; their teacher education courses provide hints for making textbook-oriented instruction interesting and productive, and as teaching interns, they both observe and practice instruction based upon mastering information found in books. Teachers may be forgiven if they cling to old models of teaching that have served them well in the past. All of their formal instruction and role models were driven by traditional teaching practices. (p.5)

In order to prepare preservice teachers to use technology well, they must experience its use in their own learning. Sandholtz, Ringstaff & Dwyer (1997) indicate that students learn best about the appropriate use of technology in the classroom when they are provided with models of good practice. Institutions of higher education must provide those models when preparing tomorrow's teachers.

Various models of distance learning are changing the way we design and develop educational systems. In distance education and general education, new standards are

being tested and defined based on education principles that include integration of technology into the educational system. (Ragan, 2000)

Distance education is becoming increasingly more visible at the higher education level. Merisotis and Phipps (1999) identify three areas of concern; access to college, the human factor, and pedagogy. It is important to note that distance education can be accomplished synchronously, asynchronously, or both. When teacher and students are connected in real-time distance, synchronously, the human factor exists differently than asynchronously and face-to-face.

In synchronous interchanges, students participate in real time conversations via video conferencing. The advantage of synchronous interchanges include a more direct sense of collegial interaction, immediate resolution to questions posed, and possibly a strong contribution to the team building required to sustain future student interactions. (Carr-Chellman, A.A. & Duchastel, P., 2000)

Depending upon the needs of the institutions and their students, distance education can take different forms and use a multitude of technologies and computer applications. In a study using the CU-See-Me Internet video-conferencing application to demonstrate the viability of offering high school core courses for credit, the researcher found the medium being assessed transparent to the teacher and students, allowing achievement of the same academic results as in the physical classroom. (Gilbert, 1999)

In a project to implement a virtual high school, researchers found, when identifying pre-course fear and concerns of their teachers, that some regarded the lack of face-to-face contact with students as a disadvantage that might make engaging students more difficult; others saw it as a strength of the "virtual medium" that could actually increase and improve teacher-student contact. (Roblyer & Elbaum, 2000) In comparing the effects of distance learning vs. face-to-face courses, Roblyer (1998) found that student attitudes play an important factor.

Limited research exists in the world of online tutoring or videotutoring. Nichol and Watson looked at the impact of videotutoring upon the tutor-tutee relationship where the videoscreen has replaced face-to-face contact. (2000) Their study identified the crucial role of non-verbal communication in videotutoring. Results indicated that videotutoring differs from face-to-face interaction in that the three-dimensional context is replaced by a two-dimensional image on a screen. Direct eye-to-eye contact is replaced by screen-focused gaze, and the spatial relationship between bodies and is apparent rather than real. (Nichol and Watson, 2000)

Baggott and Wright developed another study regarding the use of Desk Top Conferencing (DTC) in school biology education to give A-level students a series of enrichment tutorials in Cell Biology. (1997) The 12 subjects were divided into two groups ; one group was given a series of on-line tutorials, via DTC and the other group was taught face-to-face in the classroom. Although sample size is noted as a restraining force, the findings indicate that there is no significant difference between the learning outcomes from the on-line and face-to-face tutorials.

In pairing college students with eighth graders, the online tutoring program of Boston Public library designed a system to tutor middle schools from their five library branches to college student tutors in their dorm rooms. Students and tutors had access to virtual classrooms that contained a whiteboard, a box telling them who was in the room, a box for online chat and microphones. Findings indicated that younger students loved the

one-on-one attention and the library was able to recruit a pool of outstanding tutors that were unable to travel to the library branches. (Glick, 2000)

The purpose of this paper is to identify the attitudes of preservice teachers towards online tutoring and face-to-face tutoring. The research questions are:

1. Is there a difference between preservice teachers attitudes towards online tutoring and face-to-face tutoring?
2. Is there a difference between tutoring success for online tutoring and face-to-face tutoring?
3. What type of relationship exists between the preservice teacher and the K-12 student when tutoring online and face-to-face?

Methods

As part of a service-learning project for an Educational Psychology course, preservice teachers were given the opportunity to participate in a tutoring project. These preservice teachers could volunteer for approximately six hours of online tutoring or face-to-face tutoring. The online tutoring was available on campus through EducationTalk.com and the use of *Clearphone* software. The face-to-face tutoring was accessible through individual preservice teacher contacts.

Sixteen preservice teachers participated in the project. From those sixteen, six preservice teachers participated in both online and face-to-face tutoring, six preservice teachers participated in online tutoring only, and four preservice teachers participated in face-to-face tutoring only. Prior to participation in the project, the preservice teachers developed a survey focusing on attitudes towards online and face-to-face tutoring. All sixteen preservice teachers were administered a pre-survey and a post-survey in order to gather data regarding these preservice teachers attitudes towards both online and face-to-face tutoring.

The twelve preservice teachers participating in online tutoring were using the *Clearphone* system. *Clearphone* is a real time, synchronous, Internet video-phone that can:

- Send & receive audio and video over the Internet
- Send & receive text whiteboards that speak the text
- Send audio whiteboards that play recorded messages
- Send & receive any type of file
- Use shared whiteboards on the WWW
- Paste pictures, graphics and text into whiteboards and send & receive over the Internet.

CLU's School of Education provided four laptop computers with the *Clearphone* system and cameras. The systems were set up for internet connectivity in four different classrooms in one building on the Thousand Oaks campus. Preservice teachers worked in pairs in these classrooms to tutor students at Educationtalk.com offices in Anaheim, California.

These preservice teachers tutored students on Tuesday and Wednesday afternoons from 3:00-5:00pm for two weeks at the beginning of June, 2000. The students being tutored in Anaheim ranged from 5th through 12th grade. The content for tutoring was math. K-12 students would bring their homework and work with the preservice teachers

in areas of need. The content ranged from polygons to algebraic equations. Preservice teachers were being prepared for multiple and single subjects credentials, some including math content areas.

Preservice teachers were administered a pre-tutoring and a post-tutoring survey in order to gather information for research into the development of distance learning services. Preservice teachers were asked to respond to statements on their comfort level of tutoring either online or face-to-face. Also, they were asked to respond to their comfort level regarding the use of such technologies as email, chat rooms, internet resources, TV/video, telephone conferencing, and video conferencing in relation regular use and use during tutoring. Other statements asked for their attitudes towards or perceptions of tutoring and statements relating to the relationship with the students they tutored. In addition, general information was collected on teaching experience, type of service learning project, and type of teaching credential pursued.

Qualitative data was also collected from the preservice teachers. At the end of the project, all preservice teachers were required to write a report regarding their service learning experience. In addition, some preservice teachers chose to write journal entries during the tutoring experience.

Results

Survey results are reported in quantitative form with descriptive statistics. Journal entries, service learning reports, and other written feedback are reported in qualitative form for the purposes of this paper.

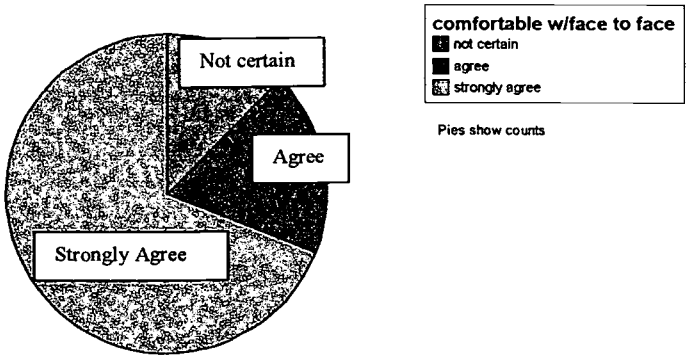
Quantitative Data

Quantitative data was analyzed on sixteen pre-surveys and sixteen post-surveys. For the purposes of this paper, quantitative results are reported in the areas of comfort level with tutoring, comfort level with the technology, preservice teachers' attitudes towards tutoring, and preservice teachers' perceptions of their relationships with the K-12 students.

Comfort Level with Tutoring

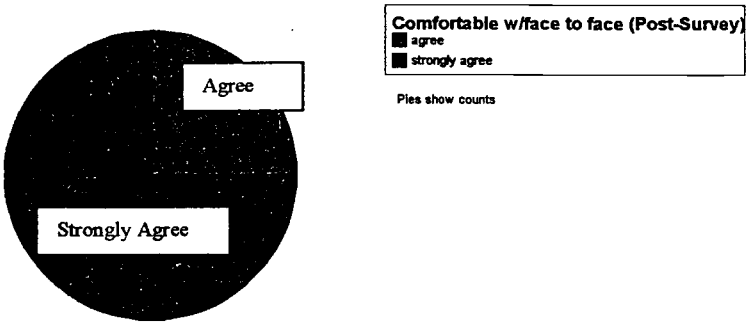
Pre-Survey results show all sixteen preservice teachers comfort level with face-to-face tutoring responding to the statement "I am comfortable with face-to-face tutoring." Responses were on a 5-point Likert scale where 5=strongly agree, 4=agree, 3=not certain, 2=disagree and 1=strongly disagree. Results indicate a mean score of 4.56 and a standard deviation of .73.

Pre-Survey: Comfort Level w/Face-to-Face Tutoring



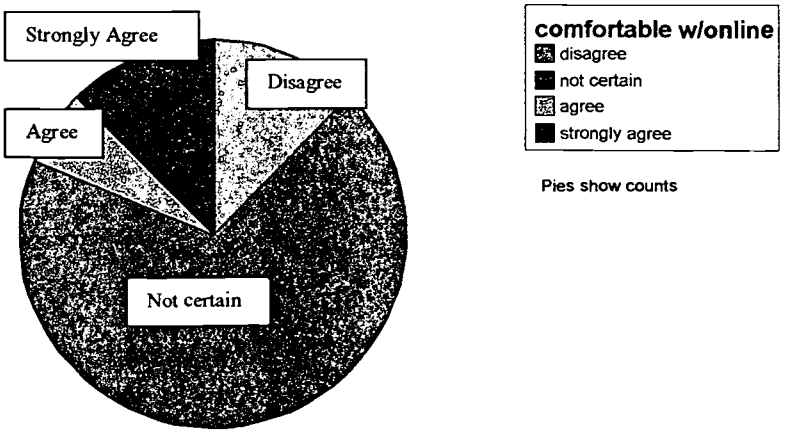
With the same statement on post-survey results, preservice teachers responded more positively toward face-to-face tutoring with a mean of 4.75 and a standard deviation of.45.

Post-Survey: Comfort Level w/Face-to-Face Tutoring



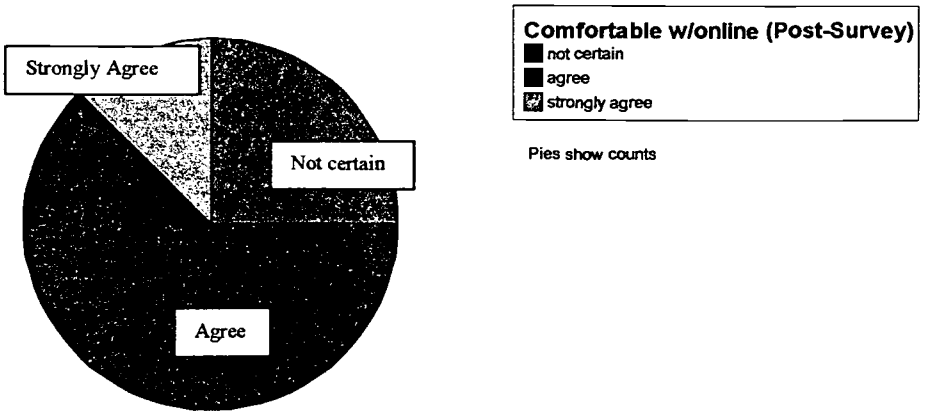
With the statement "I am comfortable with online tutoring" pre-survey results show preservice teachers' uncertainty with online tutoring. Using the same 5-point Likert scale, results indicate a mean score of 3.19 and a standard deviation of .83.

Pre-Survey: Comfort Level w/Online Tutoring



Post-Survey results on this indicator, show an increase in comfort level of online tutoring for all preservice teachers with a mean of 3.88 and a standard deviation of .62.

Post-Survey: Comfort Level w/Online Tutoring

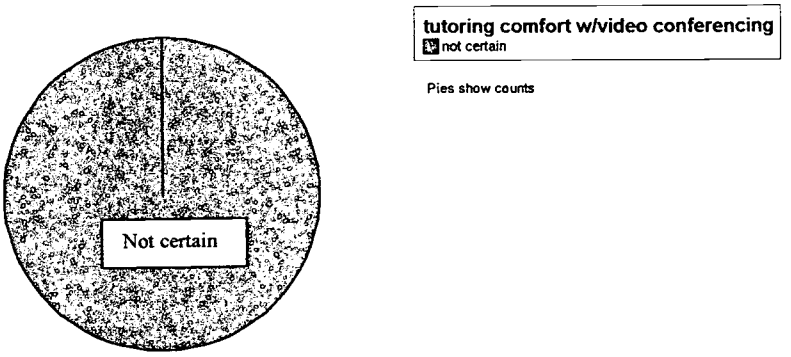


Comfort Level with the Technology

Prior to the tutoring experience, all preservice teachers identified their comfort level towards tutoring with the video conferencing technology. Subjects were asked to rate their comfort level with video conferencing technology while tutoring using a Likert Scale of 5=very comfortable, 4=comfortable, 3=not certain, 2=uncomfortable 1=very

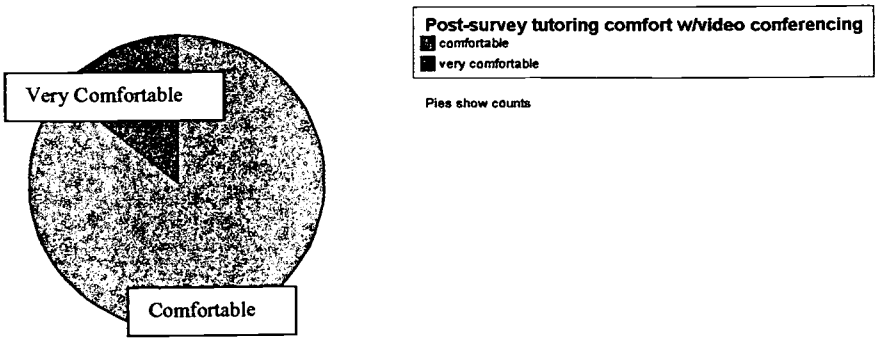
uncomfortable. On the pre-survey, results identify a mean score of 3.00 with a standard deviation of .00.

Pre-Survey: Tutoring Comfort Level w/Video Conferencing



After the two-week tutoring experience, comfort level changed towards tutoring with video-conferencing technology. On the post-survey, subjects responded with a mean score of 4.14 and a standard deviation .38.

Post-Survey: Tutoring Comfort Level w/Video Conferencing



Preservice Teachers' Attitudes towards Tutoring

In order to identify preservice teachers' attitudes towards and perceptions of prior tutoring experiences, subjects were asked to respond, using the Likert Scale of 5=strongly agree to 1=strongly disagree, to the following statement:
"I have had successful experiences tutoring"

Pre-survey results show the following:

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
successful experiences tutoring	16	3	5	4.31	.79
Valid N (listwise)	16				

Post-Survey results identify a positive increase in attitudes towards tutoring success and Analysis of Variance results show no significance difference between the three groups of face-to-face tutoring only, online tutoring only, and both face-to-face and online tutoring.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Post-Survey successful experiences tutoring	16	4	5	4.56	.51
Valid N (listwise)	16				

ANOVA

Post-Survey successful experiences tutoring

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.750E-02	2	1.875E-02	.062	.940
Within Groups	3.900	13	.300		
Total	3.938	15			

Preservice teachers' attitudes towards tutoring experiences were further quantified when subjects were asked to respond, using the Likert Scale of 5=strongly agree to 1=strongly disagree, to the following statement:

"I am enthusiastic about tutoring"

Pre-survey results show the following:

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
enthusiastic about tutoring	15	2	5	4.33	.82
Valid N (listwise)	15				

Post-Survey results identify a positive increase in attitudes towards tutoring enthusiasm and Analysis of Variance results show no significant difference between the three groups of face-to-face tutoring only, online tutoring only, and both face-to-face and online tutoring.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Post-Survey enthusiastic about tutoring	16	4	5	4.69	.48
Valid N (listwise)	16				

ANOVA

Post-Survey enthusiastic about tutoring

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.604	2	.302	1.386	.285
Within Groups	2.833	13	.218		
Total	3.437	15			

Preservice Teachers' Perceptions of their Relationships with the K-12 Students.

In order to identify preservice teachers' perceptions of their relationships with the K-12 students, subjects were asked to respond, using the Likert Scale of 5=strongly agree to 1=strongly disagree, to the following statement:

"I have a relationship with the student I am tutoring"

Post-Survey results identify a relationship with the tutee and Analysis of Variance results show no significance difference at the .05 level but there is a difference at the .10 level between the three groups of face-to-face tutoring only, online tutoring only, and both face-to-face and online tutoring.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
relationship w/student	16	2	5	3.88	1.20
Valid N (listwise)	16				

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.750	2	3.875	3.598	.057
Within Groups	14.000	13	1.077		
Total	21.750	15			

Qualitative Data

Under review of the qualitative data regarding online tutoring, the following observations have been identified into the area of general experience, use of the technology, relationship with the tutee, and suggestions for consideration.

- ***A positive experience***:
  "My experience with online tutoring has increased my self-esteem in teaching and given me the opportunity to work with technology in a teaching situation."
  "The project has reinforced my desire and intention to join the teaching profession. I walk away from this experience with the enrichment of helping students, a better understanding of internet technology, and true sense of the value on one-on-one time with students."
  "I am truly thrilled that I got to be a part of the Educationtalk.com tutorial sessions. Not only did I learn about the computers, but I also got over my fear of tutoring."
  "I am so excited that I have the knowledge from Educationtalk.com to implement in my future years as a teacher."

- ***Impressed with the technology***:
  "In doing this service learning project, I have learned what can be done with current technology to facilitate on-line tutoring. Before I did not think that you could hold a conversation and see video very well over IP. Now, even though there is lag time, I see on-line tutoring as a valuable resource."
  "I feel this has been an invaluable experience because of the development and growth that I see taking place regarding online tutoring services. It definitely is the wave of the future. One of the highlights of the technology aspect of this project took place when I finally was able to capture an image on the shared whiteboard and send it to the student. This made it so much easier to work problems out together by showing step by step how to work through the problems."
  "For me the highlight of this project was the knowledge that this type of technology is the direction of the future, and I now have a step up by having learned to use it."
  "I was able to take with me an appreciation that this technology exists that allows us to hear and see one another from thousands of miles apart. It is

phenomenal for the small price involved to purchase the software and camera for your existing computer."
"Along the way, the program's help desk gave us tons of support and showed us some interesting things that could be done with the online tutoring package. I was very impressed with the program."

- ***Established a relationship with the tutee***:
  "The highlight of this experience was the moment that I knew that the student I was tutoring caught on to what they needed help with."
  "I think the highlight of this tutoring experience was the gratification from the children. In the online tutoring, when the children would send a thank you note on the whiteboard was very gratifying."

- ***Suggestions:***
  "I also learned that it would be valuable to have a scanner at both locations. We had a student who only read part of a problem and we could not figure out how to solve it until the whole problem was read. Scanning in the problem would have left no room for confusion."

Discussion of Results

The major findings in this study identify no significant difference between the attitudes and perceptions of preservice teachers towards face-to-face tutoring and online tutoring. The one area that shows some difference between groups is the relationship established between the tutor and the tutee.

Quantitative results support the increases in comfort level for both face-to-face and online tutoring. Pre-survey means for face-to-face (4.56) and online (3.19) tutoring show different levels of comfort and this may be due to the fact that more than half of the preservice teachers had experiences with face-to-face tutoring and none of the preservice teachers had experience with online tutoring. Interestingly, even though some preservices did not have experience with online tutoring, they felt somewhat comfortable prior to the experience and this is most likely due to their technology comfort level. On the post-survey, means increased on comfort level with both face-to-face (4.75) and online (3.88) tutoring. With all subjects responding, this shows increase in comfort level with both forms of tutoring for all subjects even though some preservice teachers chose only one form of tutoring. It appears that online tutoring increases comfort level with face-to-face tutoring as well. Although most subjects seemed uncertain of their comfort with online tutoring prior to their experience, all subjects, except for four, now felt comfortable or very comfortable with online tutoring. The four subjects who were uncertain on comfort level after the tutoring experience were exposed to the online technology but chose tutoring face-to-face.

Comfort level related to tutoring with the video conferencing technology increased from a mean of 3.0 to 4.14. Prior to the experience, subjects were uncertain with their comfort level in regard to tutoring with video conferencing, but their comfort level increased to feeling comfortable and very comfortable with the video conferencing technology.

Findings are interesting in identifying attitudes of preservice teachers toward tutoring. Descriptive data revealed an increase in feelings of success with tutoring from 4.31 to 4.56. All subjects responded and ANOVA results indicate no significant differences between groups. Although students may not have felt extremely comfortable with the technology, their feelings of success were not significantly affected. Their enthusiasm towards tutoring increased as well from 4.33 to 4.69 with no significant differences between groups. Qualitative data supports this as well. One preservice teacher commented "my experience with online tutoring has increased my self-esteem in teaching". For some preservice teachers, this was their first real teaching experience with K-12 students and it was quite positive.

The one area where the descriptive data identifies some differences between face-to-face and online tutoring is with the relationship between the tutor and the tutee. The mean is 3.88 with a standard deviation of 1.20. This shows that subjects were between uncertain and agreeing that they have a relationship with the student they were tutoring. Some of this can be the result of the short amount of time spent with the tutee. Subjects were only required to have a six hour tutoring experience, although some subjects chose to extend their time. In observing preservice teachers with online tutoring, it was obvious that some relationships were established because some K-12 students would request a certain tutor that they had the day before. A hindrance to the relationship building was the fact that preservice teachers were paired when tutoring K-12 students online. The purpose for pairing was because some preservice teachers felt uncomfortable with the technology and other felt unprepared with the content. It is important to note that preservice teachers were not informed in advance of the tutoring content needs that would be addressed for tutoring online.

The qualitative data shows another side to the relationship that existed between preservice teacher and K-12 students when tutoring online. Data reported comments like "I think the highlight of this tutoring experience was the gratification from the children. In the online tutoring, when the children would send a thank you note on the whiteboard was very gratifying." Both subjects seemed to enjoy the group whiteboard for communication and sometimes a thumbs up was given to quicken the response rate. These results are not uncommon to the Nichol and Watson study which identified the crucial role of non-verbal communication in videotutoring.

The qualitative data provided some insight into networking preservice teachers with K-12 students for tutoring purposes. Preservice teachers commented on the value of the tutoring experience in preparation for their career as a teacher. For some preservice teachers, this experience validated their decision to become a teacher and helped them to realize the connection they have with K-12 students.

Conclusion

All findings show no significant differences between the attitudes and feelings of success between face-to-face and online tutoring. Most surprising in this study were the relationships established through online tutoring and the value of tutoring in preparing teachers for teaching. This research suggests further study with online tutoring where preservice teachers work individually with K-12 students, they are given the content in advance of the tutoring, and the experience last for at least six weeks.

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