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DISTANCE ADVISING

An Interactive Qualifying Project Report

submitted to the Faculty

of the

WORCESTER POLYTECHNIC INSTITUTE

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Degree of Bachelor of Science

by

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1. Advising
2. Communication
3. Computer Technology

TABLE OF CONTENTS

I. INTRODUCTION

Worcester Polytechnic Institute and its project sites are designed to give students an opportunity to experience a new culture and country while they complete the requirements of the WPI Plan. However sometimes the students are advised at a distance because of reasons that are beyond their control. The distance-advising program may be an invaluable program to the school and the students; it allows more students to benefit from this once in a lifetime experience.

The goal of this project was to evaluate the effectiveness and benefits of a project advised from a distance and to present recommendations of ways in which to increase these benefits. Past distance advising situations will be researched. Projects will be evaluated and followed during their completion and students reactions to the distance advising situation will be documented. Both scenarios where the advisor was present with the groups as well as when the advisor was still at WPI will be evaluated. Information will be collected from these project groups utilizing surveys and interviews to evaluate the effectiveness of distance advising.

Information collected will be interpreted and evaluated to determine the cause of any problems experienced and to provide a basis for which to recommend changes to the program. Technology to be used for communication will be used and evaluated for functionality and social interaction will be taken in account during interpretation of survey and interview results.

Through interviews and background research in the quality of the projects produced and the success of those students utilizing distance advising, unbiased and

accurate data was collected and evaluated. This data was used to produce the recommendations and conclusions presented in this report, which may provide additional guidelines to make distance advising more effective.

II. LITERATURE REVIEW

2.1 Learning at a Distance

Distance learning has become a more feasible means for education. Distance learning can be defined as the teaching-learning arrangement in which the teacher and learner are separated by geography and time (Williams 2). It's beginnings as a way for those students who lived in rural areas to gain access to education are a thing of the past. "Open and distance learning has the potential of generating new patterns of teaching and learning"(Williams, 17). Distance learning's links with technology are opening up new opportunities, which can be used in advising as well. "Face to face" instruction is a main benefit of distance learning, and is necessary for advising.

Distance learning is sometimes incorporated into education for school aged children however the largest use has been for adults to take classes and now for colleges and universities to offer courses that normally couldn't be offered. In addition it has been the only way for underdeveloped areas to expand their education systems without having the expense of educating thousands of teachers and building millions of dollars worth of facilities (Williams 16).

Education has largely been "locally" controlled. Schools were in the center of a town, or classes were centered to a campus. Internet technology is dissipating that idea. The use of technology cannot be forced but incorporated based on the uses and needs of the instructor. One very significant methodological development is "participatory design"; this is when an instructor or software designer has first hand knowledge of both advanced technical aspects and social aspects of a design. This is further incorporated as instructors use, as well as suggest changes and advancements for, each technology. The

key is for the instructor to take the initiative to decide what technology is appropriate. (Carroll 5)

Distance learning began with simple audio and video recordings. Broadcast lectures have become commonplace and many school systems own cable and local channels used simply for educational purposes. However, the need for technology has been the cause of the recent growth in technology and the technology has been developing so quickly that many of the newest and most promising technologies have not been available long enough to be studied in their every use. Most literature still concentrates on telephone line communications and modems, as well as the "newly developed video decompressors". These uses are important, however, as they are the basis for the development of the current technology. Telephone communications are still the basis for communication, even overseas. However, the main value of distance learning is the communication of information and there are many methods being developed to serve this purpose.

Many techniques are used and many problems arise, many of them similar or the same as in distance advising. (Horner 14) Some of the main problems include:

Time difference: Communicating with advisees or an advisor who is working on a schedule quite different from your own can be difficult. A few hours can make a huge difference in communication. One party is working, while the other is sleeping. Some problems just can't wait till the next morning.

Availability: Unlike being on campus where an advisor could possibly be found sitting in his office or searched for around campus, telephone messages may sit for hours

before being checked when perhaps a question which could have been answered in a few seconds could have been asked just by interrupting the advisor during lunch.

Discussion: People portray ideas through a variety of means, visually, orally, and through written word and drawings. This is more difficult from a distance and technology must be advanced to be able to use all means of communication necessary.

Expense: There is no doubt that communicating as well as traveling over a distance is expensive and requires certain resources.

2.2 Communication Technologies

2.2.1 International Phone Calls

There are several technologies, which can be used to overcome these issues. One is the telephone, but this does not overcome time or availability, only distance. It also does not provide for any means of communication other than oral. In the case of advising only live interacting communication is useful because the problems that arise are specific to each student or project and cannot normally be predicted. Telephone calls allow for instantaneous communication and immediate response but are also expensive, especially intercontinental.

2.2.2 Electronic Mail & Internet Chat Programs

The Internet is a popular, inexpensive and effective means of communication. There are many ways the Internet helps to transfer information. For communicating information generally to a large number of people to view at their leisure, there are e-mail groups with personalized web sites, including but not exclusive to Yahoo Groups, Topica

and VP Mail. (http://www.list.to, www.topica.com/create, www.groups.yahoo.com)The e-mail groups send notifications to all members when there is a new posting on the site and allow for more users to join and for info to be posted instead of sent directly to each person. E-mail can be used for more personalized communication, and specific questions.

Faster response time message delivering services are instant messaging services such as, AOL Instant Messenger and ICQ. Both of these are free instantaneous communication services, which communicate through typed messages or file transfers. They are also now equipped with built in features to talk using a microphone through the computer. For example, the newest version of ICQ, ICQ2000b, has several features that could serve very useful. ICQ not only has the ability to make PC to PC calls but also PC to Phone calls as well as pager and cell phone messaging systems. (www.ICQ.com)

Both messaging systems require that users have the identification number or name of the person they wish to contact. AOL Instant Messenger has a new feature, which allows the AOL server to remember a user's "buddy list". This feature allows a user to contact anyone on his or her buddy list from any computer with an Internet connection without having to remember the screen name of that person. This can be very useful if a student has a question and is not near his or her own computer, or if a project team needs to contact their advisor from a computer they hadn't been using before. (http://www.aol.com/aim/home.html)

2.3.3 Videoconferencing

One of the most effective new technologies introduced is desktop videoconferencing. Using a camera and microphone setup, software sends video and audio signals between computers. These live video and audio feeds can allow for body language, oral communication and if necessary the showing of a hand drawn illustration over a long distance.

Although video conferencing is very convenient it can be somewhat difficult to use and depending on the service being used, unreliable. NetMeeting is a Microsoft based program, which provides online chats and bulletin boards as well as file transfers and video and audio conferencing in "real time". It is also possible to send video and audio feeds to a user who does not have video hardware. NetMeeting provides a whiteboard to be used during communication on which can be displayed graphics, text or a document from almost any windows based program. This can allow for the sharing of documents drawings and viewing of important materials simultaneously by both users. In addition more than one user can be connected to a conference allowing multiple users to interact if the resources are available.
(http://www.microsoft.com/windows/NetMeeting/Features/default.ASP)

This program could be invaluable for communication, but also has its drawbacks. In order to make this software work properly it is necessary to have certain minimum requirements. In order to install and run NetMeeting it is necessary to have at least a 90MHz processor as well as a 28K modem. However, if a user wishes to use the video, audio and file transfer features then, the quality of the connection and hardware will

affect the software's performance. In many cases it is the speed of the connection to the Internet, which is the governing factor over the function of this software. The connection speed can vary and can affect the speed and quality of the data transfer, be it a video and audio stream or simple file transfer. However, NetMeeting does provide the necessary means to transfer information in real time and allow for real discussion. Used in conjunction with other programs and technologies such as ICQ, AOL or a telephone NetMeeting could prove to be an asset in communication. (http://www.microsoft.com/windows/NetMeeting/Features/default.ASP)

There are always new technologies being developed. Some which may soon be functional and affordable for distance learning and distance advising. One of these is the virtual classroom. Live audio and video streams for lectures or discussions can be seen through a 24-hour virtual classroom. Assignments can be worked on, reviewed and edited and e-mail and chat can be utilized. One different feature would be that any lecture or discussion could be played back for further analysis (Vin 97). This could be especially helpful during an advising session when students need extra clarification or during a lecture to review a point missed.

There are other drawbacks to these technologies. The expense of the Internet varies. There are numerous free Internet services, so immediate expense is no issue, but the cost of the equipment: cameras, microphones, computers, can be depending on one's budget. In addition since the topic being discussed is distance advising overseas it must be noted that the U.S. is a very advanced technological country. Many countries may not have technology capable of using these technologies to their fullest potential. However, they do allow for communication, and have shown to be reliable when properly used.

2.3 Advising

2.3.1 Academic Advising

Fundamentally advising can be stated as clearing up confusion (Kramer 9). It is up to the advisor to assist the student in clearing up the student's confusion on particular ideas.

The main role an advisor must fulfill is that of authority or knowledgeable expert (Crockett 8). The advisor must know and understand the inter-workings of the institution or in the case of a project, understand the methodology to open ended problem solving as well as help to "identify and assess alternatives and consequences of decisions" (http://www.wpi.edu/Admin/OAA/Handbook/sect1.html, National Advising Guidlines). It is necessary for the advisor to possess this knowledge and experience as well as the ability to communicate his or her ideas effectively.

There are certain conditions, which must be set for the advisor-advisee relationship to be beneficial. There must be a set of conditions, which is agreed upon by both parties as to the responsibilities of each (Kramer 11). In addition, any and all preconceptions about advisors or students must be vanquished before meeting to assure that each person is treated in a manner indicative of who they are and not who they are preconceived to be (Kramer 13).

The skills needed for academic advising and for project advising are similar; however they are required in different degrees so the two forms of advising should be separated. "Academic advising refers to specific academic matter, such as, course selection, programming, dropping and adding courses, and advice rendered" (Kramer 35).

The skills needed for academic advising are usually ones of knowledge of the system. The advisor is relied upon to ensure that the advisee is working toward completing institution requirements. The advisor cannot make decisions for the student (Crockett 59). The advisee makes the decisions but must ask the advisor for the information.

One technique used is self-advisement. This technique "encourages student responsibility in the advising and decision making process (Crockett 7)." This is particularly relevant at WPI where an advisor may have many advisees and where the requirements for each major are available and are relatively strict. Instead of setting the courses for the student, the advisor should instruct the student on how to choose courses. Then, it is the advisor's responsibility to check the course selections for relevance and requirement fulfillment and make suggestions to the student. (Crockett 7)

Self-advisement is particularly useful for project advising, since the student, not the advisor, is completing the project. However, academic advising sometimes requires a different approach, perhaps an approach of more structured aid. Many students have busy schedules and extra-academic responsibilities. The advisor at times must assist the student in developing a structured study plan. The advisor may be required to teach time management and frequent communication with the advisor may be necessary to maintain this plan (Winston, 262).

Often, especially at WPI, students have questions, such as "How do I get a double major?" "What types of classes should I take if I am unsure of my major?" "Should I apply to Graduate school, and how should I prepare?" These are all questions, which require direction and information to be provided by the advisor, and when these questions arise communication is very important. One of the main problems with communication

can be availability (Crockett 10). Technology could end this problem altogether. The technology to be used could bridge the distance gap as well as overcome the convenience issue of not having time to visit an advisor's office.

2.3.2 Project Advising

Project advising is different. Self-advising here is of the utmost importance. It is necessary that the advisees solve problems for themselves, so when problems arise communication becomes all the more important. The advisor must be able to understand the problem and then be able to effectively communicate to the advisees an idea of how to go about solving it. Unlike distance learning, distance advising requires discussion, instantaneous feedback on ideas, and personal attention. The advisor has a more difficult task in that the questions to be asked will not be of an informative nature but of a helpful nature. This is where listening and communication skills will be needed.

The study being conducted in this project on technology in advising will be easier knowing the qualities necessary for effective advising. Aspects of distance advising that are specifically affected by technology will be more evident and easier to isolate and identify with knowledge of advising in general.

2.3.3 Distance Advising

One year ago, a project team at WPI studied Distance Advising for projects as a subject (Daelhousen). Distance Advising raises somewhat different, although similar, issues from distance learning and because it is project advising and not academic advising the differences are greater still from previously studied techniques. The groups

to be studied are working on either their senior project, the Major Qualifying Project (MQP) or their junior level project, the Interdisciplinary Qualifying Project (IQP). In distance advising it is necessary for the advisees to be prepared to use the technology at hand. Preparation of the students before their departure gave an advantage to the IQP teams, which went after the MQP team returned. By understanding the capabilities of the technology and also how to use it, it became easier to set goals and make clear the intentions of the project. (Daelhousen, 69)

The students' comfort with certain technologies was apparent, and in addition the professor's aptitude with certain technologies played a role in deciding the methods of communication. The individual confidence of the students from past experiences also was a problem. The MQP students had already completed a project and therefore were prepared for the rigors of project work; the IQP students were learning for the first time and had more questions and issues, and relied more heavily on the technology to communicate. (Daelhousen, 70)

Knowing the technology available, and the techniques and strategies needed for advising, identifying the best uses of the technology and where faults lie will be much easier. Distance advising employs many of the general advising techniques. Academic advising will benefit greatly from the use of technology on our "wired" campus, and the surveys will help define what areas are lacking and where fault lies, if any. Distance learning technology correlates to distance advising in the procedures and use of the technology and the outcome needed. The technologies, which were created in order to give more "face to face" meetings for learning, are exactly the same technologies that need to be employed for distance advising. Of lesser importance are the techniques used

for presenting lectures, as there are no lectures in advising because each student needs individual attention for individual problems. In all, when the separate information is used together, a picture of distance advising can be presented and it can be seen that the technology necessary to provide the needed communication is available. The survey information will allow for the development of surveys that identify how the technology is being used as well as if and when the technology is used to its full potential.

2.4 Surveys

2.4.1 Creating a Survey

To make sure that a survey will be conducted in the correct manner, and to ensure that all data received is correct and able to be interpreted, a standard process should be used. This process involves 5 phases, which are (1) pre-survey issues, (2) survey construction, (3) survey administration, (4) data entry and analysis, and (5) presentation of findings. (Rosenfeld, Edwards, Thomas)

In efforts to diagnose a certain problem, surveys generally help in determining where the problem is originating. Questions should be geared toward determining preferences of technology, work related attitudes, or other problems at hand. A group of people called a "survey team" will decide what to base the questioning on and how the answers should be manipulated. (Rosenfeld, Edwards, Thomas) Depending on the size of the test population the survey can be conducted as an interview, for smaller populations, or done anonymously for more sensitive topics.

The first step of constructing the survey is to identify all dimensions of the problem at hand, and to create the questions efficiently the first time to reduce the amount

of sampling errors. In order for the questions to be understood as they are meant to be, short, simple and declarative sentences that help the respondent answer the questions with ease should be written (Rosenfeld, Edwards, Thomas). In addition the questions should not be biased or leading, and require very little time of the respondent. Sometimes the survey team already knows what the answers are going to be to the given questions; therefore the answers should be supplied. This will reduce the amount of analysis time. In a situation such as this, five points should be used for answering questions. The points and anchors for such a rating scale are typically 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. (Rosenfeld, Edwards, Thomas) On the other hand open-ended questions can be used to get more information from each individual, but require post-survey coding, creating more analysis time. However, using the five-point method and the open-ended method together the respondent has the option to write in additional comments to the question. This enables the analyst to further the understanding of the answers given by the respondent. Although, the open-ended questions should be kept to a minimum.

2.4.2 Pre-Testing Surveys

Once the survey is completed some experimental trials of the survey are done to see if any changes need to be made before distributing the surveys. The trials are used for feedback on how to improve the overall survey. Any recommendations that are made are considered. Requirements for a satisfactory survey are, understanding the questions, short and to the point objective, and the ability to answer the question easily. All of these are taken into consideration when the trial surveys are evaluated. Making sure that the

survey is easy to complete helps the survey team evaluate the responses easily and present them in an understandable form.

2.4.3 Distribution

The surveys must then be distributed to the respondents, and that can be done in five different ways: paper and pencil, scanner (bubble) sheets, computers, telephones, and personal interviews. (Rosenfeld, Edwards, Thomas) Some factors come into play in deciding how to distribute the surveys, such as population size, location of population, and content of the questions (personal or general). If the population size is small then the whole population should fill out a survey. However if the population is large then a sample population must be questioned, so that enough data is collected to reduce the amount of sample errors. This is necessary because the smaller the population, the larger the variance is of sample errors that occur, and the larger the population the smaller the variance that occurs. Depending on the location of the population the surveys can be delivered by mail or personally. It must be remembered that the surveys should be delivered so that the respondent has time to complete it and return it to the survey team for analysis.

2.4.4 Evaluation

All the surveys have been distributed and returned, the data must be analyzed so that a conclusion can be made. All the questions with a rating scale can be evaluated first, followed by the coding and interpretation of the open-ended questions. The questions with a rating scale and narrative answers help the survey team to further

understand the feelings of the respondent and tell if the question was too vague or not. Open-ended questions can be sorted in several different ways, for example: favorableness or unfavorableness, or according to content. (Rosenfeld, Edwards, Thomas) The narrative answers are coded by number as if it was a rating scale and evaluated. Sometimes questions may go unanswered creating confusion in the analysis, because the reason for leaving the question blank is unknown. Questions can be left blank for numerous reasons such as not understanding the question, just forgot to answer the question, fear of answering honestly, or the question wasn't relevant to the respondent. Minimizing the amount of unanswered questions is difficult, but a few ways that can help are keeping the survey length to a minimum, providing a sixth rating scale of 'not applicable/don't know', and having the survey numbered clearly creating an easy flow of answering. (Rosenfeld, Edwards, Thomas) In addition, making sure that the respondent knows that their anonymity is secure will help the answering process go a little more smoothly.

Eventually all the feedback will be organized and able to be interpreted so that a solid conclusion can be made. Now the feedback needs to be presented or documented. It must be remembered to cover the reasons why the survey was conducted, pertaining to the problem or concerns. Next, what the questions were and how they are relevant to determining a solution to the problem should be explained. Since all the results are already calculated, those too can be presented to show how the respondents felt on a personal and professional level. When presenting the data it is imperative that not only what was determined is explained, but also what was left unanswered. Finally it must be

confirmed that all data shown is not just in numbers but that written conclusions are made to address the concerns.

2.4.5 Survey Restraints

The subject of advising projects over a distance poses certain issues. The main issues posed are all related to communication between the advisor and the students. The parameters that will decide what technologies are most utilized are:

1. Time Difference - Time difference will affect whether live communication is possible or functional
2. Discussion - Discussion directly relates to time difference, because discussion many times is the best way to communicate an issue and if live discussion is not possible, different technologies, or perhaps a changing of schedules will be used.
3. Availability - What technologies are available and the cost of the technology is a major concern as well.
4. Personal Preference - Once it has been decided which technologies could be used, it would be up to the students and advisor to use the technology they feel most comfortable with.
5. Familiarity - Whether the students or advisor are familiar with certain technologies is a major issue.

6. Compatibility of preferences - Whether or not the students and advisor are familiar with and prefer the same or different technologies as each other must be addressed.

7. Capability - There is always the concern of what technologies will be available, how reliable they will be and if they will operate up to expectations.

This list identifies what this group has found to be the main issues to be addressed in this project about distance advising. This list of aspects adds even more emphasis to the idea that the student's familiarity with technology is instrumental and should be analyzed and cultivated in order to maximize the efficiency of technology.

III. METHODOLOGY

Evaluating the validity of distance advising as to whether or not it is beneficial to the advisees is the question. In order to do this, an understanding of technology is needed by the students in order to ensure that the technology can be properly used and is not completely foreign to the students. Anytime a student must learn to use a new technology there will be a learning curve. A student's familiarity with the technology will decrease or eliminate the need to learn new programs. For example, if e-mail or instant messenger is preferred over telephone or video conferencing, but video conferencing and telephone are available, then this may create some difficulty in adjusting to a new form of communication. It is important to understand what modes of communication are preferred so that an understanding of the problems that may arise during the project can be attained. For example at some project sites the students may prefer e-mail and telephones but video conferencing is the only available means of communication. This creates a problem, because if the students cannot effectively communicate with their advisor the project suffers. When assessing the progress of a project it must be taken into account that the project may be suffering from inadequate communication between the students and the advisor. It also must be noted whether the communication problem lies with the technology or with lack of student or advisor involvement. For this reason it is necessary for the survey team to know the students familiarity with the technology at hand, to properly assess where fault lies in communication failures.

The methods of communication that are available and what the students may prefer are often unknown until the students arrive at their project site. Mid-way through the students' time at the project center the students are presented with the biweekly survey that is designed to determine the interaction with the advisor and advisees during the time spent apart. The purpose of this survey is to determine how well the students are communicating with their advisor while abroad, and also how well the students are allotting their time while in a foreign country. For example, is the advisor responding to the students in a reasonable amount of time, and if not, is the liaison a helpful source of information. The survey also inquires as to how much time the students were spending on social activity and site seeing when they could be working and talking to their advisors. Also to see if the project is suffering from any unexpected problems, such as project partners not contributing equally or using Internet time for leisure instead of for work. After evaluating the answers received from the surveys it will be better understood what the students see as obstructions in the communication process, and if they were using the communication technology effectively.

Other constraints that must be considered in evaluating the effectiveness of communication are the time difference, availability, discussions, and expenses. All of these can make it difficult to communicate therefore they must be considered in determining if the students were pleased with the project's progress. Time difference is an obvious problem because the project sites were in Australia while the advisor is still at WPI (Worcester, MA). When considering the fact that when it's noontime in Worcester it's midnight in Australia, it can be seen that communication on different schedules could prove to be extremely difficult. The time difference may make it seem to the students

that the advisor is not responding quickly, and lead them to feel that they are not getting the advice needed to complete the project, and like the project is suffering when, in actuality, it may not be affected. Time difference is unavoidable in this situation, making it a very important constraint. It is because of the time difference that it may seem to the students that the advisor is not providing the necessary assistance when in fact the advisor is providing the same support as if he/she was on the project site. The time difference may be affecting responses and resulting questions to be asked quickly.

Directly associated with time difference is the availability of the advisor. The students do not have the ability to go to the advisor's office when a question needs to be answered as soon as possible, therefore the communication technology must be utilized in order to answer the question. However, the advisor may not be available to check e-mail, instant messenger or telephone messages. Fortunately there is a liaison that is present on- site to answer any questions when the advisor is not responding.

In addition to needing questions answered at any time the students also need to meet with the advisor on a scheduled basis. This is required of any project group at WPI, so that the advisor can keep a record of the progress of the group and can direct them in the right direction if needed. If the students were not utilizing a set meeting time with their advisor, then it must be known to make the appropriate assumptions about the validity of the advising process. For example if the students cannot contact the professor and make an assumption on a important topic they may be leading themselves in he wrong direction and losing valuable time and resources.

The final constraint that should be considered is the expense of Internet time. Internet services can be expensive in foreign countries that are not as advanced as the

United States is in technology, therefore creating a time and money constraint. If the students were spending too much leisure time on the computer, which uses up limited Internet time, then the time that is needed to communicate with the advisor is reduced and because the time is limited it can be expensive to replenish. In addition long distant phone calls can be extremely expensive making it difficult to use the telephone as the only means of communication. Considering all of these constraints will make improving the technique of distance advising easier, because if the stated problems were affecting the project then it's not the advisor or students' lack of effort but issues with technology that must be overcome.

Taking all of this into consideration an understanding of how well the students felt the project advanced from week to week can be determined. The goal is to eventually determine if distance advising is appropriate for the way WPI would like to conduct the advisor-student relationship. The issues, which have been discussed as major constraints, will be addressed by creating several surveys to be completed by students in distance advising situations. These surveys will be designed to identify the effect these constraints have on projects and how these issues are dealt with and overcome by the students and advisor.

To create an initial survey, interviews of the 2000 Australia IQP group were conducted. The students involved were asked about their experience with the distance-advising program. The discussion focused on the problems they faced during their entire project ranging from the Preliminary Qualifying Project (PQP) to the actual project in Australia. This was the basis for the surveys to be given to the MQP group C term, in Australia, and IQP groups, D term in Australia, that the project team would be observing.

In order to determine how experienced the students were with e-mail, instant messenger, telephone, and video conferencing the questions in the PQP Survey were created. The students were questioned on how experienced they were in the given areas of communication technology. The students were asked what mode of communication they generally prefer to use most often or what they perceive to be the easiest to use. The survey also assesses how the PQP meetings ran when meeting face to face with their advisor with regards to length, efficiency and clarity as well as how much time the students felt would be required in meetings with their advisor while they are away completing their project.

This survey was first distributed to WPI students not associated with the distance-advising program to ensure clarity and effectiveness. This allowed the project team to give a survey to the student that was easy to complete and would return the desired information to the survey team.

A Mid-Project Survey was developed to see how well communication was flowing between the students abroad and their advisor. This was done to be able compare the responses to those given during PQP and after the project was complete. The project group felt the opinions and attitudes of the students might change after the students returned from the project site and had the extra time to relax without dealing with the stress of projection completion or the foreign environment. Therefore, the survey was administered during the project so that any feelings at the time that might affect the project such as homesickness or disliking the foreign environment would be displayed in the students' responses. The survey focused on the frequency of communication with their advisor, methods of communication used, or preferred, quality of the

communication with regards to the technology, and the amount of time spent taking in local culture.

Upon the students return to WPI they received the final survey. This was given as soon as possible upon their return, so the thoughts and feelings of the project were fresh in their mind. This survey was geared toward learning how they interacted with their advisor in regards to communication, including the quality and quantity of communication. The survey also asked if the students felt they were prepared for the project with their PQP work. The students were given anonymity, as they were told the surveys would not be shown to the professors and most surveys were nameless. This anonymity allowed the students to be completely honest without any possibility of changing the professor's opinion.

The project group would review each survey when upon its return from the IQP and MQP students. The mid project and final survey were conducted over email for convenience. The MQP and the IQP data were separated. The projects were separated because the circumstances in which they are conducted differ. The MQP groups are generally seniors and have completed a major project (IQP). The MQP students were also chosen based on their advisor's knowledge of their ability to work independently, where as the IQP students normally had not completed a major project such as this and were chosen based on academic standing and interview processes. The project group observed the surveys to identify patterns in the answers and assembled together a review of the efficiency of the distance-advising program as it relates to these particular students. These results can then be interpreted to give generalized recommendations about the distance-advising program at WPI.

IV. SURVEY EXPLANATIONS

4.1 PQP Survey

This Survey is designed for each IQP group to fill out before the students leave for the project site to begin their IQP. These questions helped to identify what level of background experience with certain types of technology the students possess and also what the individual group members expect of their advisor and fellow group members. The first subsection of the questions is titled 'Demographics' which are for the sole purpose of getting written documentation of the group members, who they're paired with, and what each student plans to accomplish as an individual.[1] This gives the reviewers of the surveys information on the work ethic and personal views of the individuals being surveyed.

The next subsection of the PQP survey is the available technology, which asks general questions of the previous knowledge of certain types of communication. For example: many students at WPI are familiar enough with e-mail to get by, because it is used so frequently in the WPI community. However students may never have needed to use a web video camera before they began this project. These questions must answered so that if no one in a group is familiar with any of the forms of technology that will be available, they can each begin to learn the basic fundamentals of using these technologies before the project begins. As a follow up to the technology questions, the respondent is then asked to rate the previous seven ways of communication pertaining to how easy or difficult each is to use. Because the answer of this question is somewhat of an opinion, the next question, ranking in order of preferred use, was added as a secondary question.

[1] See Appendix A for full survey

Having these two question (ease of use and preferred use) will determine if the ease of use is ranked on the fact that it is more preferred. Having the students rank the technology for ease of use and preference in two separate questions is used as a check and balance of each other to ensure that the respondent is absolutely clear on the question asked and to be sure the reviewer understands the respondent's intended answer.

The next question deals with the expected interaction frequency between the advisor and advisee, asking how many times a week would be an acceptable amount of times for the student and advisor to interact. Five answers are given so that the respondent can answer more easily. This information could immediately help the advisor by giving him/her an understanding of how frequently the group expects to be in contact. Finally a series of opinion based questions are asked to see if the student expects to meet with the advisor on a set time, weekly and/or by appointment. Which leads to the last question of this survey that asks if the PQP meetings went according to plan.

4.2 Personal Survey

This survey is used to get an understanding of any other concerns the students may have that are going away for seven weeks.[2] The first question is to see if the student feels they will be affected by the change of culture. This question allows the student to express his/her feelings about living in another country for an extended period of time, helping the survey team understand the students main concerns of the culture change. The next question is a check on the integrity of the group members as to what their work ethic may be while away from the advisor, for example are the group members going to

[2] See Appendix A for full survey

delegate work more often than do it themselves. Some students are self-motivated, while others need to be instructed about what to do next. No matter how a student is productive the outcome of the project may be positive if the student works according to his or her strengths. Then the respondent is asked questions about how much time are they going to spend on the project, socializing, and on other activities. The next two questions are to see how each group member will respond about setting goals for each other and then themselves. This helps to see what goals the students have set for themselves, and the expectations that they have for their partners.

4.3 Mid-Survey

This survey is sent to the advisees during their time abroad, where it is important to know how the communication between the advisor and advisees is going so far[3]. In order to increase the odds of the students taking the time to complete the survey, and answering honestly, also trying not to consume too much of the students time on their project the survey utilized during the project should be short and to the point to obtain an idea of the students feelings. The answers consist of the five rankings similarly to the previous surveys so that the respondent is already familiar with the format.

The first question asks if the Internet connection is satisfactory to the students. With this information it may be possible to quickly identify who or what is to blame for any communication problems. For example if the students were unable to connect to the internet service during night hours, or most importantly during work hours there would be a considerable gap in communication if the students and advisor had planned to

[3] See Appendix B for full survey

communicate via the internet. The next question is to see if the advisor is communicating with his/her advisees. This is related to the first question because if the Internet service is operating properly then the students should have no problem contacting the advisor. Since there are considerable time differences from the U.S. to Australia, the students may be unable to receive timely responses to questions. That is the reason there are on-site liaisons assigned to the project, which is how the students can get answers to questions immediately. The third question asks if the on-site liaison is effectively helping when the advisor is not available. Responses to this question are very important to understanding the progress of the project, as well as to identifying where communication may be lacking.

All these questions evaluated as a whole can give a direction as to where the communication may be suffering. Communication between the advisor and advisees may not be required more than once a week because the liaison is providing the students with the assistance they require. However, the students may be in great need of the advisor's assistance and communication may be of primary importance to the project. The overall use of this survey is to help the survey team clearly identify that the students are receiving the adequate attention while away from the advisor so that the project is not negatively affected.

4.4 Post Project Survey

Once the students have returned back to WPI they are presented with a survey inquiring about the communication with their advisor during the project[4]. This survey is

[4] See Appendix C for full survey

to determine how the advisees felt about the advisor participation. The questions touch upon the availability, flexibility, and knowledge of the advisor.

The first question asks if the advisor listened to the students when concerns were brought up to him/her. Sometimes during a project the students may feel that group cohesiveness is not of great concern and may have miscommunications and conflicts within the group. It is the job of the advisor to deal with any such problems so that the students do not lose site of the project goal. In addition, the students may simply have had concerns with the project that could only be effectively answered by the advisor. The advisor should be flexible for his/her advisees, even though it is impossible to be available all the time, there should always be some open time for the advisor to tend to the groups concerns outside of the regular meeting time. It could be very difficult for the students to be productive if the advisor simply dictates to the students how the project should be done. This could be even more discouraging to the students when the advisor is not present on the project site, and the students are there alone for most of the time to decide what direction to take.

The next question asks the advisees how well the advisor contributed and delivered his/her knowledge to the group. It is very important that the advisor guides the students in the proper direction, so that the project advances smoothly and productively. The remaining questions are for determining whether the students communicated with the advisor as frequently as they would have if the advisor were on-site. Also this question identifies if the students feel that the advisor was unable to communicate as quickly or as frequently because of the great time difference.

All these questions give the survey team an understanding of the students' view of the advisor's ability to work with the advisees in the distance advising environment, as well as to help determine if the students were satisfied with the availability of the advisor other than the weekly arranged meeting times. These questions do not ask about the performance of the communication technologies used because it was first necessary to see what the students felt about the advisor in order to discern between students feelings toward the advisor and the students feelings toward the technology. The questions relating to the technology level, availability and frequency of use were given the final survey on the technology.

4.5 Availability and Quality of Technology

The technology that the students used while abroad is definitely not as fast and efficient as the WPI Internet connection and therefore may cause some problems in completing simple tasks. In the final survey, the students were asked about the technology's availability and efficiency to determine if any problems they experience were a direct result of poor technology[5].

The first four questions are about the availability of the different types of communication the students used from the project site. Since there was only one computer per group, the first question asked if the computer was available when needed. This gives information about how often the computer was utilized. The next question pertains to the Internet connection and if it was available when needed. The service on-site was a dial up network as opposed to the WPI Local Area Network that is always

[5] See Appendix D for full survey

logged on. With a modem connection it may seem that it is not working fast enough when in fact it may be operating properly. That brings up the next question of whether the Internet was efficient enough for the completion of the project. Finally the students are asked if the service was used to communicate with the advisor and how effectively, just pertaining to the technique of video conferencing.

The next four questions research the quality of the technology according to the students. First the hardware and software and how effective they were in completing the project, as well as if the proper software was available. The next question inquired about the Internet connection and how quickly and efficiently it was able to transfer large files. Finally the students are asked about the overall acceptability and functionality of the network.

This survey helps the survey team understand what technical difficulties may have been experienced. Comparing this survey with the Post Project Survey a direct relationship between the advisor's help and Internet capabilities can be made. The answers given to these two surveys can be used to identify if student's problems lied with the advisor or the technology or if perhaps the problems were a combination of the two.

V. RESULTS

5.1 MQP Australia C term 2001

The PQP surveys were distributed to each of the MQP students. After reviewing the completed surveys the students were noted to have the most experience and felt most comfortable using email, international phone calls, and web based real-time instant messengers (ICQ™, AOL Instant Message™). During the PQP meetings with the professor, the meetings ran well with regards to the time and effectiveness of the meeting. The students were expecting to have contact with their advisor one to two times a week during their time in Australia.

Upon receipt of the surveys and interviews with the students it could be seen that many problems faced by the Australia MQP were technology based. During the PQP the students used and were familiar with a finite element program geared towards civil engineers. When at the project site the students switched to ALGORE a finite element program geared toward mechanical engineers. The program was different and more difficult for the students to use than the previous program. Learning a new program while trying to keep up with the necessary project pace proved to be a hindrance to the students. They found it difficult to adapt to the new program while already consumed in the project work. The project files the students developed throughout their project were to be sent to Professor Barnett for evaluation and correction if needed. Some of these files were too large to be loaded onto the Yahoo Group page that the team and Professor used to exchange files; therefore the students had difficulty transferring the large files to their advisor for review.

The MQP group in the PQP surveys stated that they were most familiar and comfortable with email and instant messenger for means of communication. The group was able to phone Professor Barnett but with little regularity, due to the time differences between Worcester, MA and Australia, and the busy schedules of Professor Barnett and the students. Email and Instant Messenger were not sufficient modes of communication to have the project run as smoothly as possible as there were times when the students needed real time feedback and conversation on topics that e-mail could not provide. Instant Messenger can be useful for communication, but for complicated and intricate discussions this can be quite difficult to use.

The students complained of a poor Internet connection. The connection was said to be to slow, and hindered the project. The students were given an adequate Internet connection by modem standards, however in comparison with the WPI network, any modem connection would seem quite slow. The problem most likely arose with the students' use of the Internet connection for e-mail, World Wide Web use and download and transfer of large files. This has little to do with the technology capability, as it still serves the necessary function, but must be properly used. If too many functions are performed using the same Internet connection the transmission of files is slowed considerably and file transfers may be aborted. This scenario could be seen as the Internet connection being insufficient because the students may be used to the high-speed connection at WPI that can handle multiple file transfers simultaneously.

When a group of students is studying off campus at a project site without an advisor on-site, a liaison is present to help the student with any questions that may arise. In this case the students hesitated to contact the on site liaison with questions

immediately; the liaison's responses were not the type of responses the WPI students were accustomed to, often making it difficult for the students to approach the liaison with questions. Asking the liaison simple questions slowed the project in the opinion of the students. The answers received from the liaison to the student's questions were often too complicated to understand easily and beyond the knowledge base of the students. This most likely could have been dealt with by informing the advisor via e-mail, however it was not and therefore the situation was not remedied.

5.2 Australia IQP D- term 2001

WPI sent groups of student to the Australia project sight in D term of the 2000-2001 school year. The students were co advised by Professor Barnett, and Professor Alt from WPI campus in Worcester, MA. These groups had the benefits of being the last group to go abroad to Australia. The students were well informed and prepared for the difficulties of the distance-advising program. The students found a mutually beneficial meeting time for both their advisor and themselves with regards to work schedules and time differences. This enabled the student and the advisors to have frequent contact ensuring completion of the project. Students were briefed on the technology situation in Australia and were able to work with the computers and technology given to complete the project. The computers, software and Internet connection was not a big a factor as in the 01 C term Australia MQP. The students were not using complex engineering programs and dependent on large file transfer to send information such as Algore files. The IQP used MS Word and MS Excel to collect, organize and display information.

The only problem that was encountered by one group was a personality conflict between students, advisor, and sponsor. This can affect a project whether the work is done on site at WPI campus or in a distancing advising situation. Although meetings ran efficiently and contact between students and advisor was regular. The students felt the advisor didn't listen to their ideas about the project and at times felt the advisor lacked knowledge sufficient for advising the project. The students and sponsors worked with the professor and were able to complete the project.

Due to the co-advisor situation the students normally had a WPI advisor to turn to for generic project questions, even if that advisor was not the project's primary advisor. This also may have aided some of the students. However, the contact with the primary advisor was said by the students to be sufficient.

The students whose primary advisor was on sight reported much the same feelings as those who were primarily distance advised. Both stated that the project and those aspects of the project that were inquired about were satisfactory.

Despite the personality conflicts between the student and advisor the distance advising program worked extremely well. The students were aware of the time difference between Australia and WPI and worked around this difference with regards to meetings and information exchange. The student didn't require programs outside the Microsoft Office package to be available on the computer. These programs can run on slower processor speeds and less memory, than their engineering programs used in MQPs and other IQPs, this will allow smaller files and easier file transfers.

VI. RECOMMENDATIONS

Throughout the project the project group, with surveys and general interaction between the student away at project sites and Professor Barnet, have been able to compile some recommendations, which if implemented in the future may allow for a better project experience for the student, the professor and any organization that sponsors a project. Some of the recommendations are general recommendations, others referrer to the technology and the use of the technology available.

6.1 Technological Recommendations

Many of the problems the student faced were technological. The students were accustomed to working in WPI computer labs, with access to the best computers and fastest Internet access. When going abroad they were expecting the same type of technology and service provider. The students must realize they are no longer at WPI and should not expect the same type of technology and service. When faced with less technology they must be able to adapt and properly utilize the resources at hand. For example if the computer Internet connection cannot support web videoconferencing, the student can use the video while talking to their advisor via telephone. This could be done to give practice presentations and for face to face meetings where a complicated topic is being discussed.

During a PQP it is necessary not only to prepare the students for the environment and the study material but also for the communication and tools they will be using. The students should begin to choose the programs they are going to use, confirm they are going to be available on the project site before they begin to use them and continue to use them on the project site. The 2000 C term Australia MQP had this problem and it

hindered the project. The students should also be acquainted with the communication software to be used, as well as the connection speed, so that the students know what to expect when sending files. Make sure the means by which the student and professor decide on to exchange information can handle the file size they expect to send. When using certain programs like Pro E or ALGORE, the files will be extremely large; the students should be working with these programs at least briefly during PQP so that they can be comfortable transferring files of this type.

The students should be exposed to the exact software and hardware they will be working with when they are on-site. A part of the PQP should be confirming the means of communication to give the students a head start on learning the software to be used. Since the advisor is not on-site to guide the students in learning these programs during their project, the time when the student and advisor are near should be used to be insure the technology that will be used for communication is understood by both parties and that both parties are comfortable with the technologies.

6.2 Communication Recommendations

The time difference affects the student no matter how good the computers and the Internet may be. When email is sent to someone halfway around the world it is not likely to get a quick response because it is not likely to be read by anyone for at least a few hours. For the students and the advisor there will be some inconvenience in communication, which will be increased by the time difference. The students and advisor will be busy regardless of the time zone situation, so a time difference is an added issue. Students need to understand this ahead of time and be prepared for the situation to arise.

Students will need to be more organized before contacting their advisor. This way the students can get all of the questions answered in one or two meetings a week instead of trying to have direct contact numerous times a day. Unlike when working with an on-site advisor multiple questions sent in one day will not be responded to immediately. However, the questions should still be asked. Above all else, the students must be encouraged to contact the advisor to ask specific questions. Time is lost when a question is not asked immediately.

The advisor must also be prepared. Students are going to have issues with their projects. The advisor must ask the necessary questions to ensure that the students are moving forward and know what they are doing next. This does not mean the advisor must tell the students what to do next, rather simply ask for a plan of action to ensure that proper goals are being set.

One of the more overlooked problems with distance advising may simply be that because the student and advisor are not in the same building or even area, they will not see or speak to one another unless it is intentional. Therefore an effort must be made on both parts to communicate. Both the advisor and student must be sure to keep in contact and make sure that the advisor has the necessary contact to be available to steer the project.

PQP Recommendations

During a PQP the students should slowly begin to conduct meetings and PQP related business through the means of communication they plan on using while abroad. The Last two weeks of the PQP should be completely free of direct contact with their advisor. At the end of PQP the students and professor should sit down face-to-face and discus the problems they had if any with the modes of communication they used while not meeting face to face during PQP. This will help the student get acclimated with distance advising and help iron out any communication problems they might have had.

VII. CONCLUSION

The distance-advising program at WPI is an invaluable program to the school and the students. It allows the student an opportunity to go abroad and experience a different culture, with out limiting the professor's schedule to teach classes and advise other projects whether abroad or at WPI. The distance-advising program currently works and can only improve. With the professor gaining more experience with the program, and the continuous advances in technology as well increases in the availability of those technologies the program can only continue to excel. Whenever the students are separated from their advisors for extended periods of time, there will be some problems. All students interviewed agreed that it was one of the best experiences of their life. The student's reactions as well as the quality of the projects, which were of excellent quality, are the most important measurements of a project program. Regardless of whether they felt the project ran smoothly and efficiently, or if they felt there were minor issues to be resolved, all agreed that they would do it again and that the experience was both positive and rewarding.

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APPENDIX

Appendix A
PQP Survey

Name: _____ e-mail: _____
Major: _____

I. Demographics:

1. Project Topic and location:

_____

_____

a.) Project Goals:

_____

_____

_____

b.) Project Partners: _____

c.) Project Advisor: _____

II. Available Technology

(Please circle the number answer that best describes your personal experience in each category.)

1= no experience 2= little experience 3= enough to get by 4= experienced 5= very experienced

1. International Telephone Calls:	1	2	3	4	5
2. E-mail (utilizing file attachments):	1	2	3	4	5
3. International Internet Service Providers:	1	2	3	4	5
4. Teleconferencing:	1	2	3	4	5
5. ICQ/instant messenger servers	1	2	3	4	5
6. WEB Based Conferencing(web Phone)	1	2	3	4	5
7. WEB Based conferencing (web video)	1	2	3	4	5

8. Rank the above technologies that you have used for ease of use:

_____ _____ _____ _____ _____ _____ _____
Most difficult Easiest

9. Rank the above technologies that you have used for your preferred choice of communication:

_____ _____ _____ _____ _____ _____ _____
Least preferred Most preferred

10. A. How often did you like to have direct contact (real time)with your advisor?
    a. Once a day b. Two/Three times a week e. Other _____
    c. Once a week d. Less than once a week

11. Set office hours in addition to weekly meetings are beneficial.
1=strongly disagree 2=disagree 3=neither agree nor disagree 4=agree 5=strongly agree

12. Your meetings have gone well during PQP (i.e. interruptions, productivity, communication…)

1=strongly disagree 2=disagree 3=neither agree nor disagree 4=agree 5=strongly agree

Appendix B

Biweekly Survey

This survey is to be given BI weekly to students away at their project sight.

1=strongly disagree 2=disagree 3=neither agree nor disagree 4=agree 5=strongly agree

1. **During the past two weeks you had no problems using the technology available to you at your project sight.**

   1 2 3 4 5

2. **During the past two weeks you spent about 10 to 15 hours absorbing local cultural.**

   1 2 3 4 5

3. **During the past two weeks you had no problems communicating with your advisor.**

   1 2 3 4 5

4. **When your advisor was unavailable your liaison officer was able to assist you with**

   your project.

   1 2 3 4 5

6. **Which technology did you use the most when communicating with your advisor? (i.e. e-mail, teleconferencing, ICQ, WEB based conferencing)**

7. **How many times have you spoken with your advisor in the past to weeks.**

8. **How many hours of leisure time in the past two weeks have you spent on the Internet?**

Appendix C

Post Project Interview Survey

For IQP

III. Distance Advising

For the following 7 question please rate you advisor on the following qualities.

1=strongly disagree 2=disagree 3=neither agree nor disagree 4=agree 5=strongly agree

1. Your advisor listened to your concerns during the project.
   1 2 3 4 5
2. Your advisor was flexible with regard to meeting times.
   1 2 3 4 5
3. Your advisor was flexible with IQP related ideas during the project.
   1 2 3 4 5
4. Your advisor showed knowledge in related to your IQP.
   1 2 3 4 5
5. Your professor was available during non-schedule meeting times.
   1 2 3 4 5
6. Your advisor was on task during meeting times.
   1 2 3 4 5
7. Do you feel you advisor's availability was severely effected by the different time Zones.
   1 2 3 4 5
8. Were you well prepared for your project.
   2 3 4 5
9. The foreign atmosphere limited your success in achieving your project goals.
   1 2 3 4 5

Appendix D

Availability and Quality of Technology

Please rank the following

1=strongly disagree 2=disagree 3=neither agree nor disagree 4=agree 5=strongly agree

1. **Computers were available when needed.**

   1 2 3 4 5

2. **The Internet was accessible form your computer.**

   1 2 3 4 5

3. **The Network was effective in the completion of your project.**

   1 2 3 4 5

4. **The Web cam was suitable for you meetings via the Internet.**

   1 2 3 4 5

Please rank the following on Quality

1=strongly disagree 2=disagree 3=neither agree nor disagree 4=agree 5=strongly agree

1. **The computer had adequate hardware/software to complete the IQP.**

   1 2 3 4 5

2. **Internet connection was fast enough to run internet programs effectively**

   1 2 3 4 5

3. **The Internet Connection was reliable.**

   1 2 3 4 5

4. **The network was reliable.**

1 2 3 4 5

1. **Please explain any complications or problems experienced with the technology**