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Web-based Course Evaluations

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by

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Executive Summary

Course evaluation forms have become a valued tool at institutions of higher education. Worcester Polytechnic Institute has been using its current course evaluation questionnaire since the 1970's. Since its creation it has not undergone any changes whatsoever. With the current state of technology and utilization of the Internet, some institutions have changed from a paper-based evaluation form to a web-based evaluation form. By changing to a web-based course evaluation, these institutions have been able to easily customize the forms to allow professors and departments to gain more useful information from the students.

Of the 74 WPI professors who responded to a survey, 71% wanted to get the results of the evaluations, and 79% of the professors would like to be able to add questions to their course evaluation forms. The major concern of the professors surveyed was student response rate to the web-based evaluation. Seventy-two percent of them responded that they were concerned with response rate.

The paper-based evaluation forms cost WPI $1800 annually. We estimate the annual cost of a web-based system to be $1200 the first year and substantially in following years. We also estimated that only 4 to 8 days of employee labor would be needed to maintain the web-based form, which is considerably less than the 20 days of labor that is needed to administer the paper-based form.

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Introduction

Course evaluations have become a valued tool at institutions of higher education. Worcester Polytechnic Institute has been using its current course evaluation questionnaire since the 1970's. Since its creation it has not undergone any changes whatsoever. With the current state of technology and utilization of the Internet, some institutions have changed from a paper-based evaluation form to a web-based evaluation form. By changing to a web-based course evaluation, these institutions have been able to easily customize the forms to allow professors and departments to gain more useful information from the students.

WPI's widespread utilization of the web makes it a prime candidate for a web-based evaluation. Before switching to a web-based evaluation there are factors that must be considered. Both students and professors must be supportive of the idea. A third party must host the web page so that students feel comfortable giving honest answers. The web site must be secure to allow students to evaluate only the professors that they had the previous term. Based on expected student response rates, the institution has to decide whether or not to make the web-based evaluations mandatory.

After determining whether or not the students and professors support the idea of a web-based evaluation system, the institution will have to determine whether or not to keep the evaluations the same as the paper-based evaluations or whether to enable professors to customize the evaluation forms that will be used for their class.

There are many benefits to be gained from putting the evaluations on the web if the students and professors are willing to use it. The professors could get the results of their evaluations much sooner than they do with the paper-based system. The entire

process of transferring the written results to a database would be eliminated. The cost, material and time to print out copies of the paper evaluation form would be done away with. Students may feel more comfortable if they are able to fill out the form on their own time. Having the paper evaluation form given out right at the end of class may not provide the student with enough time to fill out the back of the form as completely as they wish to.

In this IQP we used surveys of students and full time professors to determine if there is support for changing over to a web-based course evaluation system. A test web-based course evaluation was given to a number of students.

Literature Review

Previously Implemented Web-based Evaluation Forms

Three Hong Kong Universities have introduced web-based course evaluation forms. They performed trial runs of the new system parallel with the widely used paper system. Several reports have been produced about the initial trial run of the online system at the Hong Kong University of Science and Technology (HKUST), the Hong Kong University (HKU) and the Hong Kong Polytechnic University (HKPU) (Kelly and Marsh, 1999). Their system, COSSET (Centralized On-line System for Student Evaluation of Teaching), can be accessed through the internet using any regular web browser such as Netscape or Internet Explorer (http://home.ust.hk/~eteval/cosset/left.html). The trial runs performed in Hong Kong are some of the first instances where a web-based form was tested. The National University of Singapore implemented an online system, but data from that is not available.

A major concern with web-based evaluation is the number of students who will respond (Kelly and Marsh, 1999). Each of three trials conducted showed that some form of pressure had to be exerted on the students in order to increase the response rate. One solution could be to require the students to complete the form in a designated on-campus computer lab. This solution would, however, diminish many of the benefits of a web-based survey, such as being able to complete the form on your own time. The National University of Singapore was the first school to try an online system and they created a system that made it impossible for students to finish their course without filling out the evaluation form. They required students to register for their final examination, but they

could only have access to the registration if they submitted all of their course evaluations. COSSET manages to get a very high response rate because it is automated to send emails out to students who have not completed the form. HKUST performed two trials, each in a different manner. The first trial was conducted at the end of the semester and students were asked to do both an online and paper version of the evaluation form. One group of students was given a random code to log onto the site and another group used their school email ID to log into the system. The second trial split up students and asked them to do the online form or the paper form, but not both. This trial had their students use their email system login ID names and passwords. The first trial got a low response rate of 23%, but the overall response from the second trial was a much higher 87.7%. Students were much more likely to complete the web-based form if they did not have to complete an additional paper-based form also. Conducting a trial run of a web-based evaluation form during the same time paper evaluation forms are being handed out could result in a very low response rate.

During the first trial of the COSSET system, students were asked to use their student ID to log onto the system and only 15% responded, but 27% responded when they were given a random ID code. The difference in response rate for each trial is understandable. We are not surprised that students were less likely to go online and complete the evaluation form if they were asked to do a paper form also. They may not have had time to do both forms or weren't motivated enough to answer the same questions twice. The first trial should not be considered an accurate reflection of what the response would be if students were asked to complete their course evaluations online. The trial procedure should be as close as possible to the procedure that would be

Anonymity

implemented if the evaluations were placed online. Students would not be required to fill out both the paper and online form if the online form is fully implemented and put to use. A trial run of the web-based course evaluation form should simulate the fully implemented version as closely as possible.

Another concern is the ability to reassure students that their responses will be anonymous while gathering the needed student information. The information gathered would be used to prevent students from submitting multiple forms for the same class or filling out a form for a class for which they are not registered. If completing the online evaluation form were to be made mandatory, it would be necessary to have a list of which students have and have not filled out the form. It would be nearly impossible to create a system that provided both 100% anonymity and 100% security. One tested solution for this dilemma is to randomly assign access codes to students. This method doesn't insure confidentiality and only raised the response rate of the first trial from 15% to 27%, which is still unacceptable. One would need a system to generate random access codes such that all have a unique value. The system would then have to keep track of which numbers have access to which course evaluation. Unless the students receive a separate access code for each class they are registered for, each code could be traced back to the student who is taking a specific list of classes. Access codes could be stolen or lost. The other solution is to present the system to students in such a matter that they believe the use of their login names would still ensure that their identity is secure.

At HKUST Some students were concerned about their anonymity, but a survey conducted after the second online trial showed that lack of anonymity didn't bother most students. This contradicts the results of trial one, which shows a higher response rate

when students used random access codes rather than their school login names and passwords. Students access COSSET using their email login names and passwords. The COSSET system uses the school's login authentication system to match usernames with passwords. The login process is simplified because it can use existing methods to check ID's and passwords. After the second trial was completed, over 70% of students preferred the online system despite anonymity risks and 65% found the log-on method acceptable (Ha, Jones and Marsh, 1999).

The OSTEI system introduced another login process that provides the students with anonymity (Ha and Marsh, 1999). The OSTEI system was also developed and placed online by HKUST to give students a chance to review their instructors (http://home.ust.hk/~eteval/ostei/) . Each class has a single secret ID given out by the professor that will take them directly to the correct evaluation form. Each student of a particular class has the same secret ID number. The problem with this system is that there is nothing to stop the students from filling out more than one evaluation form for the same class. The OSTEI system is still a prototype and it has not been formally tested. The OSTEI system should only be used by professors who are curious about their performance and want a general idea of how the students are responding to the material or teaching style (Ha and Marsh, 1999).

Most students preferred the online process to the paper process. After the second trial (in which students were asked to complete only the online form or the paper form) a survey was conducted at HKUST.

- 72% preferred on-line system to the previous paper system
- 65% found the log-on method acceptable
- 7% objected to the arrangement
- 64% said the log-on methods would not affect their responses
- 72% found the online system easy to use
- 1% said they had great difficulty with filling out the form

One of the benefits that COSSET provided was minimizing the workload on the administration. Staff members no longer had to print out the forms, collect the forms or enter the students' responses into a database by hand. There was, however, an increased workload for the people who created and maintained the on-line system. Once the system is up and running the work put into maintaining the site may be minimal.

We had a hypothesis that the course evaluation results would be more negative towards professors if they filled out a web-based form, especially if it wasn't mandatory. We believe that most students fill the form out because they are forced to in class, so that students with the strongest opinions would take the time to address their issues on the web. From personal experiences we felt that students with a strong negative view would be more likely to fill out the evaluation form than a student with strong positive views. The Hong Kong Universities trial runs show results that are the opposite of our hypothesis. Students tended to rate courses more favorably when they used the online evaluation form. Mavis Kelly and Jonathon Marsh, the authors of Going Online with Student Evaluation of Teaching figured this occurred because students with positive views were motivated to fill out the form. The evaluations were done on a rating scale from 1 to 5 where 1 is unfavorable and 5 is favorable. The mean response to the statement "Teaching generally well organized" was 4.35 when students filled out the online form. The mean was 3.59 when students filled out the paper evaluation form.

This is a difference of 0.75 points. The results for each question are generally a half a point higher when collected from the online form.

Creating a Survey

For this project we conducted a survey of all full time professors at WPI. We wanted to determine how they feel about issues related to a web-based professor evaluation form. By following the ten steps necessary for a successful survey described by Salant and Dillman in How To Conduct Your Own Survey we were able to construct a survey that met our needs.

The first step to a successful survey is to avoid the four major sources of error. The first source of error is coverage error, which is choosing a biased sampling frame. The sampling frame is simply the list of names that the sample is drawn from. A famous example of this type of error was the survey conducted by the Literary Digest in 1936. The survey was intended to project the outcome of the presidential election but the sampling frame that the Literary Digest chose was biased. It consisted only of people listed in the phone book and people with registered automobiles. In 1936 a large number of poor people had neither a phone nor an automobile and these people were not represented in the chosen sampling frame.

The second source of error is sampling error, which is choosing a biased sample of names from an unbiased sampling frame. The third source of error is called measurement error. "The size of the measurement error is the difference between a respondent's answer to a particular question and the correct answer" (Salant and Dillman, 1994). The final source of error is nonresponse error. Nonresponse error becomes a problem if the following two conditions are met at the same time: "1. More than a small

number of people who were selected in the sample are not interviewed, either because they cannot be reached or refuse to participate and 2. Nonrespondents are different from respondents in a way that pertains to the study focus" (Salant and Dillman, 1994).

One way in which the first two errors can be avoided is to survey the entire body that one wants gain information from without sampling it. This eliminates the need to construct a sampling frame and survey only a portion of it. Measurement error depends on both the survey method and the questionnaire. Choosing the best survey method and constructing an unbiased questionnaire can help avoid measurement error. Nonresponse error is difficult to guard against since it is caused simply by the individuals who choose not to respond to the survey. Making the survey as easy to complete as possible is one way to ensure more responses and thus help overcome nonresponse error.

The next consideration for a successful survey is to determine specifically what new information is needed. Constructing questions that get this information specifically without being vague is an integral part of the successful survey (Salant and Dillman, 1994). In our case, the survey needed to explain the technology that the questions were about without using confusing jargon. The questions have to be detailed enough for the individuals being surveyed to fully understand what is being asked, but at the same time, they have to be simple enough to avoid confusing the individuals as to what is being asked.

The third key is choosing the survey method that best fits the needs of the surveyor. If the survey needs to be anonymous like ours does, then an email survey is out of the question. A phone survey is an effective way to gather information, but people administering the survey over the phone must be both comfortable with talking to

strangers and with asking questions over the phone. One problem with a phone survey is that it is not anonymous. A mail survey is a good way to avoid getting biased results. This is true for a few reasons. It isn't biased toward the technologically savvy as the email survey is, and it also avoids error that phone surveys create with the interaction between the person conducting the survey and the person being surveyed. Unfortunately it tends to be much more work than an email survey. The other benefit of a mail survey is that it is anonymous. The one shortcoming of the mail survey is the response rate. Mail is often ignored more often than an email or a phone call.

Deciding whether and how to sample is the next step in a successful survey. If the entire population is surveyed you can obtain accurate information with relatively few respondents (Sallant and Dillman, 1994). Alternatively, choosing a sample that will give you accurate results can be the most difficult part of constructing a survey. Factors that could bias results such as sampling frame, sample, survey method, and constructing questions must be taken into account. Even after considering all possible biasing factors there is still a risk of getting inaccurate results.

The next step in creating a successful survey is the most important. It is creating good questions. At this step you should already know what information you need to get with this survey and therefore you know what your questions need to ask. The respondents need to not only be able to answer the questions, but also be willing to provide the information. Question structure is an important factor to the success of the question. Partially closed-ended questions are quite often the most effective type of question structure. These questions give the ease of multiple choice while allowing the

respondents to fill in their own answers in the section labeled "other". An example of a closed-ended question would be:

1. What do you believe to be important benefits of a web-based evaluation form?
    - ❑ Faster results for professors
    - ❑ Give students the opportunity to give more thorough answers
    - ❑ Evaluation form customization
    - ❑ Paper conservation

By adding an area for the people being surveyed to write their own comments it becomes a partially closed-ended question like this one:

2. What do you believe to be important benefits of a web-based evaluation form?
    - ❑ Faster results for professors
    - ❑ Give students the opportunity to give more thorough answers
    - ❑ Evaluation form customization
    - ❑ Paper conservation
    - ❑ Other (please list) _____

An open-ended version of this question would be:

3. What do you believe to be important benefits of a web-based evaluation form?

_____

Designing a questionnaire that is not only easy to answer but also interesting is the sixth step to a successful survey. The survey should be appealing to the eye. If the

text is packed close together then not many people are going to fill the survey out. Indentation and bullets are the key to making a survey easy to read and pleasing on the eyes.

Getting the survey in motion and getting it done is very important. You should set up a timeframe when you begin constructing the survey and leave yourself enough time to gather and compile your results (Salant and Dillman, 1994). Starting ahead of time is a good idea in case you run into unforeseen difficulties. Mailing the surveys in professional looking envelopes often means the difference between their being opened and being thrown in the trash. You should always leave enough time so that if enough results are not received from the first mailing, a second can be sent out. A last point to keep in mind is when to mail out the surveys. People are more than likely to open the survey and complete it when it is the only thing in their mailbox. This means avoiding times when people often get the most mail, for instance the bills at the end of each month or in WPI's case the numerous surveys that professors get by groups of students doing their IQP and MQP's.

The eighth step to a successful survey is to code, computerize, and analyze the data collected from the surveys. The whole point of the survey is to receive information and if the information is not properly analyzed then there is no point in collecting it in the first place. Once the data has been properly analyzed with statistical analysis then it is time to interpret the results. Something that should always be kept in mind when interpreting the results are sources of error. If there were biases in the survey then they should be pointed out and certain parts of the survey may have to be disregarded due to measurement error (Sallant and Dillman, 1994).

Reporting your results is the next step. Even if your survey was a great success and you got information that clearly supports your claims, the way you present your findings makes all the difference. If nobody can understand your tables and charts then they aren't going to see what you saw in your information. You need to be concise and explain what numerical values mean (Sallant and Dillman, 1994). If the average answer to a question was 3.67, explain what that means. Is 1 the lowest and 5 the highest? Your audience won't know unless you tell them. More than likely you aren't trying to prove a point to yourself with this survey. You are trying to prove a point to others, and you can't do that unless you present your findings in a clear manner.

The last key to a successful survey is to maintain your perspective. It is important to always keep your goals in mind. Before you start the survey you should have an idea of how you are going to present your findings. Keep the four main sources of error in mind at all times and never lose sight of your goal.

A successful survey doesn't have to be difficult to create. As you can see there are many things that you have to keep in mind while constructing the survey but if you pay attention to the key elements of successful surveys then you can gather the information you need on the first try.

Project Objectives

The main goal we set out to accomplish with this project was to test the feasibility of an online course evaluation at WPI. To accomplish this we needed to test five aspects:

1. Student support for online evaluations
2. Student response rate to online evaluations
3. Student concerns about anonymity
4. Faculty support for online evaluations
5. Economic comparison between evaluation formats

Methodology

Faculty Survey

One potential problem with web-based evaluations would be lack of faculty support. To determine if professors at WPI will support the idea of a web-based system we distributed a paper survey. For this project we conducted a survey of all full time professors at WPI. We wanted to determine how they feel about issues related to a web-based teaching evaluation form. We could have created either an in depth survey or a brief survey to give to the professors. Each type of survey has its pros and cons.

An in depth survey gave us more specific information to use in determining what aspects of the web-based evaluation form the professors feel strongly about. On the other hand, an in depth survey vastly reduced the number of responses that we would get. Many students are surveying professors for their IQP at the end year and professors would be likely to set aside a multi-page survey and forget about it. Since we are trying to do a sampling of the entire faculty, response rate is a prime consideration.

A brief survey gives professors an opportunity to quickly give their opinion on the issue at hand. We determined that it would be a good idea to give a brief mail survey and to leave spaces for professors to write comments about other aspects of the online survey that we hadn't considered. Thus the appealing aspects of both the in depth survey and brief survey have been incorporated into our survey (Appendix 2).

We decided to include the entire body of full time professors in our survey. By giving the survey to all professors we did not have the error associated with creating a sample of the population.

We created questions for the survey with simplicity in mind and kept the wording simple so as to avoid any confusion. We also wanted to make the questions multiple choice so that professors would feel that the survey would only take a moment of their time. All the questions were multiple choice, but two had space for the professors to add other comments. We felt that this would give us more detailed information without costing us in the response rate.

We determined that the best survey method to use would be a mail survey. Even though most professors at WPI are email savvy, there are some that don't check email regularly and would not want to spend time answering an survey over email. A mail survey would lend itself to both email savvy and non-email savvy professors. Since the professors who are not email savvy are most likely not web savvy either, their feelings on a web based evaluation form are critical. They are most likely to be the strongest opponents of the idea and choosing a survey method that limited the number of results received from them would bias the survey.

We also decided that it would be a good idea to add a spot for professors to volunteer their classes for our web-based evaluation form. This way we were able to get an idea of how many professors were willing to let their classes try the web-based evaluation and we used this to decide how exactly we want to administer the online evaluation. If a large number of professors had volunteered their classes then we might

have taken a sampling of them. Since only eight professors volunteered their classes then we did not need to worry about a taking a sampling of them.

Web-based and Paper-based Evaluations

Two concerns that other institutions had with a web-based implementation of the course evaluations is student response rate and whether the responses to the web version are comparable to the responses given on the paper version. The web-based evaluation will be useless if students do not use it. It will also be useless if the responses they give are not serious. To determine how students would respond to a web-based version of course evaluations, we constructed a web page with an exact replica of the paper version of the evaluation. When a professor volunteered to let us give their class the evaluation on the web we gave the professor a group of 4-digit personal identification numbers. These numbers allowed students to submit results for only that professor's class. Once the student had submitted their survey for the course their pin number was deactivated. This ensured that students did not submit multiple surveys for a single course. The pin also ensured anonymity since neither the professor nor we knew which student got which 4-digit pin.

To ensure that students were not able to bypass the login process and jump right to the page that allowed them to vote, we used a perl script to generate the course evaluation survey only after the student had entered a valid pin number. Our test system had a separate page that professors could go to in order to log in to the system and view their results. Each professor got his or her own 4-digit pin to ensure that they were the only one that got to view their results. Some professors expressed a desire to have the open-ended portion of the course evaluation survey available on the web-based version as

well. Other professors were strongly opposed to this idea. To satisfy both groups of professors, we added a test and check system into the login script that kept track of which professors wanted the extra comments available. If the student was evaluating a course in which the professor wanted the open-ended questions available then they were displayed for the student to fill out, otherwise only the close-ended portion of the evaluation form was displayed.

Student Survey

Students who completed the web version of the evaluation form were asked to complete a simple web-based survey (Appendix 3). The survey was simple so as not to discourage students from answering. We had to keep in mind that they had already taken the time to fill out an evaluation form on the web and may not have wanted to spend much more time answering questions. The survey attempted to determine if the students themselves thought that the web-based version of the form was better than the paper-based version. We attempted to determine if the students would use the web-based system even if it wasn't made mandatory since this is one of the main concerns of web implementation. We also tried to determine if they would take the web-based system seriously. The last piece of information we gathered with the survey was whether the students were concerned with anonymity with the web-based evaluation forms. If students don't feel that their responses are anonymous then their answers are not going to be honest and are therefore useless.

Results and Analysis

Cost Analysis

The current paper-based course evaluation form involves not only a large amount of paper but also a large amount of data entry. These two factors lead us to believe that implementing a web-based version of the form would cut costs considerably. We contacted Joan Shanahan, the Faculty Governance Coordinator, to determine the cost of the paper-based evaluation. She informed us that her office orders 5 boxes of undergraduate course evaluation forms a year at a cost of $800 and 1500 envelopes a year at a cost of $1000. This means that materials alone for the paper-based evaluation form cost WPI $1800 a year. Secretaries at WPI enter the data from the paper-based course evaluations into the computer system by hand. This means that there is no cost in addition to regular paychecks to have the data entered. The time it takes to have the data entered is quite substantial though. It is estimated that a secretary spends approximately one full week entering data from each quarter's paper forms. This means that a secretary spends four weeks keying in data for the paper forms during the regular academic yeard (not counting the summer term). This is a substantial amount of personnel resources that are needed to simply key in data from the paper forms. Assuming the person keying in the data is being paid $10 an hour, data entry for the paper-based evaluation will cost WPI $1600 a year. This brings the total cost of the paper-based evaluations to $3400 a year.

To determine what it would cost WPI to get a web-based version of the evaluation form online we contacted Ben Thompson, the Administrative Systems Manager at the

College Computer Center. Getting a system online would involve the substantial cost of initial coding and construction. A high estimate of time required to construct the system is one week. Assuming the person doing the coding makes $30 an hour, this week's work would cost the school $1200. Maintaining the system would most likely be absorbed into a current employee's job. The time spent maintaining and updating the system each term would probably be on the order of a day or two at a cost of about $240 a quarter. Cost of materials needed for the online system would be negligible since no additional servers would be needed to host such a page.

This means that the first year the web-based course evaluations are implemented they would cost WPI approximately $1200 the first quarter and $240 a quarter for the remaining three quarters. This comes to a total of $1920 for the first year. This is only half of the cost of the paper-based evaluations. The amount of time employees need to spend on the web based system is substantially less than on the paper-based system. The first year the web-based system is implemented it would require perhaps 8 days of employee labor. In subsequent years, only 4 days of labor would be needed to maintain it. This is much lower than the 20 days of employee labor needed to complete the paper-based course evaluations each year. This also means that WPI will only be paying approximately $960 a year to maintain the website. This means that after the first year, the web-based evaluations will only cost 28 percent of what the paper-based evaluations cost each year.

Not only would the web-based system cost WPI less money, it would be less prone to errors in data entry, and it could get the professors the results instantly instead of the weeks it takes to get the results of the paper-based version.

Professor Survey

An important prerequisite for switching the current paper-based evaluation system to a web-based evaluation form is the acceptance and support for the new system among professors. The WPI faculty relies on the course evaluation for promotions, raises and comments on how to improve their teaching style. It is important that they feel confident that a web-based system would not negatively affect their career or reduce the quality of feedback they receive on their teaching methods. If students fail to complete the evaluation form, the professors would not have the feedback they need to improve their techniques. Professors may be afraid that a web-based system would not accurately show what students really think. They may feel that the suggestions the students supply would not be as useful or meaningful.

Table #1
Professor Survey Results

Would you like to be able to get the results of your course evaluations as soon as the class is completed?	Yes = 71% No = 29%
Which customizations would you like to have?	
Add course specific questions from a predefined question bank to the original evaluation form.	Yes = 40% No = 60%
Add course specific questions of your own to the original evaluation form.	Yes = 79% No = 21%
Have departments add questions to the original evaluation form.	Yes = 39% No = 61%
What do you believe to be benefits of web-based evaluations?	
Faster results for professors	Yes = 62% No = 38%
Give students the opportunity to give more thorough answers	Yes = 45% No = 55%
Evaluation form customization	Yes = 57% No = 43%
Paper conservation	Yes = 59% No = 41%
What are your objectives and concerns with web-based course evaluations?	
Reduced response rate	Yes = 73% No = 27%
Evaluation form customization	Yes = 8% No = 92%
Security concerns	Yes = 39% No = 61%
Anonymity concerns	Yes = 31% No = 69%
What is your overall opinion of a web-based course evaluation form on a scale of 1 to 5? 1=Against 5=For	Average = 3.4

We created a survey to determine the general opinion of a potential web-based course evaluation form among professors (Appendix 2). Seventy-three professors out of approximately 300 responded to our survey for a response rate of 24%.

Our first question asked if professors would like to receive the results of their course evaluations as soon as the class is completed. About 71% of professors said they would like to get the results sooner. A few professors wrote additional comments on the side that expressed that the waiting period now was way too long. Professors often have

to wait 6 to 8 weeks to get course feedback. We talked to Benjamin Thompson, the Manager of Administrative Systems at WPI, and he stated that the reason professors get results so late is because of the number of things that must be accomplished after classes are completed. For example, entering the course grades takes priority over entering the course evaluation data. The web-based evaluation would do away with the need to find time to manually enter the results into a database. We have shown with our prototype web-based course evaluation form that data entry is instantaneous and the results are updated the moment a student submits the form.

One of the selling points for the use of a web-based course evaluation form was the potential for customization. A system could be created that allowed a professor to change the questions normally asked on the back of the paper evaluation form. The questions could be more tailored to the material taught in class. The open-ended questions are for a professor's own benefit so they should be able to get the most out of them. The survey showed that the professors are interested in being able to customize the back of the form. Only about 40% cared to pick the questions from a predefined database of questions, but 79% said they would like to be able to create their own questions and add them to the form. When asked if they would be interested in the departments adding questions for them, only 36% said they liked the idea. It appears that professors do not feel that the back of the paper form has the questions they desire. Most professors have questions of their own that they would like to ask. Since almost 80% of professors who replied to the survey said they would like to be able to add their own questions it is apparent that they feel that they are not getting the information back from which they can truly benefit.

We then asked professors to tell us what they believe to be the important benefits of a web-based evaluation form. The most popular benefit, with 62% of professors saying it was important, was faster results for professors. The next highest benefit was paper conservation, with about 60% of professors who completed the survey thinking that the conservation of paper is a bonus to the web system. Fifty-six percent believe that customization would be an important benefit. This is interesting considering the fact that 79% of the professors said they would like to have the ability to create custom questions. Apparently they do not believe that customization is a crucial benefit, but would take advantage of it if it were available. Forty-five percent thought that one benefit would be the fact that students would have more time to give more thorough answers. However, one professor stated that it would be unrealistic to believe that students will give more thorough answers just because they have more time. We also asked professors to please list any other benefits that they felt would be important that we didn't include in the survey. Three wrote down that they believe it would save class time. Other benefits listed were the ease of filing and the ability to search the additional comments from students by keyword.

There are also objections and concerns that professors may have to the web-based system. We asked them what these objections and concerns would be. Knowing what the professors viewed as being the top concerns would help determine which problems need to be solved before the system would become widely accepted. The biggest fear is that there would be a reduced number of students who would complete the evaluation. Seventy-two percent of participants were concerned about this issue and many of them wrote in comments strongly expressing how they felt it would be a problem. A few

stated that if we could solve this problem then their overall opinion of a web-based form would become more positive. If the system were voluntary then response rate would be an obvious problem. The online course evaluation system may have to be mandatory in order to ever be reliable.

Thirty-nine percent had concerns about security. Is the system safe from people breaking in and changing results, what if the student fills out multiple forms for the same class, or what if students who aren't registered fill out the form? These are all issues that need to be taken care of before the system is implemented. Even if the professors weren't concerned about security, it would still be an issue that would have to be addressed. Thirty-one percent thought that anonymity would be a problem. One of the hardest aspects of creating an online form is that there has to be compromise between security and anonymity. In order to make the form mandatory and to only allow students who are registered or have not filled out the form to participate, the students' identities would need to be known. If professors are concerned then students may be also.

We encouraged professors to list any other concerns they had. One professor reiterated our theory that only students with strong negative opinions would fill out the form. The best solution for this problem would be to make filling out the form mandatory for all students. Another professor felt that it would be unfair if students who didn't attend class filled out the form. If a student disliked the class or professor and stopped attending they would still be able to fill out the form. In the future that particular student may have to fill out the form because it would be mandatory. The student may not have attended enough classes to give a well substantiated opinion of the professor. However, this could happen with the paper form too. A student may not attend class, but

may show up the few days before end of the term hoping to learn all they need to in a pre-exam review session. This may be the day that evaluations are passed out.

Overall, the faculty's opinion of a web-based course evaluation was neutral. We asked professors to give us a number from 1 (against) to 5 (for), that sums up their overall opinion of the form. The average was 3.41. The standard deviation was 1.29, which shows that most answers were either 2, 3, or 4. Some plainly said that if their concerns and objections were solved, their opinion would go up. The professors have not seen the benefits of the system first hand to be able to see if they outweigh the potential problems. We would predict that making the system mandatory and the addition of the ability to customize open-ended questions would increase support for an online evaluation form.

Online Student Survey

The results of the online student survey give good insight into how students at WPI feel about online course evaluations. The survey was open to all 2500 WPI undergraduates. One hundred and eighty-three students filled out the student survey. Forty-three of these were students who used the online evaluations. The other one hundred and forty students did not use the online course evaluation but were able to view a sample of the evaluation form.

Table #2
Student Survey Results

	Yes	No	No Opinion
Do you prefer Online course evaluations to paper-based course evaluations?	58%	28%	14%
Do you feel confident of your anonymity logging in with a randomly assigned PIN?	79%	15%	7%
If your anonymity were guaranteed, would you feel confident of your anonymity if you logged in with your UNIX password?	58%	35%	7%
Do you feel confident of your anonymity with paper-based evaluations?	73%	24%	4%
Would the login method affect the honesty of your responses?	20%	74%	6%
Would you object to making completion of online course evaluations mandatory for registration for the next term?	54%	42%	5%

The second issue that the survey addressed was whether students were concerned about anonymity. The login method is an important issue when implementing an online system and if the students don't like the login method then they simply won't use the online system. Seventy-eight percent of the students who responded to the survey said that they would feel confident of their anonymity logging in with a random pin number. Only fifteen percent of the students responded that they would feel unsure of their anonymity logging in with a random pin number. This means that the method of login that our test site used was appealing to 78% of the students.

Only fifty-eight percent of the students said that they would feel confident of their anonymity logging in with their Unix username and password. Thirty-five percent said that they would not feel confident of their anonymity and the other seven percent said that they had no opinion on the subject. An online system cannot be successful if only half of the students feel secure using the system. If WPI were to implement a system that

used a login that required the students to enter their Unix username and password then the system would most likely be destined for failure unless WPI was to send a clear message to the students ensuring that the system will protect their identities.

Interestingly only seventy-two percent of the students said that they felt secure of their anonymity with the paper-based evaluations. One student even added the comment that after handing in their evaluation for a course the professor approached him/her and asked why he/she had given the course such a horrible rating. Obviously the professor was able to recognize the handwriting of the student. If students feel more secure about their anonymity using a random pin number than using a paper-based survey then perhaps the online system will in fact get more honest responses from the students.

The students overwhelmingly said that the login method would not affect the honesty of their answers. Even though they would not feel anonymous using their Unix usernames and passwords, the students would still give honest answers. This means that the students do not feel pressured to give the professors good ratings simply because the professor might find out what ratings individual students gave them.

The final question in the survey might turn out to be the most important one. The students were asked if they would object to online course evaluations becoming mandatory. Fifty-three percent of the students said that they would object. Forty-two percent said that they would not object to the evaluations being made mandatory. The remaining 5% said that they had no opinion. The response rate of the students is a major concern with online course evaluations. The system cannot be successful unless the response rate is quite high. Our test run of the online system was not a success since only 40 students out of almost 400 who had access used the site. This equates to a response

rate of roughly 10%. With a response rate like this, the online course evaluation system is almost useless to the professors.

Students don't seem to dislike the online system. Of students that used the site, almost 80% said that they favored it to the paper-based version. This means that the issue isn't students disliking the online system; they just have no motivation to use it. The easiest way to remedy a poor response rate is to make the evaluations mandatory but not only would students object to this, but as we stated earlier it is difficult to make the evaluations mandatory and simultaneously preserve anonymity.

Additional comments given by the students enabled us to determine exactly what they liked or disliked about the online system. Responses ranged from, "I hate filling those things out and I would rather fill in a couple of circles on a web site" to "Paper comments are nice because you're in class then. Yes, it takes up class time, but that's well worth it. If I was forced to do online evaluations, I'll probably forget / put off doing it, and if I was made to do it before registering, it would be too far from the class time to be accurate". Some students seemed optimistic about the possibilities "It would be a good idea. Saves paper, time and money hence a little less tuition. I'm all for it" while others were less than optimistic, "I think no one will do it if is online, just because you're in the class at the time you do it. But if you have to go find a computer and do all that stuff nobody will do it specially since it is anonymous they'll think they don't have to".

Conclusions

Login / Anonymity Concerns

If WPI were to implement we-based course evaluations, student access would most likely be controlled in a similar manner to the one we used for our test run. Students can currently use their ID number and PIN to log into the Banner system to enroll for classes. This system could easily be used to ensure security with an online system. It would also have the benefit of being able to make sure that students evaluate only the courses that they are registered for. The web site with the evaluations would have to be controlled by a third party to ensure students that even though the system knows who they are, the professors will not. This third party would most likely be the registrar's office. This would be the most convenient third party since the registrar's office is the one that controls the registration system and is already familiar with the Banner system.

Professor and Student Support

One of the goals of this project was to determine the professor support for an online-course evaluations system. After surveying the full time professors at WPI we determined that the support for an online system was 3.4 on a scale of 1 to 5 where 1 was against and 5 was supportive. What exactly does this value mean? It means that the overall support for an online-course evaluation system is positive but it also means that this positive support is mediocre at best. Professors on the whole are not jumping at the

idea of an online system. The students seemed more supportive of the online system with 66% of them responding that they preferred the online system. But even with 66% of the responding students preferring the online system, there still doesn't seem to currently be enough support to make an online system successful at WPI. Without students and professors who are willing to use a new system, the online system cannot be a success.

Response Rate

Perhaps our main concern with an online course evaluation system was response rate. Other institutions had the same concern and were able to find some solutions to the problem. But when considering response rate, one must also take anonymity and security into account. Finding the balance among these three issues seems to be the most difficult task when creating a successful online evaluation system. The method that we employed during this project focused on anonymity. We were hoping that the students would feel comfortable with their anonymity and the response rate would be high enough to give the professors useful results. Unfortunately this wasn't the case. About 10% of students who were given pin numbers to use the online course evaluation system logged in. This is not enough responses to produce valuable results. On the other hand, anonymity and security were a success. Of the students who filled out the questionnaire at the end of the course evaluation form, 78% said that they felt secure in their anonymity. We realized that in the future if WPI were to implement an online course evaluation the login would likely use the students' Unix username and password. When asked if they would feel secure in their anonymity with this system, only 58% of the students said that they would. This

means that the randomly assigned pin number system that we used is not only secure but also makes students confident of their anonymity.

This leaves only response rate to be dealt with. The problem with increasing response rate is that perhaps the only way to increase it to a level that provides enough responses for the system to be successful is to make the evaluations mandatory. More than half of the students who filled out the survey said that they would object to filling out the survey if it was made mandatory. Forcing the student body to do something that more than half of it objects to might not be a wise thing for WPI to do. Therefore it seems that the only valid option left is to find a way to encourage students to fill out the evaluations. Perhaps if students were given a pin number after filling out the evaluations that allowed them to get a discount at the bookstore they would be more willing to use the online form.

The poor response rate could be due to many factors. The evaluation was given in addition to the regular form, which most likely discouraged students from filling out the online form since it was non-mandatory. The professors who asked their classes to use the online evaluation form may not have encouraged the students enough to get them to use the website.

The results seem to show that the students like the online form and they like the login method. They simply need to be encouraged to use the online system. We didn't want to incorporate an "encouragement" into our test run because we wanted to see what the response rate would be without it and we now know that an encouragement is going to be needed. We feel that if WPI were to implement an online course evaluation, it

would be most successful if it were to use a login method similar to our randomly assigned pin numbers and encourage the students to use the site.

Future Work

Implementing a Web-based course evaluation form involves many crucial incremental steps. We have completed the initial step by creating a page and performing a test run of the system. We gathered the opinions of both the students and the professors and can use that information to help plan the next steps in developing a fully functional online course evaluation form.

The largest concern that professors had was the likelihood of a low response rate. They didn't believe that students would voluntarily go online and complete the course evaluation form. The response rate of our trial run depended on students volunteering to fill out the form on their own. Out of approximately 400 students, only 43 filled out the form. This shows that in order for the web-based course evaluation form to be successful it has to be mandatory. Making the completion of the form mandatory would involve coming up with a system that would find a successful compromise between security and anonymity. The responses on the course evaluation form are supposed to be confidential so knowing who and who didn't fill out the form could result in a lack of anonymity. Once the students log in their name could be checked off a list and then their responses sent to a file not associated with the list of students who have or have not filled out the form. Students should be made aware that their results would not be associated with their names. According to our survey 58% of the students felt that their anonymity was guaranteed when logging in with their Unix username and password. More than half of the students said that they would object to the system being made mandatory.

One benefit of an online course evaluation form would be the ability for professors to add course specific questions of their own to the original evaluation form. Seventy-nine percent of professors surveyed said that they would like to be able to add their own questions to the form. This should be looked into more thoroughly. Future work could include developing a system that would provide volunteering professors with a system that would enable them to add questions to an evaluation form then let the students go online and fill out the form. After the professors get responses to their questions they could be interviewed in order to determine if the customizable form benefited them or not. Results could be analyzed to conclude if a final, fully functional web-based course evaluation form should include the ability for professors to add questions.

Another concern with the implementation of a web-based course evaluation form is the impact it may have on the results of the evaluation itself. With the present paper-based system students may often just circle an entire column of A (Agree), for instance, in order to get home more quickly. It is possible that students would not feel a time constraint when filling out the web-based survey and would put more thought into each answer. This could lower or raise the average score each professor receives. Despite having a low response rate we noticed that many students who filled out the online form included comments to the questions that normally appear on the back of the paper course evaluation form. This could be a result of having the more motivated students filling out the form. A study should be done to see if students are more likely to fill out the extra open ended questions if they fill out the online form rather than the paper form. This

additional work needs to be completed before an online course evaluation form is fully implemented for official use at WPI.

Appendix 1

Course Evaluation Form

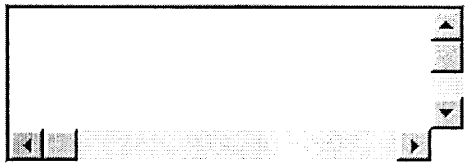
Student Evaluation of Course/Lab or Conference	N/A	SD	D	A	SA
The instructor established clear objectives in the course	○	○	○	○	○
The instructor organized the course well	○	○	○	○	○
The instructor was well prepared to teach each class	○	○	○	○	○
The instructor communicated well	○	○	○	○	○
The instructor demonstrated a good understanding of the material being taught	○	○	○	○	○
The instructor used the blackboard/visual aids in an effective manner	○	○	○	○	○
The instructor used class time effectively	○	○	○	○	○
The instructor assigned homework that aided my learning	○	○	○	○	○
The instructor used evaluations that were good measure of the material covered	○	○	○	○	○
The instructor provided adequate assistance outside the classroom	○	○	○	○	○
The instructor stimulated my interest in the subject matter	○	○	○	○	○
The instructor seemed really concerned about the students	○	○	○	○	○
The instructor was well above average	○	○	○	○	○
For Laboratory Course	N/A	SD	D	A	SA
The instructor showed me how to use laboratory equipment properly	○	○	○	○	○
The instructor provided adequate time to complete experiments	○	○	○	○	○
The instructor clearly defined the requirements for preparing lab reports	○	○	○	○	○
Some General Perceptions	N/A	SD	D	A	SA
The textbook helped me learn the subject matter	○	○	○	○	○
The room used for the course was acceptable	○	○	○	○	○
The lab and/or computer equipment was in good operating condition	○	○	○	○	○
I rate myself in general as an excellent student	○	○	○	○	○
I had a good understanding of material that was prerequisite for the course/lab	○	○	○	○	○
I learned a lot in this course	○	○	○	○	○

Background Information						
My current student year classification is	1st Year ○	2nd Year ○	3rd Year ○	4th Year ○	5th Year ○	Graduate ○
My major field is	CM ○	CE ○	EE ○	ME ○	CH ○	CS ○
	BB ○	MG ○	MA ○	PH ○	Intd ○	Cons ○

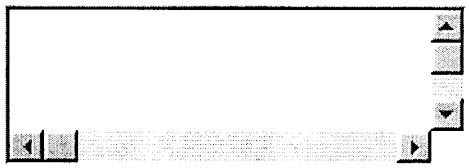
Additional Comments for the Instructor

What did you particularly like about this course/lab?

What did you particularly dislike about this course/lab?

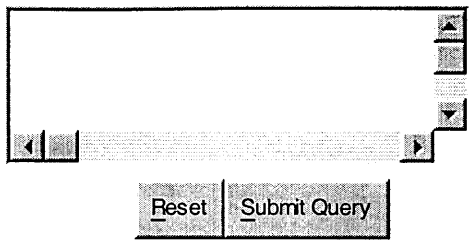


Can you suggest anything that the instructor can do to improve the quality of teaching?



What strategy would you advise a friend to use to benefit from this course?

Other Comments?


Reset
Submit Query

Appendix 2
Professor Survey

We are currently working on an IQP to determine if it would be feasible to put the course evaluation form online. An important aspect of converting the system would be the opinions of the professors who depend on the course evaluation form. It would be a great help to us if we could gather your opinion on the subject. A sample of what the final outline form may look like can be found at www.wpi.edu/~rackliff/evaluation.html.

Jared Judecki
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Eric Rackliff
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1. Would you like to be able to get the results of your course evaluations as soon as the class is completed?

   Yes No

2. The back of the course evaluation can be a useful tool for professors. With an online system it would be possible to easily customize the back of the form. A professor could potentially log on and change the evaluation for their specific class or classes. Would you be interested in customizing the evaluation in any of the following ways?

   (check all that apply)

   - ❑ Add course specific questions from a predefined question bank to the original evaluation form.
   - ❑ Add course specific questions of your own to the original evaluation form.
   - ❑ Have departments add questions to the original evaluation form.

3. What do you believe to be important benefits of a web-based evaluation form?

   (check all that apply)

   - ❑ Faster results for professors
   - ❑ Give students the opportunity to give more thorough answers
   - ❑ Evaluation form customization
   - ❑ Paper conservation
   - ❑ Other (please list)

4. What are your objections/concerns with web-based evaluations?

   - ❑ Reduced response rate
   - ❑ Evaluation form customization
   - ❑ Security concerns
   - ❑ Anonymity concerns
   - ❑ Other (please list)

5. What is your overall opinion of a web-based course evaluation form?

   Against 1 2 3 4 5 For

6. Your Department: _____

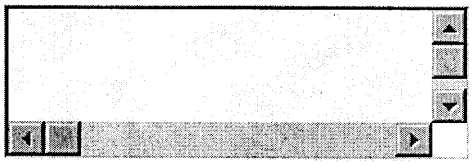
7. If you are willing to volunteer your D-term course to perform a trial run of the online course evaluation form, please print your name so we may contact you.

Appendix 3
Student Survey

Thank you for participating in a test run of an online course evaluation form.
We would greatly appreciate it if you would take time to answer these questions.

	Yes	No	No Opinion
Do you prefer Online course evaluations to paper-based course evaluations?	○	○	○
Do you feel confident of your anonymity logging in with a randomly assigned PIN?	○	○	○
If your anonymity were guaranteed, would you feel confident of your anonymity if you logged in with your UNIX password?	○	○	○
Do you feel confident of your anonymity with paper-based evaluations?	○	○	○
Would the login method affect the honesty of your responses?	○	○	○
Would you object to making completion of online course evaluations mandatory for registration for the next term?	○	○	○

Any additional comments?



Reset Submit

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