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## ***Online Instructor Evaluations: A Web-Based Application***

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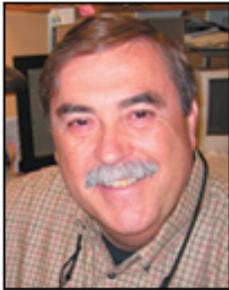
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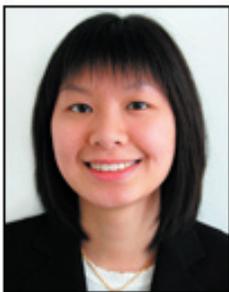
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# Online Instructor Evaluations: A Web-Based Application

By Mr. Ronald J. Glotzbach, Mr. Terry L. Burton & Ms. Betty Co

## Abstract

Instructor evaluations are still paper-based throughout many universities; however, some universities are beginning to evaluate Web-based solutions to a time-consuming and wasteful process. Purdue OnLine Evaluations (POLE) is a Web-based system currently in place for students in the Department of Computer Graphics Technology (CGT) at Purdue University to evaluate their instructors and courses. An upgrade to ASP.NET, which provided additional functionality related to charting and graphing, using C# and a Microsoft SQL Server database management system was completed along with Ajax user interface components that provided a more fluid and rich user interface. While the application was used on a relatively small scale, steps were taken to implement this Web-based solution as the evaluation software for Purdue University and possibly as the benchmark for other universities. The system has applications for not only Industrial Technology, but any college or department interested in automating the instructor and course evaluation process. The findings showed that the majority of students tested, who agreed that completing an online evaluation was quick, also agreed that they would use POLE to evaluate their courses. Additionally, by providing faculty an easy way to create evaluation questions, they were also highly likely to use POLE for creating course evaluations. Finally, the findings of this study show that integration of an online evaluation system can provide accurate, timely, and more detailed information to instructors and departments, as well as, retain the confidentiality, security, and functionality of the traditional paper-based approach.

## Introduction

Near the end of each semester, Purdue University's instructors and courses were evaluated by students enrolled in them through a paper-based system. Through this process, administrators received valuable information for assessing each instructor's performance and the perceived effectiveness of each course. This information was also used by instructors for improving their courses and teaching skills, as well as providing metrics for accreditation. Ideally, results would be delivered to department heads as soon as possible after students' grades were processed, while using minimal resources. The information needed to be presented in a way that both instructors and department heads found understandable and useful, and the system also needed to be stable and accessible (C. Gosnell & M. Halsema, personal communication, October 4, 2006).

After further investigation, it was observed that Purdue University did not have an available Web-based method for conducting instructor evaluations that could viably replace the antiquated Optical Mark Reader (OMR) system, which uses a typical bubble sheet evaluation that is fed through the system to obtain and tally the results – a process requiring nearly half a million sheets of paper each semester. Administrators in the Office of the Provost believed that an online course evaluation solution would improve upon the aforementioned requirements. A team separate from the authors, with representatives from the Center for Instructional Excellence (CIE) and Information Technology at Purdue (ITaP), were in the process of recommending a third-party online evaluation solution for the university to purchase (L. Knowley, personal com-

munication, October 2, 2006) and the CIE / ITaA team had developed a list of weighted metrics that more specifically defined the requirements, as determined by CIE.

In the fall of 2006, more than 5,000 Purdue courses used Optical Mark Reader bubble sheets to conduct student evaluations. Typically, students completed evaluations during class; then, a third party would courier them to the respective department. These evaluations were processed by Purdue's central Instructional Data Processing (IDP) department using a customized system called Purdue Instructor Course Evaluation Service (PICES). Afterwards, IDP relayed the processed data to department heads and each department head was then responsible for sharing the results with faculty.

In the College of Technology (CoT) at Purdue University, there are nine departments: Aviation Technology, Building Construction Management, Computer and Information Technology, Computer Graphics Technology, Electrical and Computer Engineering Technology, Industrial Technology, Manufacturing Engineering Technology, Mechanical Engineering Technology, and Organizational Leadership and Supervision. Among these departments, only Computer Graphics Technology (CGT) was using a Web-based application for administering instructor and course evaluations; however, most other departments both in the college and across the university were interested in switching to a Web-based application.

In the CGT department, most student evaluations were conducted online using the Purdue OnLine Evaluations (POLE) system. Some instructors requested that students complete their evaluation during a lab session and/or make it a required assignment. In other cases, student evaluations were deemed optional; however, an 80% response rate was expected by the department head. The data were processed automatically and results were accessible to the instructors through POLE after final grades were submitted to the registrar

and processed. Afterwards, the department head would ask faculty members to report the results of their student evaluations.

According to IDP, departments using bubble sheets to conduct student evaluations consumed 225,000–500,000 sheets of paper per semester. Processing the bubble sheets required time and labor that may be deemed unnecessary within the context of existing technology (C. Gosnell & M. Halsema, personal communication, October 4, 2006). Although POLE eliminated the need for bubble sheet evaluations, the department head of CGT informed the authors that results were not being returned back to the department head in a timely or meaningful fashion. In fact, there was no administrative reporting mechanism provided for the department head to access. Additionally, through investigation of the structure of POLE, it appeared that it was not designed or tested for potential use beyond the CGT department.

### ***Problem Statement***

Purdue University does not have a viable online alternative to paper-based instructor evaluations.

### ***Research Questions***

- Does Purdue OnLine Evaluations (POLE) serve as a viable alternative to the current Purdue Instructor Course Evaluation Service (PICES) system in terms of the ease and quickness of use? (Center for Instructional Excellence Requirement)
- Does POLE retain or improve upon the following characteristics of the PICES system: accuracy, timeliness, level of detail of responses, confidentiality, security, and functionality?

### ***Significance***

The research questions were chosen based upon the importance placed on them by the Center for Instructional Excellence (CIE). CIE stressed that for a solution to be a viable alternative, it must, first and foremost, be as easy, or easier, to use than the current PICES system and be as fast or faster in compiling and delivering results

to instructors and departments. The solution must also retain the existing characteristics of the PICES system while increasing efficiency.

### ***Literature Review***

The primary research was the implementation of online course evaluation systems for universities. Previous studies reviewed included those for Cornell University, Hong Kong University, California State University, and St. Louis College (Avery, Dommeyer, Ha, & Kasiar, 2006). The reoccurring factors for using an online system were response rates, quality, anonymity, and flexibility. These were important considerations for the development of POLE, especially with the intent of integrating the system into multiple departments.

### **Ease of use**

Several factors can play into the ease of use of the POLE application, including the ability to reuse questions, the ability to add instructor-supplied questions, and the ability to return and make changes, to name a few. Paper-based evaluations require more communication among involved parties to add and reuse questions, whereas online evaluations provide an easy interface for instructors to directly add the questions or reuse others that exist in the database. In creating that interface, Krug (2006) suggests keeping most Web pages limited to one page in length, as many visitors will not scroll below the fold to see the additional information. Additionally, if changes are necessary, the ability to change questions on the paper-based form again requires more communication among several people, as compared to online evaluations that save the settings for each instructor and are updateable until they are sent out to be completed.

### **Quickness of Use**

Krug (2006), states that Web sites that feel effortless are more usable than those that do not. Providing a straightforward interface allows users to quickly find what they are looking for and accomplish the task at hand. McCracken and Wolfe (2004) contribute to

this, stating that improved productivity through speed and efficiency provides a more user-centered Web site. In moving towards a more user-centered approach, comparing paper-based to online-based evaluations, paper-based results take days to process and return to departments and instructors, whereas, online evaluations provide the results in real-time. This puts the user at the center of the design, providing quick access to necessary information.

### **Response Rate**

In most cases, the response rate of instructor evaluations completed online dropped when compared to the existing traditional paper-based version. In the study conducted at California State University, the response rate was 32.8% for online evaluations and 60.6% for in-class. It should be noted that this decrease in the response was not necessarily attributed to the instrument used to complete the evaluation; rather, online evaluations were usually completed outside of class whereas paper-based were completed in-class (Dommeyer, Baum, & Hanna, 2004).

The average response rate for in-class paper-based evaluations ranged from 61–82 percent; for that reason, the desired response rate for online evaluations was to be within this range (Avery, 2006). One approach to increase the response rate was to send reminder emails to non-responders. At Hong Kong University, three email reminders were sent and an increase in the response rate from 60 to 87 percent was observed (Ha, Marsh, & Jones, 1998). At Cornell University, the online system was in place for three years and overall response rates increased reaching an average of 68.1 percent for all courses (Avery, 2006).

### **Quality**

Based on the literature reviewed, the quality of the responses between online and paper evaluations did not have a significant difference (Leung & Kember, 2005). Other research noted that the quantity in comments for open ended questions were greater for online systems versus paper versions. A study

calculated a ratio of 186 words per student using online versions compared to 25 words per student for paper versions (Kasiar, Schroeder, & Holstad, 2002).

### **Anonymity**

A common concern expressed among students who used POLE was whether they remained anonymous when completing evaluations. For the most part, this was a perceived concern since responses are indeed not linked to student IDs. To address this issue, POLE needed a privacy statement detailing anonymity and security concerns expressed. In some cases, paper-based evaluations compromised anonymity if handwritten responses were not transcribed. Having the comments typed initially using the online system prevented this issue and eliminated the need to transcribe the responses.

### **Flexibility**

PICES has a list of 646 questions faculty can choose from to create their course evaluation. The same concept was implemented for POLE in which faculty could choose from the same bank of questions or even create instructor supplied questions. On the student end, most online evaluations were available for a seven to ten day period for students to complete. Also when completing the evaluation, students were not limited to in-class time to complete the form. Previously, all data reports were obtained through a request to PICES. POLE, however, permits reported data to be accessed online when needed.

### **Other Universities**

Other Big Ten Universities were contacted to assess their use of online evaluations. The purpose of this was to gauge whether comparable universities were implementing a system similar to POLE; the results were mixed.

Indiana University reported using paper forms for over 95% of evaluations with no major move towards an online system (D. Perry, personal communication, October 10, 2006). Iowa University used a system called ACES – very similar to PICES – and was in the early

stages of examining an online system (D. Ungs, personal communication, October 10, 2006).

Michigan State University had tried standardized online forms for the past two years, but received mixed to negative reviews from faculty and students. The assumed cause was that the forms were not customizable enough for each class, therefore not allowing for appropriate evaluation (J. Kulik, personal communication, October 10, 2006).

The University of Illinois and University of Michigan both reported that they still used a paper-based system, but planned to have an online evaluation method available by the fall 2007 semester, at least a beta version available for testing (C. Migotsky & R. Pline, personal communication, October 10, 2006).

### **Methodology**

The methodology of this study included two parts: improvement and new development of the solution and the evaluation of the solution. The following two sections detail the procedures that were followed during each part. Appendix A offers a general timeline of the events that took place. Additionally, Appendix B provides a flow diagram that depicts the process.

### **Development Prior to Evaluation**

In order to meet the ease and quickness of use criteria set by CIE as a required standard of an online solution for the university, an evaluation of the existing live version of POLE was reviewed. While no formal usability analysis was performed, it was determined through conversations with students and instructors that certain aspects needed to be improved and additional features were to be added to increase usability and functionality.

Figure 1 (*page 5*) shows the original interface design, while Figure 2 (*page 5*) shows the antiquated navigation scheme. The following sections discuss some of the changes that were implemented to help increase the usability and functionality of the site.

### Interface Design

According to the Purdue Identity and Graphic Standards manual provided by Purdue Marketing and Communications, the interface design of POLE did not reflect the University's Web standards. Therefore, a graphical redesign was created (see Figure 3, page 6). In addition to University logos and color schemes, POLE's redesign met the University requirements for a Web site, per Purdue Marketing and Communications standards. These included linking back to the main University home page, application of a standard font scheme, and University contact information at the bottom of every page.

The navigation scheme for the POLE site was updated to follow a standard and consistent design; the previous version had significantly different layouts, even on similar pages. The site was updated from a table-based design to a more standards compliant Cascading Style Sheet (CSS) backed layout. This ensured that the POLE site would be viewed correctly across multiple browser platforms. The redesign of the POLE site came at a time when the two leading Web browsers released significantly new versions of their software. Internet Explorer 7 and Mozilla Firefox 2 allowed POLE to be compatibility checked against the browsers that would be in use for years to come.

In addition to improving the look and feel of the site, POLE also met the Americans with Disabilities Act standards. Some of the more notable standards included: providing an instruction page to visitors and a way to communicate any problems encountered, "Alt" tags for images and graphics, and avoiding non-standard site documents, such as PDF's (Waddell, 1998).

### Site Structure

The structure of the site was modified to account for the numerous pages that shared common files. Therefore many files were combined into one folder, for instance having a common "includes" directory rather than separate directories containing the same files. Also, unused files were deleted and broken links were eliminated.

### Evaluation Questions

POLE originally had a default set of lecture and laboratory questions that were utilized by faculty for their courses; however, they were not updateable by each faculty member. These included the two university core questions required for all courses. POLE also had "Custom Questions" allowing faculty to add up to three of their own evaluation questions; however, each faculty member had to request the change through

a central administrator. IDP expressed the importance of allowing faculty to modify questions upon request. In order to have POLE appeal to different departments, the evaluation questions for each course needed to be customizable to support flexibility. Figure 4 (page 6) shows an example screen listing the chosen questions for a course.

The PICES system had 646 questions that the faculty could choose from to

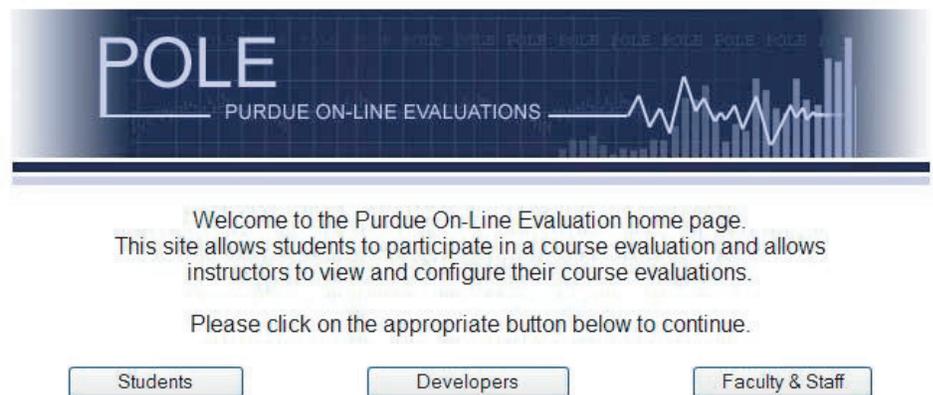


Figure 1. The original interface was outdated and did not represent the university.

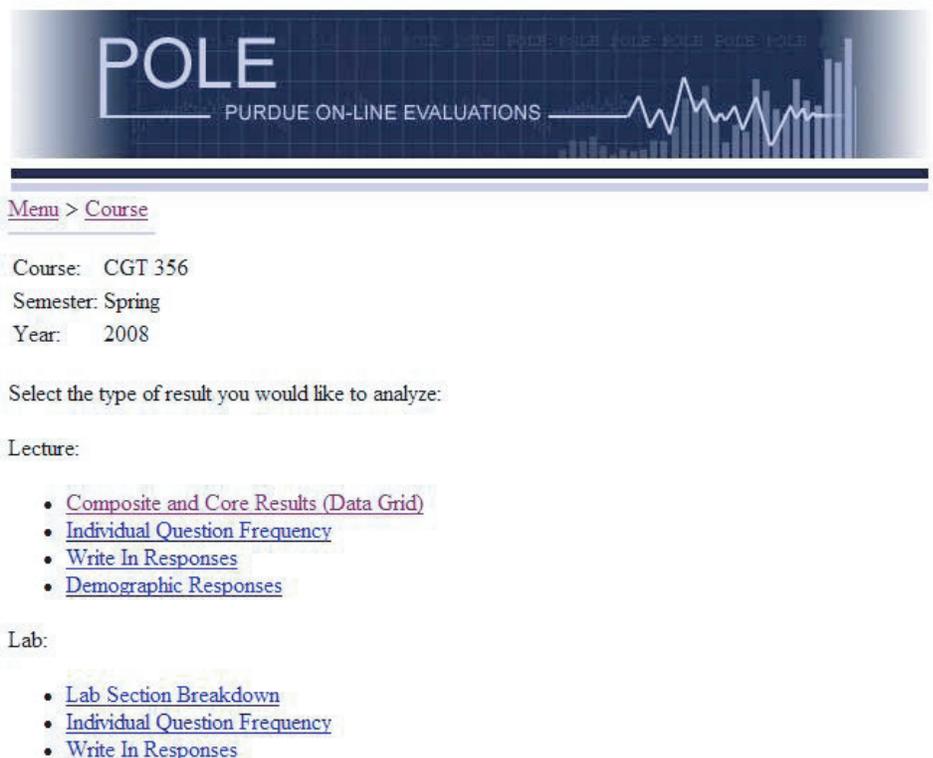


Figure 2. The navigation was in lists and not consistent across the entire site.

create course evaluations. These PICES questions were added to POLE as a question bank for faculty to search and select to customize their evaluations. POLE's original default set of evaluation questions included the university core questions. After implementing the question bank, faculty had the ability to modify the list of questions by replacing and/or adding questions from the question bank. The wording of "Custom Questions" was replaced with "Instructor Supplied" items to match the terminology used by PICES.

In addition to the default university core questions, each department also had the option to create a set of its own default questions. This allowed an administrator to create questions that were specifically used for all department courses. Since the questions used by the CGT department in previous semesters differed from those in the PICES question bank, they were moved under their own category.

The design and development of the question bank involved using ASP and Ajax technology to dynamically search and select questions. ASP was used to access the questions stored in a Microsoft SQL Server database while Ajax was used to display information in real time. The search mechanism generated a list of questions stored in the database that matched the keywords typed by the user in the search box. The user could quickly browse through the question bank, modify their search accordingly, and add the question to the existing list. Given the capabilities of Ajax, this tool provided a quick way to find specific questions without needing to reload the page (see Figure 5, page 7).

Due to the large list of questions (646), the design needed to allow users to easily browse and select questions. Taking this into account, a shopping cart-like design, a feature widely used on e-commerce Web sites, was adapted for the user to browse through questions by category. The question categories were listed in alphabetical order with each corresponding question revealed only when clicking on a category name. If

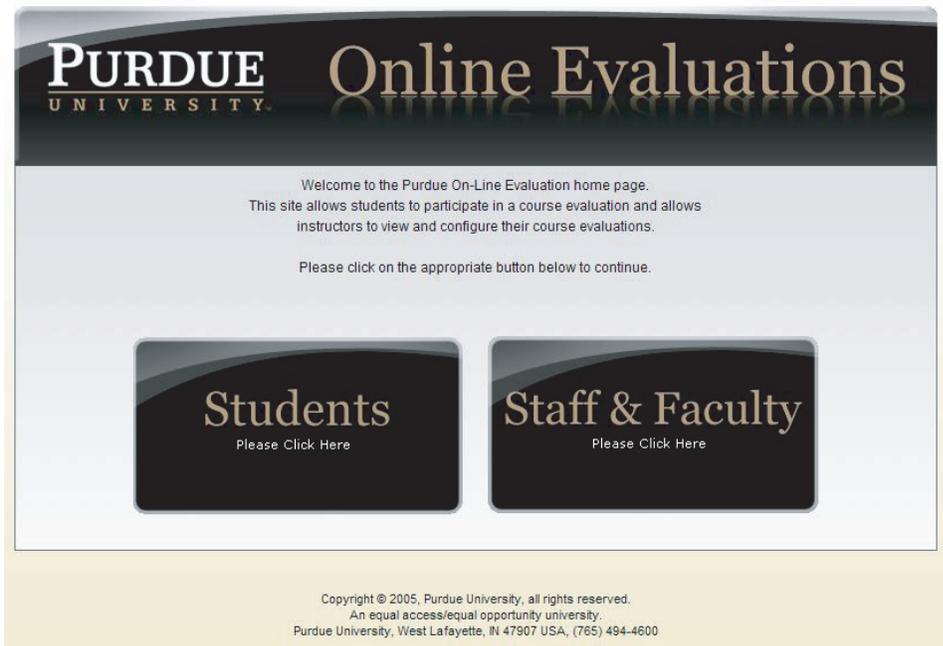


Figure 3. A screen capture of the login screen and POLE user interface.

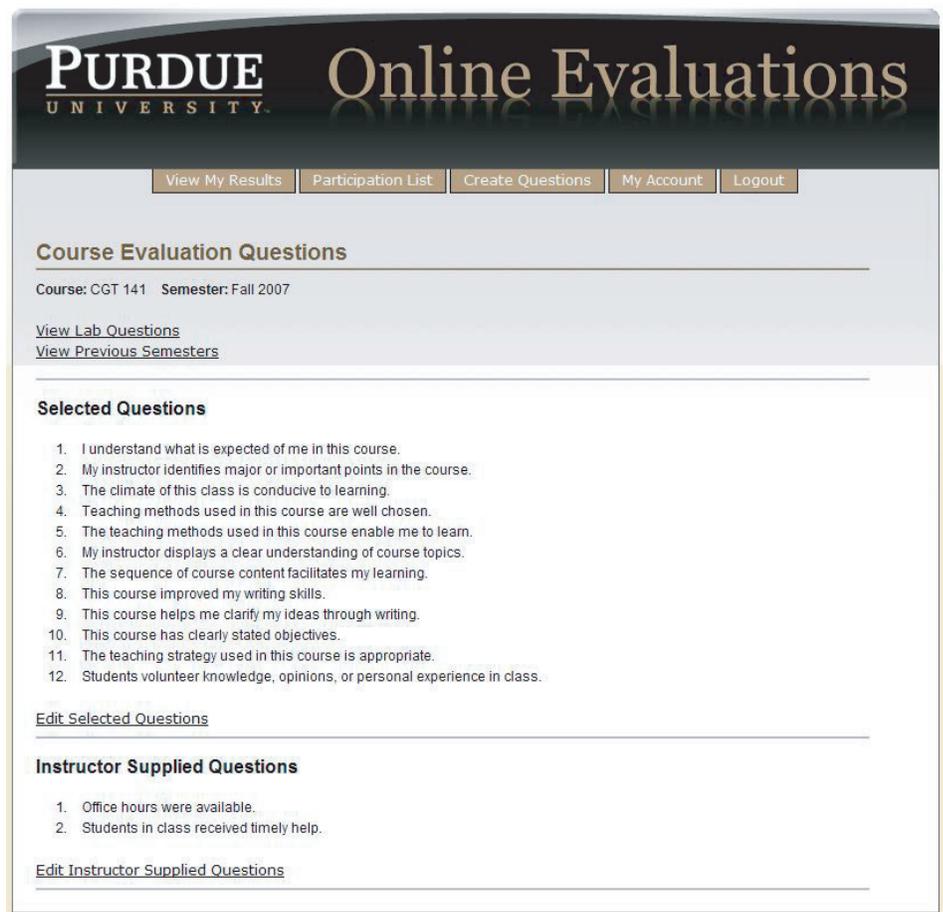


Figure 4. An example screen showing the chosen questions for an individual course.

the list of questions in each category exceeded 450 pixels in height, a scrollbar would automatically appear for the majority of browsers (see Figure 6). The height specified was to allow approximately ten questions to appear before auto scrolling. This was in attempt to minimize overall page scrolling and keep category names “above the fold” which increases usability (Krug, 2000). The alternate view for unsupported browsers was simply the complete list without scrolling.

Upon selecting a question, it automatically appeared in the “Questions Selected” list along with a total number of questions selected. The user could choose to remove items from the list by deselecting the checkbox. Another way to remove a question was to click on the “X” beside each question in the “Questions Selected” list (see Figure 7). The user could save the set of questions, which were updated and used for the current semester.

An option to reuse previously saved sets of questions from former semesters was also available. This feature allowed faculty to save time if they desired to reuse a set of questions, but still had the flexibility to modify the list. The ability to create a set of evaluation questions was a new component for POLE. Therefore this particular aspect of the Web site, along with the interface redesign was tested among faculty to determine its usability and whether it met other CIE requirements.

### Standard Reports

POLE used mean calculations to report individual lecture and laboratory scores. To coincide with CIE standards, the median calculation was also added. Originally, POLE did not have any grouped frequency distribution statistics; after reviewing that the PICES system used the grouped median in its standard reports, this reporting feature was also added to POLE during this development phase before evaluation. Another feature incorporated was a printable standard report to allow faculty to easily compile hard-copy versions of the reports if needed. Electron-

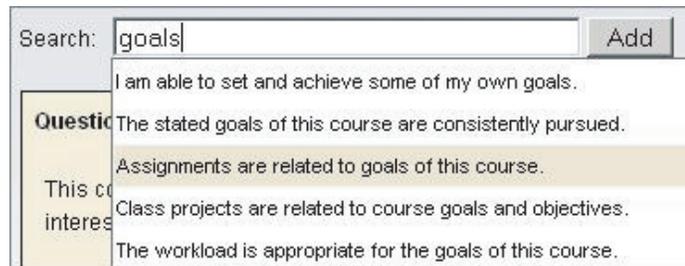


Figure 5. An example of Ajax searching the database as the user types.



Figure 6. The list of questions being added to a category.

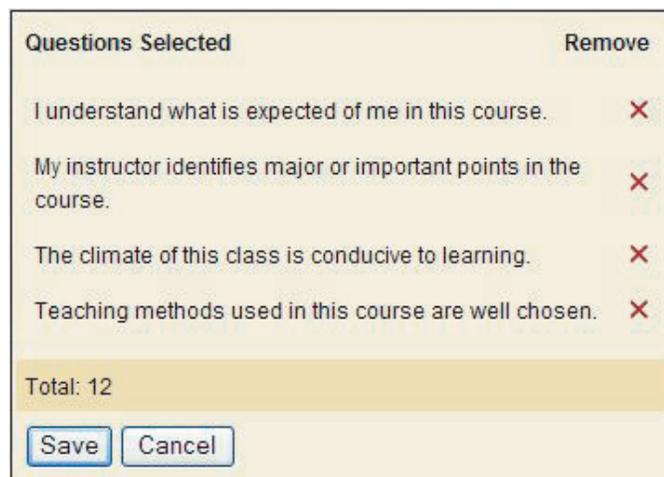


Figure 7. A display of the chosen questions for a given category.

ic formats included the additional PDF and an Excel documents dynamically generated upon request.

### Anonymity

POLE was originally designed to allow instructors and administrators to see which individual students had completed evaluations while the evaluations were available to take. This was often

used to reward students who completed evaluations, thus giving them added incentive to do so. However, this was inconsistent with the University’s policy regarding anonymity for students. Therefore, the indication of which individual students had completed a course evaluation was removed. The privacy policy concerning anonymity may vary between institutions; for this reason,

it would be possible to re-implement this feature if this policy changes or if the solution is implemented elsewhere. In terms of participation and response rates, instructors were still able to view overall percentage of class completion while the evaluations were ongoing.

### **Security**

One minor security issue that existed in POLE was the separation of the username and password display errors. This was inconsistent with common practices, as a user could determine whether they had a correct username by simply submitting it to the form. This was corrected by combining the display error, indicating that username and/or password was incorrect.

### **Functionality**

Some functional errors existed at the beginning phase of the POLE project. These issues were addressed for a more complete and usable system. Instructors were able to view core data for any semester of their course. Originally, the page displaying this data only worked sporadically (for certain courses) due to database errors. This issue was resolved by cleaning up the extraction of data from the source.

In the administration mode, the option to modify a course was improved so that the user could easily determine which courses were available at which campus location. Beforehand, a single dropdown list was provided, listing all the courses and its campus location together, making it difficult to distinguish the main and satellite campuses. Therefore, two dependant dynamic lists were created to categorize the courses by campus. This was accomplished by using ASP and JavaScript technologies. The result allowed the user to choose the campus first, and depending on the selection, the corresponding courses were listed in the second dropdown list.

### **Evaluation**

After new development of POLE had concluded, the system was ready to be evaluated by students and faculty. The initial step determined how to validate the measurability of ease and quick-

ness of using POLE. These metrics were directly related to the usability of the Web application. Therefore the study consisted of a usability survey in which quantitative data and descriptive responses were collected. The structure of the survey was a questionnaire using a five-point Likert scale and open-ended responses. Both student and faculty were tested to assess whether or not POLE fulfilled the aforementioned criteria. An exemption request was submitted to the Institutional Review Board (IRB) and was granted prior to conducting the study.

### **Quantitative Study**

The study was administered to students and faculty within the departments in the College of Technology, Horticulture and Landscape Architecture of Agriculture, Liberal Arts, and Management. In addition, faculty in Statewide Technology locations of Kokomo, New Albany, Richmond, South Bend, and Calumet were also contacted. Electronic mail was sent describing the study and requesting voluntary participation among students and faculty.

The entire study was completed online, allotting ten days for testing to occur. As an incentive, users were informed that a desktop wallpaper was available for download after finishing the study. Furthermore, the CGT 112 professor provided extra credit for the students' participation.

There were two surveys created for this study: one for the students and one for the faculty. The Web pages that the students had access to were few in number and consisted only of the online evaluation. Therefore, a set of questions was created for them, tailored to their experience, as it would be different from the instructors' experience. There were many pages that the instructors had access to, as discussed above. In addition to building the survey questions, instructors could also view different courses and past performance in a particular course. Thus, the instructors were tested on different functionality than the students.

The purpose of the student survey was to evaluate the following specifications for POLE: (a) Accessing the system, (b) navigation (c) aesthetic appeal and (d) response rate (see Appendix C). Students simulated completing a course evaluation for an imaginary course. Upon completing the evaluation, the usability survey questions directly followed.

The faculty survey evaluated the following specifications: (a) Accessing the system, (b) navigation, (c) task completion, (d) customizability for the department, and (e) customizability for course (see Appendix D). Faculty were tested on specific components of the Web site; replicating the process of choosing questions to create a course evaluation.

### **Confidentiality**

Student participants of the study were given a generic university ID to login and access the testing site. This information was for simulation purposes in completing an online course evaluation. The survey responses were not linked to the students so that the data results were analyzed anonymously.

Likewise, faculty participants were required to login with a generic username and password. This information was for simulation purposes in accessing the site. The survey responses were not linked to the faculty users and data results were analyzed anonymously.

All tests were completed unobserved and at the participant's own leisure. Although certain departments were approached for the study, the Web site was public for any student or faculty member to participate.

### **Findings**

At the end of testing, 73 student responses and 30 faculty responses were collected. Overall, student and faculty feedback was positive, showing a favorable interest for future use of POLE.

### **Student Results**

The frequency for the first ten question's (see Appendix C) responses is represented in Figure 8 (page 9). The

majority of the responses were Strongly Agree. As for the Web site’s graphical redesign, Question 7, “Website is recognizable as a Purdue University site” and Question 8, “The Web site appears professionally designed” were asked to determine the aesthetic appeal. It was noted that the individual frequency means were 4.60 and 4.56 respectively (see Figure 9 and Table 1).

Chi-Square and correlation tests were run to see if there were any notable relationships among questions. Question 5, “Completing a course evaluation online is quick” was compared to Question 10, “If this Web site was offered to evaluate all my courses, I would use it.” The Pearson chi-square calculated was 119.815 with a significant p-value of 0.000. This shows that the two questions were not independent. The Spearman correlation was 0.542, indicating a strong positive relationship between Question 5 and Question 10. Therefore, the majority of students tested who agreed that completing an online evaluation was quick (CIE requirement) also agreed that they would use POLE to evaluate their courses.

Written comments regarding what students liked about the site included “it was easy to use,” “straight forward,” and “online.” Among dislikes were “no previous button,” “no progress bar,” and “the font size was too small.” Suggestions to make the site easier to use included having less questions per page, repeating the scale if page scrolling occurs, and a progress indicator. Additional comments shared the concern of using student IDs, that it was an improvement to paper-based evaluations, and an interest for future use for other courses.

**Faculty Results**

The frequency graph in Figure 10 (page 10) shows the faculty responses for Questions 1 to 12 (see Appendix D). It was determined that Question 2, “Easy to find and select questions to create an evaluation” and Question 12, “If this Web site was offered to create course evaluations, I would use it” are related. It was noted that the individual

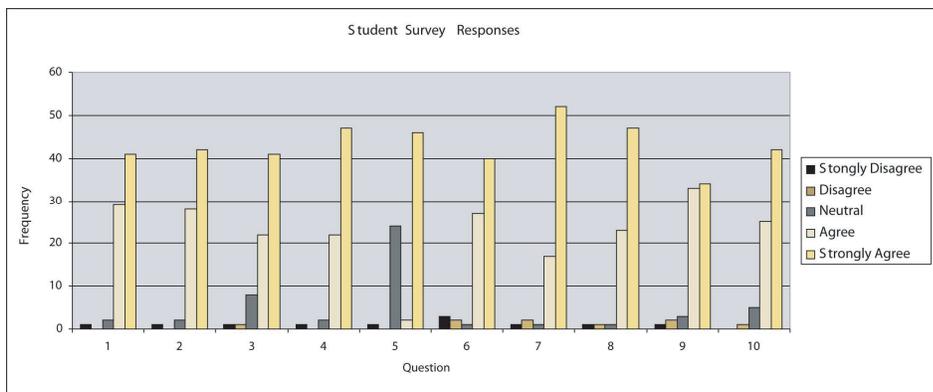


Figure 8. Frequency of responses on the student survey for the first ten questions.

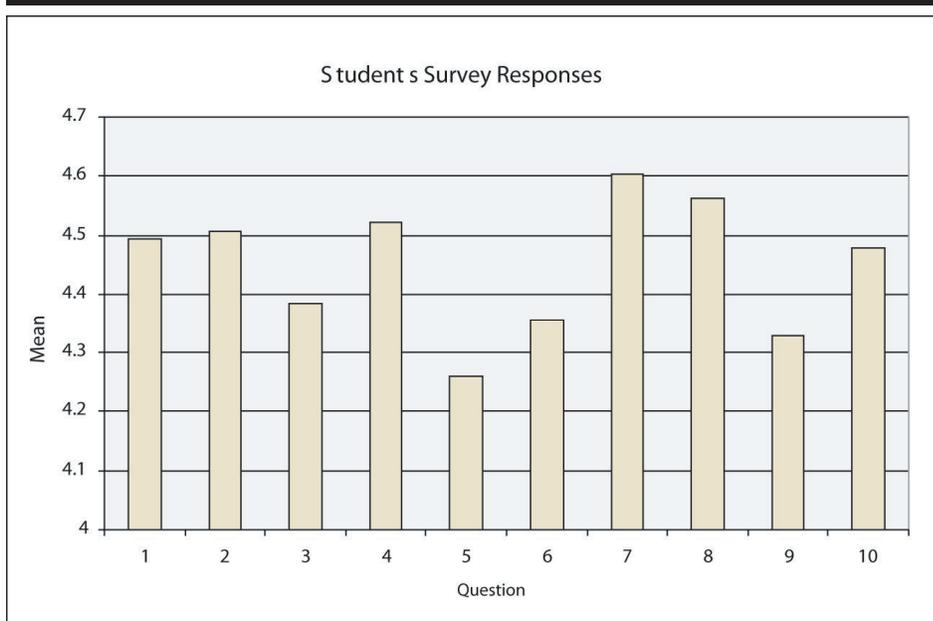


Figure 9. A graph of the individual frequency of student responses.

Question	1	2	3	4	5	6	7	8	9	10
Mean	4.49	4.51	4.38	4.52	4.26	4.36	4.60	4.56	4.33	4.48
Median	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00	5.00
Mode	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Table 1. Student Individual Frequency Responses (see Appendix C).

frequency means were 3.97 and 3.93 respectively (see Figure 11 and Table 2, page 10). The Pearson chi-square value was 27.550 with a significant p-value of 0.006. The Spearman correlation of 0.521 and p-value 0.003 indicates a strong relationship between the two. Thus, given a high response for Question 2, a high response for Question 12 is expected. Therefore, by providing faculty an easy way to create evaluation

questions, they were highly likely to use POLE for creating course evaluations. Some of the faculty written responses expressed that it was “well designed” and “easy to use.” As for dislikes, the question bank loaded too slowly, removing a question was not intuitive, and not having an undo button for using previous semester questions were among the responses.

### Discussion

The goal of this study was to determine if POLE would serve as a viable alternative to the existing PICES system.

#### Research Question One

Does POLE serve as a viable alternative to the current PICES system in terms of the ease and quickness of use (Center for Instructional Excellence Requirement)? The findings showed that the majority of students tested, who agreed that completing an online evaluation was quick (CIE requirement), also agreed that they would use POLE to evaluate their courses. Additionally, the findings showed that by providing faculty an easy way to create evaluation questions, they were highly likely to use POLE for creating course evaluations. This coincides with Krug (2006), who states that Web sites that feel effortless are more usable than those that do not, as well as McCracken and Wolfe (2004), who state that improved productivity through speed and efficiency provides a more user-centered Web site. As a result, the author speculates that POLE would serve as a viable alternative to PICES in terms of ease and quickness of use.

#### Research Question Two

Does POLE retain or improve upon the following characteristics of the PICES system: accuracy, timeliness, level of detail of responses, confidentiality, security, and functionality? As discussed in the literature review, supporting sources agree that each of these characteristics meets or exceeds the level of the PICES system. Accuracy of the information is retained as data is now stored in a database for later retrieval at any time. Timeliness is far improved as department heads and instructors no longer need to wait for the bubble sheets to be scanned and have results reported back. The level of details in responses actually increases on typed responses, exceeding the average number of words that would be hand written. Confidentiality is retained as student responses are not tied to the student in the database, thus a response by a student could not be reverse en-

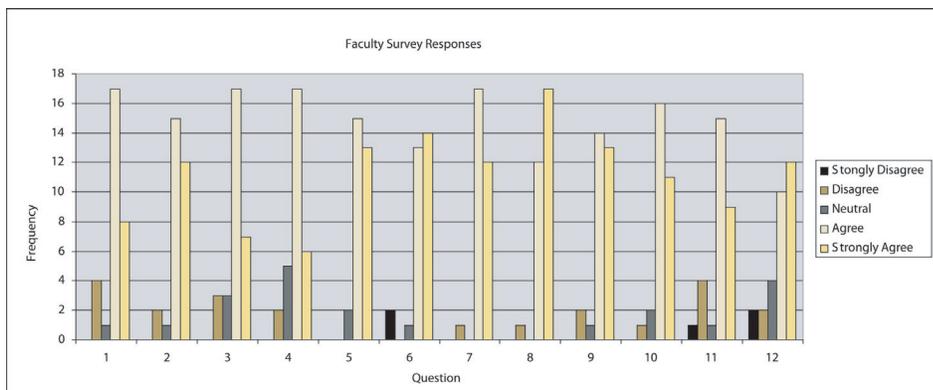


Figure 10. Frequency of responses on the faculty survey for the first twelve questions.

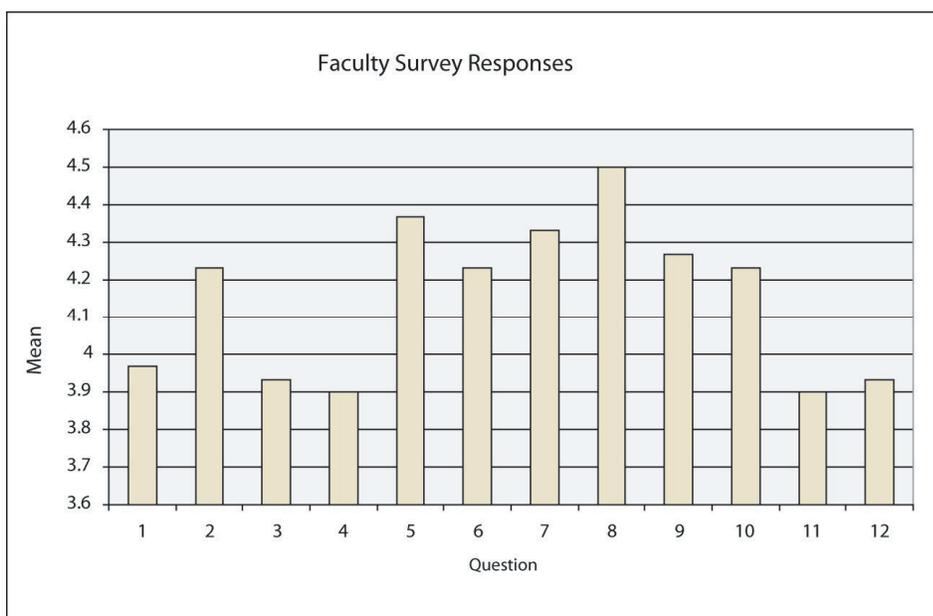


Figure 11. A graph of the individual frequency of faculty responses.

Question	1	2	3	4	5	6	7	8	9	10	11	12
Mean	3.97	4.23	3.93	3.90	4.37	4.23	4.33	4.50	4.27	4.23	3.90	3.93
Median	4.00	4.00	4.00	4.00	4.00	4.00	4.00	5.00	4.00	4.00	4.00	4.00
Mode	4.00	4.00	4.00	4.00	4.00	5.00	4.00	5.00	4.00	4.00	4.00	5.00

Table 2. Faculty Individual Frequency Responses (see Appendix D).

gineered to breach that confidentiality. The POLE system is placed behind a Secure Socket Layer (SSL) certificate, providing the familiar padlock icon in the Web browser, indicating that the Web site is secure. Finally, instructors are able to deliver evaluations to students in much the same manner as before, but receive the results in a more timely fashion. Thus, the functionality

of the online evaluation system exceeds the functionality of the paper-based system.

#### Resulting Development of Student Feedback

Taking student feedback into consideration, additional features were added to increase usability. These included adding the option to increase font size, a

progress indicator, and previous button. Another improvement included highlighting the scale used for the university core questions (Excellent, Good, Fair, Poor, Very Poor) which differs from the other scale (Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree).

### **Resulting Development of Faculty Feedback**

The main request by faculty members that would improve ease of use was providing a help section detailing how to add, delete, and search questions. This feature was created giving a step-by-step procedure in completing each task. Additional comments included expressed interest for future implementation, concern of student response rates, and any quality effects in student responses by using an online system. According to previous research, the concern of quality changes in student responses can be alleviated, since there is no significant difference between online and paper-based (Dommeyer, 2002).

### **Conclusions**

Based upon the research conducted, study findings, and developments for Purdue Online Evaluations (POLE), it is considered to be highly feasible for this version to be fully implemented at the end of next spring 2008; with fulfillment of the recommendations prescribed, code validation, and concurrent testing. The findings showed that the majority of students tested, who agreed that completing an online evaluation was quick (CIE requirement), also agreed that they would use POLE to evaluate their courses. Additionally, by providing faculty an easy way to create evaluation questions, they were highly likely to use POLE for creating course evaluations.

The system has applications for not only Industrial Technology, but any college or department interested in automating the instructor and course

evaluation process. The findings of this study show that integration of an online evaluation system can provide accurate, timely, and more detailed information to instructors and departments, as well as, retain the confidentiality, security, and functionality of the traditional paper-based approach. Course instructors find benefits in the ease and quickness of use, which leads to time saved. It also benefits course instructors by providing faster reporting and electronic reporting, which can be used to more easily update promotion or merit documents. As Purdue University moves towards an online course evaluation system, POLE serves as an immediate viable alternative to the current paper-based system. It is anticipated that it will continue to serve as an evaluation system for the Computer Graphics Technology department and soon be adopted by other departments at Purdue.

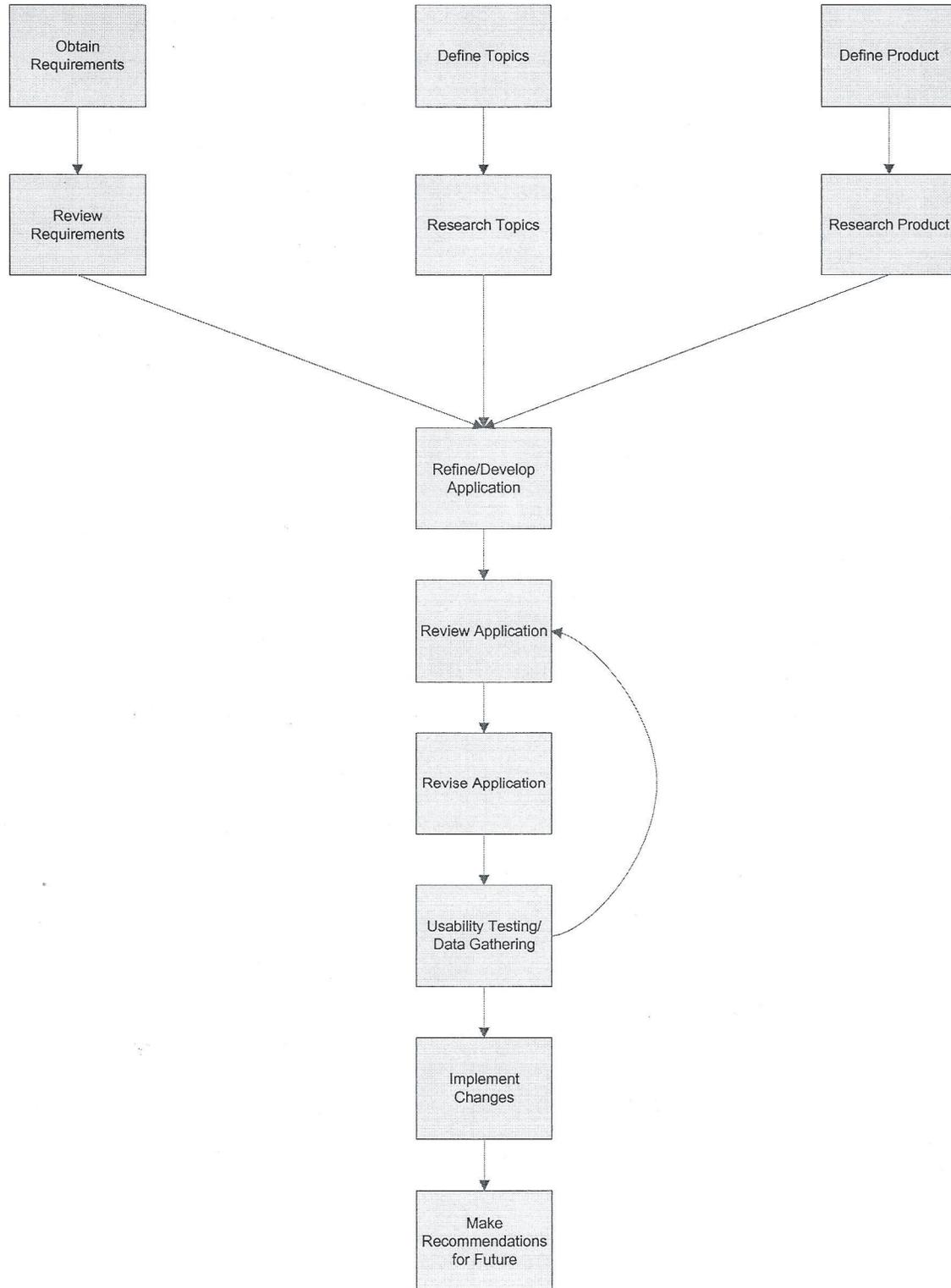
### **References**

- Avery, R., Bryant, W., Mathios, A., Kang, H., and Bell, D. (2006). Electronic Course Evaluations: Does an Online Delivery System Influence Student Evaluations? *The Journal of Economic Education*, (37(1), 21-37. Retrieved October 9, 2006, from Omnifile Full Text/Mega Database.
- Dommeyer, C., Baum, P., and Hanna, R. (2002 September/October). College Students' Attitudes Toward Methods of Collecting Teaching Evaluations: In-Class Versus On-Line. *Journal of Education for Business*, 78(1), 11. Retrieved September 23, 2006, from Academic Search Premier.
- Dommeyer, C., Baum, P., Hanna, R., and Chapman, K. (2004). Gathering faculty teaching evaluations by in-class and online surveys: their effects on response rates and evaluations. *Assessment & Evaluation in Higher Education*, 29(5), 611-623.
- Ha, T., Marsh, J., and Jones, J. (1998). A Web-based System for Teaching Evaluation. *Proceedings of the 30<sup>th</sup> annual conference on New Challenges and Innovations in Teaching and Training into the 21st Century*.
- Kasiar, J., Schroeder, S., and Holstad, S. (2002). Comparison of Traditional and Web-Based Course Evaluation Processes in a Required, Team-Taught Pharmacotherapy Course. *American Journal of Pharmaceutical Education*, 66, 268-270.
- Krug, Steve. (2006). *Don't Make Me Think! A Common Sense Approach to Web Usability* (2nd ed.). Berkely, California: New Riders Publishing.
- Leung, D., and Kember D. (2005 August). Comparability of Data Gathered from Evaluation Questionnaires on Paper and Through the Internet. *Research in Higher Education*, 46(5), 571. Retrieved September 23, 2006, from Academic Search Premier.
- McCracken, D. D., & Wolfe, R. J. (2004). *User-centered website development: a human computer interaction approach*. Upper Saddle River, NJ: Pearson Education.
- Milne, S., Gibson, L., Gregor, P., and Keighren, K. (2003). Pupil consultation online: developing a web-based questionnaire system. *Proceeding of the 2003 conference on Interaction design and children*, 127-133. Retrieved September 9, 2006, from <http://doi.acm.org/10.1145/953536.953554>
- PMC ADA Checklist. Purdue Marketing Communications. Retrieved October 10, 2006, from [http://www.pmc.purdue.edu/pages/web/ada\\_tips.html](http://www.pmc.purdue.edu/pages/web/ada_tips.html).
- Purdue Identity Graphic Standards. Purdue Marketing Communications. Retrieved October 10, 2006, from [http://www.pmc.purdue.edu/pages/downloads/pmc\\_web\\_graphics/identity\\_manual/StandardsManual\\_screen.pdf](http://www.pmc.purdue.edu/pages/downloads/pmc_web_graphics/identity_manual/StandardsManual_screen.pdf)
- Waddell, C. Applying the ADA to the Internet: A Web Accessibility Standard. Retrieved November 9, 2006 from <http://www.rit.edu/~easi/law/>

**Appendicies on next page**



## Appendix B. Flow diagram of the procedures



## Appendix C. Student Study

The purpose of this study is test the usability of the Purdue OnLine Evaluation website (POLE) which allows students to complete course evaluations online. We would like to have students from various departments test the current version of POLE with consideration for future implementation. Testing will be open any time November 14 – 22. All responses will remain anonymous and the study will only take a few minutes. Your help will greatly contribute to the development of POLE.

If you are interested in participating in the study, please follow the directions below:

1. Visit pole.tech.purdue.edu
2. Enter the Student section.
3. Login with PUID: 0012345678
4. Select Course.
5. Complete course evaluation. (Please answer questions as you would for a course in which you are currently enrolled.)
6. Logout of the website.
7. Complete usability survey.

### Student Usability Survey

Please indicate the level of agreement that most accurately reflects your opinion about POLE.

SA) Strongly Agree    A) Agree    N) Neutral    D) Disagree    SD) Strongly Disagree

1. The navigation of the site is intuitive.
2. Format of the evaluation questions are clear and readable.
3. Submitted course evaluations are anonymous.
4. The instructions on the website were easy to understand.
5. Completing a course evaluation online is quick.
6. There are not too many links on each page.
7. Website is recognizable as a Purdue University site.
8. The website appears professionally designed.
9. Login and logout options are easy to locate.
10. If this website was offered to evaluate all my courses, I would use it.

Open-ended questions:

11. What, if anything, did you like about the site?
12. What, if anything, did you dislike about the site?
13. What, if anything, do you think would make the site easier to use?
14. Please add any other comments you would like:

## Appendix D. Faculty Study

The purpose of this study is test the usability of the Purdue OnLine Evaluation website (POLE) which allows faculty to create online course evaluations for students. We would like to have faculty from various departments test the current version of POLE with consideration for future implementation. Testing will be open any time November 14 – 22. All responses will remain anonymous and the study will only take a few minutes. Your help will greatly contribute to the development of POLE.

If you are interested in participating in the study, please follow the directions below:

1. Visit pole.tech.purdue.edu
2. Enter the Faculty & Staff section
3. Login with Username: faculty Password: pass
4. View evaluation questions for a course.
5. Add/Edit a “Selected Question”.
6. Search and add a question.
7. Remove a question from the list.
8. Save the question list.
9. Add/Edit an “Instructor Supplied” question.
10. View a previous semester’s evaluation questions.
11. Click “Yes” to reuse the previous semester’s questions for the current semester.
12. Logout of the website.
13. Fill out usability survey.

### Faculty Usability Survey

Please indicate the level of agreement that most accurately reflects your opinion about POLE.

SA) Strongly Agree    A) Agree    N) Neutral    D) Disagree    SD) Strongly Disagree

1. The navigation of the site is intuitive.
2. Easy to find and select questions to create an evaluation.
3. Easy to find questions by using the search box.
4. Quick to find specific questions.
5. Easy to remove questions from list.
6. Easy to add an “Instructor Supplied” question.
7. Login and logout options are easy to locate.
8. Website is recognizable as a Purdue University site.
9. There are not too many links on each page.
10. The website appears professionally designed.
11. The instructions on the website were easy to understand.
12. If this website was offered to create course evaluations, I would use it.

Open-ended questions:

13. What, if anything, did you like about the site?
14. What, if anything, did you dislike about the site?
15. What, if anything, do you think would make the site easier to use?
16. Please add any other comments you would like: