PEERRS COMPARATIVE EVALUATION REPORT:

THREE ACADEMIC SITES
AND ONE FREE ONLINE TUTORIAL SITE

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Overview

This is a comparative evaluation of the University of Michigan's **Program for Education and Evaluation in Responsible Research and Scholarship (PEERRS)** website measured against three other educational institutions' research certification process and one online open access training tutorial. During the examination of several comparable websites, the research team determined which usability metrics to evaluate. These metrics are based on the functionality and usability of the sites. For the purpose of this discussion, functionality is defined in terms of navigation and usability is defined as ease of use. The four main categories examined are navigation, content (for example, are there quizzes?), profile editing, and feedback. Not all websites examined contain all of these elements. These sites were not evaluated on the quality or accuracy of the content.

PEERRS Description

The Program for Education and Evaluation in Responsible Research and Scholarship (PEERRS) online system was created to provide efficient delivery of information, training, and certification testing to the University of Michigan research community. It is specifically designed to inform, train, and test researchers in a variety of areas relating to responsible research practices.

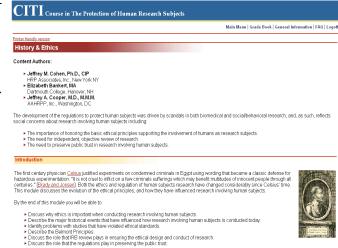
The system consists of information links, training modules, and test modules. Each training module consists of 20-30 pages of content and additional case studies. Lists of additional resources are also provided. Users can either utilize the training modules prior to testing or choose immediate testing. A user can retake the tests until a passing score is achieved. All users who have successfully passed one or more module certification tests are listed in a database accessible by any user with a valid UM Kerberos username and password, or appropriate UM *Friends* account.

The University of Michigan requires that all Principal Investigators (PIs) and Co-Principal Investigators (Co-PIs) in research projects with start dates of June 1, 2005 and later, be certified through the online PEERRS system. Individual schools and departments may have additional requirements. Furthermore, supplementary faculty, staff, and students *may be required* to complete PEERRS training and certification *as determined* by project PIs on an individual basis. UM PEERRS certification is valid for three (3) years and only for University of Michigan requirements. Research projects spanning additional universities may require researchers to be certified at those institutions, in addition to UM PEERRS certification completion. The PEERRS system begins sending automatic email notification of impending certification expiration beginning thirty (30) days prior to that date.

The National Institutes of Health (NIH) also requires training and certification for PIs, Co-PIs and other "key personnel" (as defined on the NIH Website) in research projects involving human subjects. Not fulfilling this requirement results in withholding of funds allocated by the NIH. The U of M PEERRS system was designed to comply with NIH guidelines and currently fulfills NIH requirements.

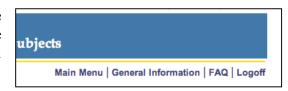
CITI: COLLABORATIVE IRB TRAINING INITIATIVE

The CITI: Collaborative IRB Training Initiative¹ is based out of the University of Miami. As a collaborative certification site, over two hundred schools have access to use this program. Two members of our research team were able to successfully register and subsequently login.



Navigation

There are two main methods of navigation on the CITI site. There is a group of links that are available on all pages that include "Main Menu", "General Information", "FAQ" and "Logoff".



On the "Main Page" the following links are available: Announcements and FAQ, Refresher Course, Basic Course, Institutional Instructions, Completion Reports, CMS/CEU credits, Change

Announcements and FAQ
Refresher Course (Status - Completed)
Basic Course (Status - Completed)
Institutional Instructions
Completion Reports
CME/CEU credits
Change Username or Password
Contact Information
Change Group

Username or Password, Contact Information, Change Group. The "Refresher Course" and "Basic Course" are the main method for accessing the modules and seeing information about which modules you have completed. Click either of these takes you to the "grade book." The "grade book" is the CITI terminology for list of modules and grades. Navigation is mildly confusing because links with different names frequently go to the same location.

Modules are entirely one (sometimes long) page. Each module is broken into sections; each section has a heading that describes the content in it. Most sections contain only a paragraph or two of text and do not have links to external sites for more information about a given topic. There is no way to navigate between sections other than scrolling your browser window. Forward and Back buttons always work. Session information is stored in the URL instead of as POST data.

Testing

After reading the module information, users click on the "Take the Quiz" link at the bottom of



the page. The link opens a page that describes the process for taking the quiz (e.g. "Click the link below to generate a quiz. Click the link only once. It may take up to a minute to load the

http://www.miami.edu/citireg/

quiz."). The quiz is randomly generated from a list of possible question. This keeps users from repeatedly taking the quiz to score higher. Each question has four possible answers, only one of which is correct. When users have completed the quiz, they submit it for grading using the submit button. The quiz is graded automatically and gives feed back on answers if they were incorrect by indicating the correct answer and explaining why it was the best possible answer out of the given four. After the quiz results are explained, users are given the option of viewing the module again, printing a certificate of completion (if they passed), submitting a comment about the exam via email, or viewing their "grade book".

Your Answer: Prison research cannot involve more than minimal risk to the prisoners.

Correct Answer: Researchers may study the effects of privilege upgrades if they are awarded by the prison.

Explanation: While prisoners may not be awarded privilege upgrades for participating in research as this would constitute undue influence to participate, researchers may study the effects of upgrades awarded by the prison for other reasons. Researchers may pay prisoners, as long as the amount of compensation would not create undue influence to participate. The decision to participate in research cannot be considered during parole hearings as this practice would clearly constitute undue influence to participate. Many state laws specifically prohibit this practice as do the federal regulations for protecting research subjects. Research with prisoners may involve more than minimal risk.

Points Earned: 0

Profile Editing

Editing your profile information occurs on three separate pages. These pages can be access from the CITI main menu (accessible from any page by clicking the "Main Menu" link. Once a user has reached the main menu, they can change profile information by selecting one of the following three links: Change Username or Password, Contact Information, Change Group

Change Username or Password
Contact Information
Change Group

Change Username or Password: Users can reset their username and passwords here. **Contact Information:** Users can edit personal information here (e.g. Name, email address, gender, role in human based research, and which courses they plan to take). **Change Group:** This allows you to change the group you are affiliated with at the University of Michigan.

Only by changing which courses you plan to take (under Contact Information) does the list of courses under "Basic Course" update.

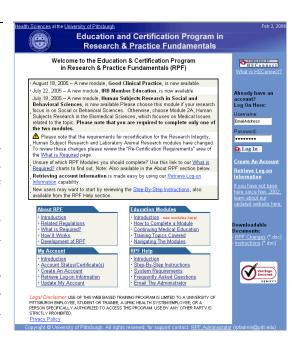
CITI does not allow you to keep more detailed information about your affiliation, and users must elect to take certain tracks of courses (Biomedical, Social and Behavioral, or Biomedical and Social and Behavioral) rather than the list being generated based on user profiles.

Quality of Feedback to University

CITI only allows feedback through the "Contact Us" link that appears on every page. There is no formal mechanism for gathering user feedback.

EDUCATION AND CERTIFICATION PROGRAM IN RESEARCH & PRACTICE **FUNDAMENTALS: UNIVERSITY OF PITTSBURGH**

The Education and Certification Program in Research & Practice Fundamentals² (RPF) owned and operated by the University of Pittsburgh is quite similar to the University of Michigan PEERRS system. The University of Pittsburgh system was developed to provide online education and certification in responsible research practices. Though initiated through the Health Sciences department of the University of Pittsburgh, modules concerning Human Subjects Research in social and behavioral sciences were added in July, 2005.



The RPF system consists of online training modules that can be accessed at will by registered users of the system. Online testing is provided to assess skill levels and certify users in a variety of research areas. The RPF system also provides a feedback mechanism so that users can evaluate their experiences and share their opinions of the RPF system on a continuous basis.

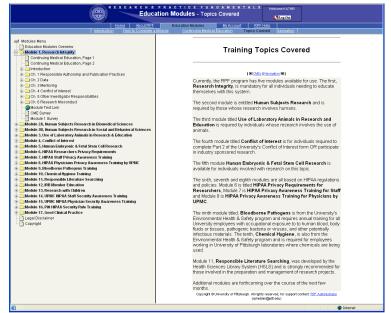
Seventeen training and certification modules are available through the RPF system. Each module contains an online training component, paired with an available online testing component for certification. Test scores of 80% or higher allow the user to print a certificate immediately from the quiz module itself, or through a user's My Account page.

Navigation

The Education Modules page of the system provides links to thorough explanations about the system, its requirements, its contents, and navigation. Additionally, a hierarchical folder structure is displayed on the left side of the page providing a graphical representation of the modules and their contents

The graphical tree works exactly like the Folder View in applications such as Windows Explorer and facilitates a familiarity and ease of use for the user.

Any folder can be expanded to see the ² http://rpf.health.pitt.edu/rpf/index.cfm



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Course: Research Integrity, Test Lesson: Research Integrity Test

> O You want to justify a request to your de chair for additional space.

O Your project involved an investigative new drug for which a marketing application was still pending
An appeal against a finding of research misconduct in connection with your project is still

O A challenge to a patent application based on you project has not been resolved.

contents within; any item can be clicked on to take the user to that item. This eliminates the need to use the browser's Forward and Back buttons. There may be instances where a user would want to skip to a different area of a module, or go back two or more sections in a given module. The Forward and Back buttons would be much less effective for this desired action than using the navigational tool provided by RPF. Forward and Back buttons always work. Session information is stored in the URL instead of as POST data.

Testing

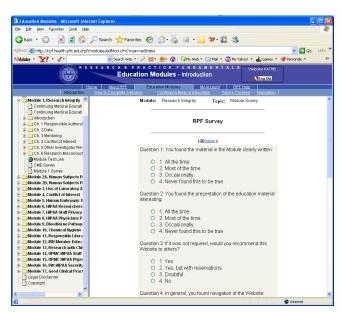
Users are not required to complete the training modules in order to take the online tests. Using the graphical navigation tool, users can go straight to the testing component of any module at any time.

Selecting the test option of any module will take users to another screen in which they are notified that they are requesting a test and on which users must choose the link to the test. Once users select the link to the testing tool, a pop-up window containing the name of the test requested, and buttons to the test itself, as well as instructions regarding how to mark test questions is displayed. Once a selection has been made, the popup will change to accommodate the request.

Registration for this system is required. To register, a user must supply personal information and university affiliation information, and a valid email address for verification. Upon testing, the registration was validated and usable before the confirmation arrived in the email box provided. The site does post a disclaimer on the home page notifying visitors that the system is for UP affiliated users and those with legitimate need for the system. The UP RPF system also uses VeriSign for its encrypted security needs, and a UP proprietary system called HSConnect which allows users to use a single login ID (email address) and password to access multiple online tools.

Quality of Feedback to University:

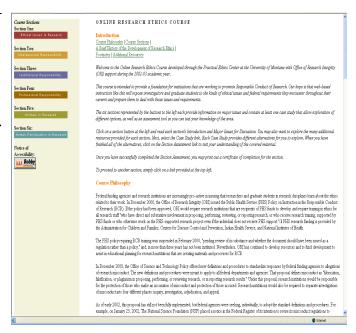
Additional features of this system include: Likert Scale survey tools at the end of each module for providing immediate feedback the UP RPF system owners and the Continuing Medical Education department; links to continuing medical education areas; link to navigation instructions at all times; and links to additional outside material in every module.



ONLINE RESEARCH ETHICS **COURSE: UNIVERSITY OF** MONTANA

The Online Research Ethics Course³ is owned and operated by the University of Montana. The site was developed by the University's Practical Ethics Center and Office of Research Integrity (ORI) during the 2002-03 academic year.

This online system contains six online training modules covering a variety of ethics issues in research, accompanied by a testing option. Anyone can access both the training modules and testing components without registration restrictions.



Navigation



There are two primary methods of navigation provided by this site, other than the Forward and Back buttons provided by the browser interface. Available at all times is the navigation bar situated on the left side of the page allowing users to move between training modules.

Additionally, all pages have a series of navigational links at the top which specific to the module currently being viewed. Being located only at the top, they are not useful for navigation once users have moved past the first

ONLINE RESEARCH ETHICS COURSE

Course Philosophy | Course Sections | A Brief History of the Development of Research Ethics Footnotes | Additional Resources

page of information. Unless a user has returned to the top for some reason; it is likely that users may lose track of their location since there is no indication of location other than the textual content of the training page.

Once users leave the introductory page that explains the program, training, and testing, without using the browser's Back button, the only way to get back is to go to the *bottom* of the current module and select the link entitled Return to the Main Page.

Ethical Issues in Research | Interpersonal Responsibility | Institutional Responsibility | Professional Responsibility | Animals in Research | Human Participation in Research | Return to the Main Page

Like the CITI system, modules are contained entirely within one page, sometimes leading to extremely long pages. Each module is broken into sections preceded by heading that describes the content in it, followed by a Return to the Top link at the end of that section. All modules contain case studies, while many sections contain <500 words of text, footnote reference

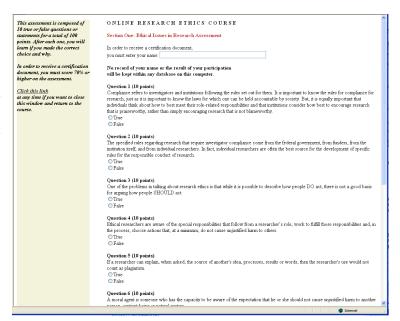
³ http://ori.hhs.gov/education/products/montana_round1/research_ethics.html

numbers, and links to external sites for more information about a given topic. There is no way to navigate between sections other than scrolling your browser window, or returning to the top and clicking a link to the desired section. Forward and Back buttons always work. Session information is stored in the URL instead of as POST data.

Testing is accessed via a link at the bottom of the module page. Though the top of the page appears to have a link to the test, it actually takes the user to the bottom of the page where the real link must be clicked. Once requested, the test will open in a new window. Since there is no restriction, users can navigate back and forth between the training module window and the test window while taking the test.

Testing

Users are not required to complete the training modules in order to take the online tests. In addition, users are not required to register for testing at any point during the tutorials or testing options. In order to receive a certificate for successful completion of any text, a user need only supply a name that will be used in the Name field of the printable certificate. Note in the screen shot that no record of the user's information is stored.



After answering all the questions and clicking the Done button, users receive the results immediately in the same window. Whether the answer the user provided was correct or not, the correct answer is displayed. At the bottom of the window the user's score is displayed and a notice regarding whether the score was sufficient for certification.

Quality of Feedback to University

The Online Research Ethics Course did not supply any feedback mechanism nor information for contacting the site's responsible parties directly.

W3 SCHOOLS

W3Schools⁴ is a free web development portal that contains tutorials on a variety of web programming languages such as html, xml, JavaScript, ASP, and PHP. All tutorials follow W3C standards. At the end of each tutorial the user has the option to take a multiple-choice quiz to test their knowledge of the language. Though the main content of the site is the tutorials, the site also offers other web-building references, examples to try online, code validation, and a forum.

The W3Schools tutorials, which cater to both new and advanced users, receive over 1.5 million page views per day. The users of the site range of individuals learning a language for the first time to teachers to advanced programmers using the site as a reference tool. The site is funded through advertisements which appear on all pages.



The authors of the site, Hege Refsnes, Ståle Refsnes and Jan Egil Refsnes are members of the Norwegian software development company, Refsnes Data.

Navigation



On the home page of the site, all available modules are listed by category (HTML, XML, Browser Scripting, Server Scripting, etc) on the left most side of the page. To access any module, the user clicks on the link containing the module name.

Each module is divided into a series of separate pages, each page containing information on one particular aspect of the programming language. The

separate pages of the module can be accessed by clicking on any particular page, or by using the "previous" and "next" buttons that appear on the top and bottom of each page. When inside a module, the left hand menu changes from a list of all tutorials available to a list of all pages available for that particular tutorial.



⁴ www.w3schools.com

Each page of the module is broken down into three to 6 sections, divided by grey lines. The top of each section begins at the top of the page, however, the bottom of each section can be found in approximately the middle of the page. The bottom half of each page contains advertisements and links to other sections of the W3schools web site. Because the advertisements and links look similar to the tutorial content, it can be hard to distinguish between content and advertisements. Additionally, the advertisements give the site a cluttered look and feel.



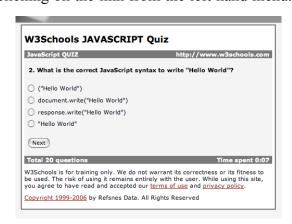
The last segment of each module contains pages with example programming text and scripts that can be edited in one frame of the page and executed in another frame on the same page.

Testing

At the end of each tutorial module there is a 20 point quiz that the user can take to assess their knowledge of the material. The quiz is neither comprehensive nor official in any way. The user can skip straight to the quiz if they would like by clicking on the link from the left hand menu.

Though the quiz is not time, there is a clock in the lower left hand corner that keeps track of how long the user has spent on the quiz.

One question is shown at a time. The question can be answered by clicking one of the circular buttons and the "Next" button, or skipped entirely by clicking the "Next" button. There is no way to go back and change a previous answer within the quiz itself, but the forward and back buttons do work throughout.



At the end of each quiz a the users are shown the number of questions they got right and wrong, the correct answer percentage, and the time they took on the test with a qualitative message about the score. For example, a test taker with a 5% score is shown the message "You must study much harder!" Users are able to view a breakdown of all questions showing which were answered correctly and which were answered incorrectly. The correct answers are not shown for the incorrect responses. Users may opt to take the quiz over again, but they must take it over again from the beginning and re-answer the questions they previously answered correctly.

Quality of Feedback

The only apparent way to send feedback to the site is through email addresses provided in several sections of the "About W3schools" section of the site. The "About Advertising," "About

Helpers," and "About Privacy" all contain an email address for information about that particular topic. There is an "About Comments" page that displays a plethora of positive comments about the site, however does not provide any means of making those comments.

Summary Analysis

Overall, the University of Pittsburgh's RPF site was evaluated as the most navigable and useful. The clear hierarchical structure of the modules allows users to know exactly where they are in within the module and in the entire website. In comparison, the PEERRS modules are not as clear to follow. The PEERRS modules are identified by name, but do not have the obvious hierarchical navigation tree to orient the user. Additionally, the PEERRS site requires users to continuously return to My Page to switch between modules. Both websites are good examples of maintaining consistency of form in the layout and design throughout the website; "a global header is useful in providing users with a sense of place...and is important to navigation" (George, 2005). In addition, all evaluators responded strongly to the RPF feedback survey. Research shows users provide useful feedback when designers ask them specific questions (Nielsen, 1999).

The University of Miami's CITI site and the University of Montana Online Research Ethics Course did not compare well to PEERRS. Both sites lack the clear navigation of either the PEERRS or the RPF sites. The main deficiency in these sites' navigation is the lack of a scroll bar. Without scroll bars, designers make the assumption that users know intuitively to look beyond the window currently displayed on screen. This assumption is a common mistake in poorly designed websites. The lack of scroll bar also impacts the accessibility of the website (Nielsen, 2005). Individuals with poor motor skills or the elderly may be excluded or struggle to use this site. ESL users may become frustrated with this site as well. A scroll bar is a universal web tool to tell the user there is more content beyond the view of the window. An alternative to the scroll bar may be to break the content up over several pages, which is how both PEERRS and RPF present several pages of information.

The advantage CITI has over the other two academic sites is its open door policy allowing users from more than 200 institutions to use its content. As University of Michigan students, our team members had no problem registering for the correct modules to become certified.

An additional difference between all of the sites reviewed and PEERRS is the customization of the individual users' profile. In PEERRS, an individual's research requirements dictate the modules that are selected for training and testing. The user's profile then dictates the content of the left-side navigation bar. In the RPF site, the left-hand navigation remains fixed regardless of the individual's specific research. The Online Research Ethic Course provides limited, non-customizable left-hand navigation. The CITI site does not offer left-hand navigation at all.

Both PEERRS and the University of Pittsburgh's RPF sites provided the user with a navigation module. This instructional content explains in detail to the user how to navigate through the training and testing modules. At the beginning of every module, users have the option to review how the navigation works in PEERRS. In addition, the second step of every module in PEERRS

is an overview of what information will be covered in the module. The other sites reviewed did not offer this feature.

Interestingly, none of the sites examined, including PEERRS, provided users with a sitemap. A sitemap is useful for helping a user orient themselves in a complex, multi-level website. According to Nielson, "A site map should **not be a navigational challenge** of its own. It should be a map." (2002). Users of all of these sites would benefit from a clear, easy to read site map.

Conclusion

From the examples we reviewed, it is clear PEERRS lacks comprehensive navigation. In comparison to the CITI and Online Research Ethics Course sites, the PEERRS site displays superior navigation. We posit that the University of Pittsburgh site could serve as a navigational model for all of the other sites reviewed in this comparative analysis.

	Registration Required	Module Navigation Explained	Site Map Provided	Fixed Module Navigation Bar Provided on Left	Additional Navigation Tools Based on Module Content	Complete Module Content Contained in One Page	Testing Provided	Certificate Provided	Feedback Mechanism
University of Michigan: PEERRS	Y	Y	N	Y	Y	N	Y	Y	Y
University of Miami: CITI: Collaborative IRB Training Initiative	Y	N	N	Y top only	N	Y	Y	Y	N
University of Montana: Online Research Ethics Course	N	N	N	Y top only	Y	Y	Y	Y	N
University of Pittsburgh: Program on Research and Practice	Y	Y	N	Y	N	N	Y	Y	Y
W3Schools	N	N	N	Y	N	N	Y	N	N

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