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Refining an e-Course Usability Evaluation Tool

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Refining an e-course usability evaluation tool

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Abstract: Evaluating e-courses can be difficult task, because there are a myriad of skills and knowledge that must be applied to the evaluation activity. Similarly, finding an evaluation tool that can be used with different types of courses has been challenging. The complications emerge when evaluation tools have confusing definitions, along with different units of analysis and methodologies. This paper discusses the methodology used to refine an e-course usability evaluation tool. The resulting tool can be used to evaluate e-courses and would assist in informing the creation of a usability tools for a variety of e-learning products.

Introduction

Many efforts have been devoted to the development of evaluation instruments for e-courses (Moore, Dickson-Deane, Galyen, Vo & Charoentham 2008). However, the efforts have produced instruments, which have varying units of analysis, contradicting definitions of those units, and vague descriptors, which allow for multiple interpretations of the required elements. Rather than e-learning usability evaluation converging, it seems to be diverging. As a result, there appears to be no consolidated forms of usability evaluation for e-learning (Ardito et al., 2005). In addition, many of these instruments do not provide course developers and educators sufficient mechanisms for course evaluation. The current instruments provide general concepts, which are useful but need to be refined or adapted for various types of e-courses.

In order to constrain the variables associated with evaluating the many types of e-learning, the authors are refining usability evaluation items as they pertain to e-courses (Moore, et al, 2008). Usability evaluation is the method chosen to improve such quality but this method has proven to be much more difficult than it really appears. There are a number of usability instruments and methods that use varying foundations for evaluating e-learning products. The smallest standalone unit, an e-course, has very few usability instruments focusing on its quality and most evaluations adapt instruments modeled for larger or smaller e-learning products. Previously the authors clarified terminology, defined key concepts and categories, and identified usability items that governed general e-course usability evaluation. The purpose of this paper is to showcase the ongoing work to refine a usability evaluation instrument for an e-course.

Framework of Evaluation Categories

The team reviewed more than fifteen papers published during a ten-year period to identify commonalities in definitions and instrumentation design (Moore et al., 2008). Based on the literature and the team's e-learning experience, an e-course was defined as an online course that is supported by a learning management system (LMS), course management system (CMS), or an online learning environment that combines several communication technologies to support instructor-led learning activities (Moore et al., 2008). In supporting this definition, the following categories were deemed important for e-course usability evaluation:

1. User Experience - The e-Course interface provides flexibility and support based on the user's experience with an online learning environment.
   · Example: Orientation activities for the learning environment
   · Example: Hints or tips for how to navigate the interface.

2. Information Organization - The content of the e-Course is logically organized into modules or units.
    · Example: The user can easily determine the sequencing of content and instructional activities to support learning objectives
    · Example: Flexible organization scheme that provides links to content from multiple locations
3. Tools - The e-Course utilizes appropriate tools to support course management, communication, and completion of assignments.
    · Example: An instructor's ease of use when creating content or assigning student groups.
    · Example: The ease in setting user preferences for how and when information is displayed. Example: The ability to search for content
4. Visual design - The e-Course employs Web site interface standards and easy navigation
    · Example: Color, spacing, font, icon, and information mapping provide the ability to scan and identify important information
    · Example: Interface provides breadcrumbs, title location, and visited links to indicate location and what content has been visited
5. Media - The e-Course provides different formats of content to support different learning styles
    · Example: Provide PDF, Web Page, audio, video, or flash formats
    · Example: Support learners of various learning styles with different format of the same content
6. Interaction - The course organization, navigation, and tools support peer-to-peer, peer-to-content, peer-to-instructor, and instructor-to-peer interaction
    · Example: The ease in uploading and downloading files for assignments
    · Example: The ease in submitting assignments within a minimal amount of steps
    · Example: The ease in creating organizing content with activities that must be submitted
7. Instructional strategies - The methods used to facilitate and support learning.
    · Example: The ease in supporting individual and group-work activities such as retrieving, submitting, editing, and sharing documents.
    · Example: The ease in participating in synchronous lecture-based delivery of content

Methodology

From the literature review, two usability evaluation instruments emerged as the best tools to use as anchors for our process. The first instrument was an adaptable usability heuristic checklist by Dringus and Cohen (2005). Their checklist was used to evaluate the usability of WebCT with the purpose of evaluating all e-courses. The second was set of categorical questions by Mehlenbacher et al. (2005), which also focused on an adapted set of Nielson's heuristics. However, they also included a focus on instructional content. Both of these instruments used Neilson (1994) as well as Benson et al. (2002) as a base for their instrument design.

The authors used an iterative approach to refining the usability instrument (See Figure 1). For each instrument, the team discussed the categories and usability heuristics (i.e., questions or checklist items) to determine meanings as it relates to our experiences with e-courses. We identified questions that were too vague or not applicable and removed from the instrument. In addition, we reworded heuristics to allow yes and no answers to reflect the positive and negative meanings, respectively. For example, a yes for "Are the screens too cluttered or too sparse?" would mean a negative quality whereas a yes for "Are the screens pleasing to look at?" would be a positive quality. This resulted in an

evaluative score which, when tallied, represented the number of issues with the course; meaning a lower score equated to a higher quality product.

We selected a Flash Authoring e-course to use for our refinement of the usability evaluation instrument. This e-course focuses on developing skills and competencies for flash animation. By using this course, we were able to perform the evaluation from different perspectives: subject matter novice, subject matter expert, e-course instructor, e-course student, usability evaluation novice, usability evaluation expert. The evaluators had a myriad of experiences in e-learning, and as such could take on those varying roles. In addition, these perspectives created a wider range of results to be analyzed (see Figure 2). Focus was placed on each evaluator's ability to evaluate the e-course using the instrument as opposed to the result of the instrument's usability evaluation.
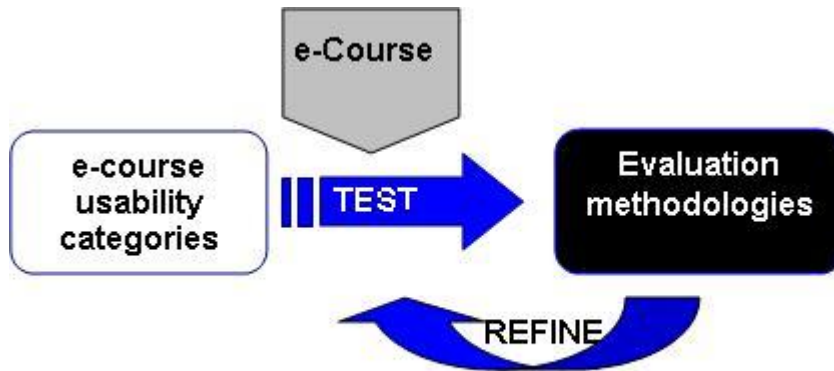
Figure 1: Refining an e-course usability instrument process
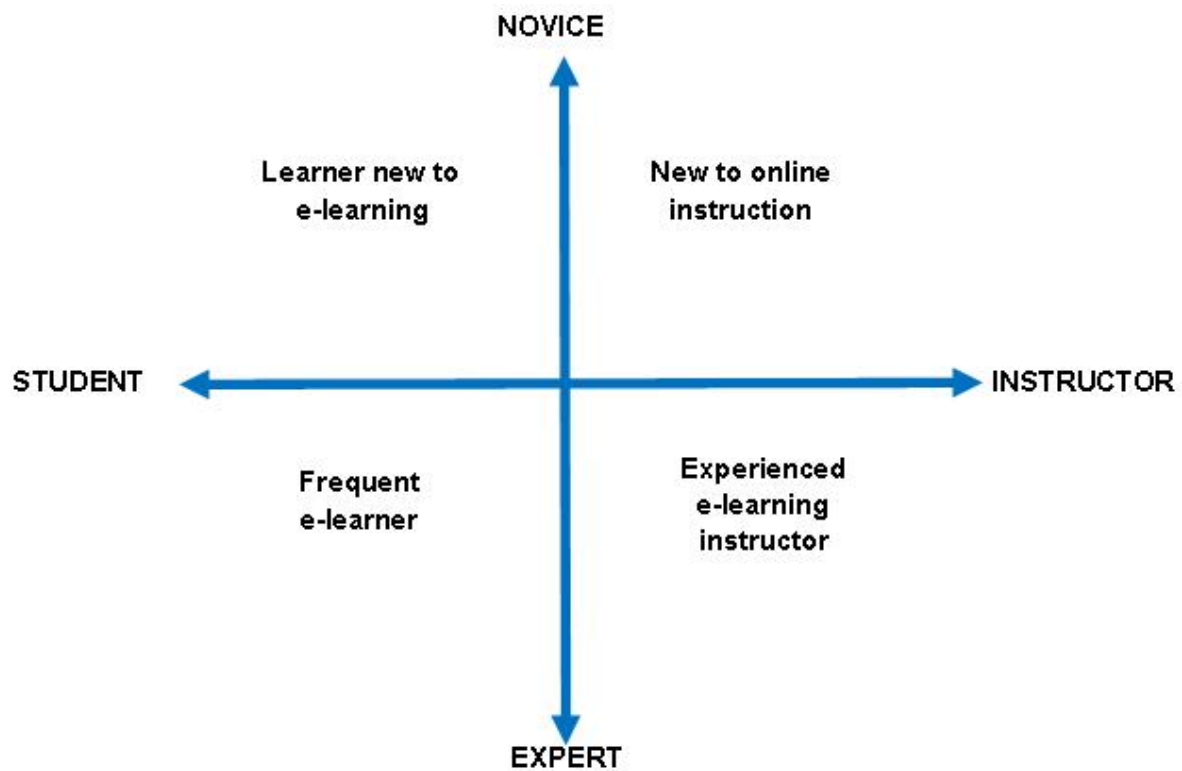
Figure 2: Evaluative dimensions

Participants

The participants are graduate students in a learning technologies curriculum and have been involved in usability evaluation projects. Table 1 provides an overview of their characteristics.

Characteristics	Evaluator A	Evaluator B	Evaluator C	Evaluator D
Current education status	Masters	Doctoral	Doctoral	Doctoral
Number of online courses (instructor-led) you have taken	10	2	18	22
English as second language	Yes	Yes	No	No
Sakai Experience	Yes, Intermediate to Expert	Yes, Novice	Yes, Expert	Yes, Intermediate
Experience with other content/ learning management systems:	Yes	Yes	Yes	Yes
Were you a previous student of the Flash course?	Yes	No	Yes	No
Have you taught/designed a course in Sakai?	No	No	Yes	No
Instructional Design Experience	Yes, Novice	Yes, Intermediate to Expert	Yes, Expert	Yes, Expert
Usability Evaluation Experience	Yes, Intermediate	Yes, Intermediate	Yes, Intermediate	Yes, Intermediate

Table 1: Evaluator Profiles

Based on the evaluator profiles, Figure 3 illustrates the evaluators' position as per the evaluative dimension described in Figure 2.
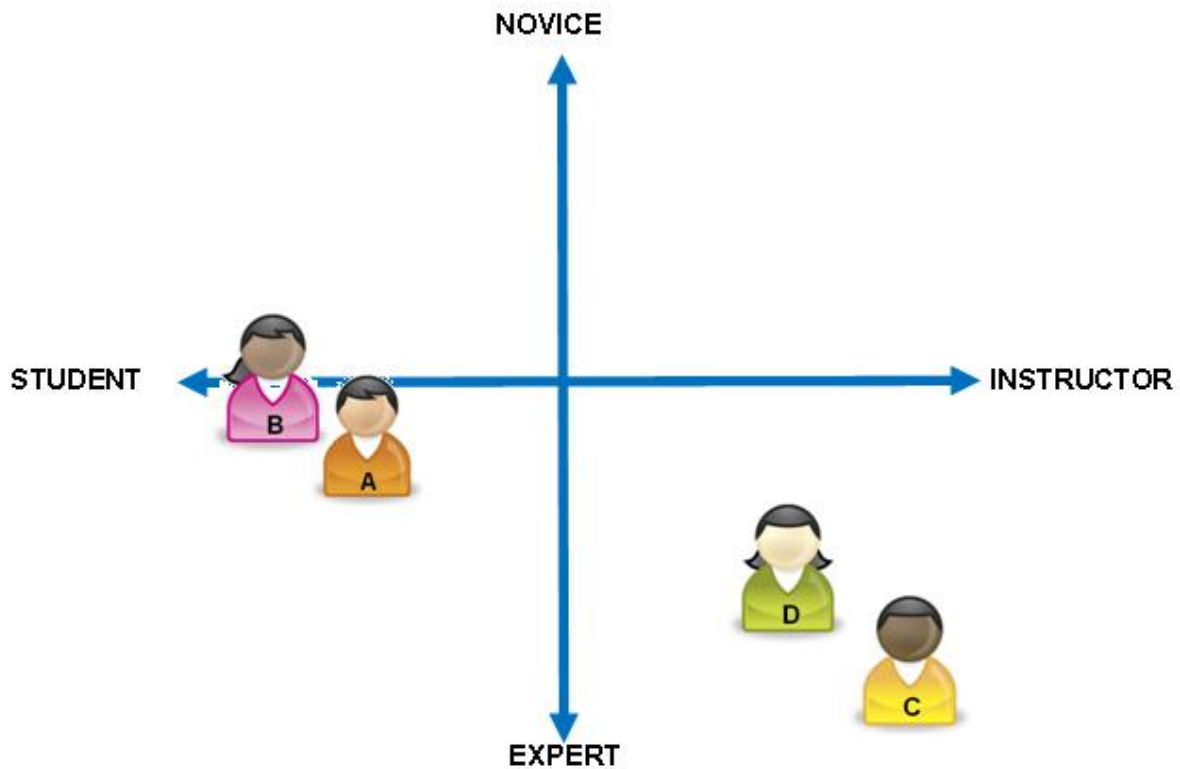
Figure 3: Evaluators in the evaluative dimension

Evaluator Reflections of the Process

Below are three tables, each containing evaluators' feedback on the implementation procedure, the difficulties encountered, and the applicability of the instrument for e-courses.

Evaluator	Evaluation Procedure Reflections
A	· Browsed the course; Special attention to assignments, unit of instruction, discussion, etc. · Read each checklist question, and browse the e-course to determine the answer
B	· Explored the website from a learner's perspective · Went through sections to get a sense of course organization and navigation system. · Chose one unit to determine how the interface assist with completing the tasks · Used the checklist to study the website. This evaluation was "cognitively-consuming", so I went back through the checklist to double check each answer
C	· Explored the website first · Used the checklist to evaluate the e-course; Some questions were easy to answer because of my previous experience with Sakai, the content management system · Color-coded answers that were confusing as green; color-coded that were not yes/no questions or yes answer was a negative meaning as blue
D	· Used music to help me to concentrate on the evaluation · Explored the e-course and links

	· Used the instrument; Breaks were taken because of the length of the instrument

Table 2: Reflections about the process

Evaluator	Difficulties Encountered Reflections
A	· Some questions with a no answer indicated an intuitive function of the system. · Several questions could not be answered with yes/no · Questions for leaner's and instructor's interface were intermingled; should separate the perspectives
B	· Marked out items I did not understand
C	· The instrument would sometimes use words and phrases to represent aspects or functions that were more specific to other types of LMSs, such as Blackboard or Moodle. For example, "message can be easily expanded and collapsed". This is not a function in Sakai. This is an issue: being too specific runs into issues like this, but being too general then runs into the issue of ambiguity.
D	· Several questions could not be answered due to wrong evaluative references or ambiguity of the question.

Table 3: Reflections about difficulties

Evaluator	Applicability Reflections
A	· The Flash course is an instructor-led online course with interaction. The interface covers interfaces from the learner and instructor interactions, indicating a holistic approach. However, as some functions are only available from a certain perspective, it would be difficult to use the same set of questions as presented in the instrument, without indicating that a questions can be applied for only one interface. · Questions related to the instructor interactions with the interface are dominant in many categories, especially interactivity, flexibility, and course management. · Several categories do not provide the detail to determine what is meant by "appropriate"
B	· The instrument is a mix of student and instructor perspectives. That makes the instrument too long People without instructional design experience cannot answer some of the questions. It is an instrument mixed with assessing usability of course and usability of Sakai in supporting course design. I don't have experience managing a course and for some items I did not know whether to answer yes or no. Also, I am not confident that I know enough about Sakai · I think my limited experience with CMS-based online learning makes it hard for me to see whether some of the items are important or common
C	· The applicability of the tool for the type of the course is great concerning the instructor-led aspect. · The tool does, however, include some instructional design questions, which are not necessarily appropriate for usability evaluation. · Many questions were repetitive in nature. For example, "are the buttons big enough", and things like that would be covered by accessibility standards. By addressing accessibility standards, many of the other issues regarding usability would go away.
D	· The tool needs to be modified to review one view of the course not two views (i.e. strictly only the instructor view or strictly only the student view).

| | · Questions should be separated even if they are related and the instrument is absolutely too long. The length can and will alter the possible results provided by an evaluator due to the possibility of the evaluator getting tired. |

Table 4: Reflections about applicability

Conclusions

The evaluator reflections reveal several issues with usability evaluation. First, the evaluator experience is important for providing valid and meaningful results in regards to issues. Second, the instrument length can cause evaluator fatigues, which can impact the outcomes. Third, instructional design and strategies knowledge are necessary for determining the appropriateness of learning activities and how they are presented. Fourth, specific LMS experience is important for understanding capabilities and whether activity designs are impacted.

The evaluators' reflections were very informative in understanding interpretations of the instrument, which provided directions for improvement. As we continue to update the instrument with each implementation with a different e-course, we are closer to developing a tool that can be applied to other e-courses. During the presentation, we will share the current version of the instrument.

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