

## Usability Report: PHP BASIC Paper Prototype

### Learner Profile:

In total, three subjects took part in the usability test. The subjects include one male and two female residential graduate students from Instructional Systems Technology, School of Education. The age of the users ranged from 24-31 years. One subject is a native English speaker, while the other two subjects are non-native English speakers. Subject One (S1) has novice programming language experience in HTML and BASIC. Subject two (S2) has intermediate experience in HTML. Subject Three (S3) has advance experience in HTML, and novice level experience in C, Perl, and ASP (See Table 1).

Table 1: Users experience in programming languages

Users experience in Programming languages			
	Novice	Intermediate	Advance
HTML	S1	S2	S3
C	S3		
Perl	S3		
ASP	S3		
Basic	S1		

All users have prior experience using web-based tutorials. Two users like learning new programs using web-based tutorials, but one user does not like online tutorials. All of the users did not have experience using Homesite.

All users were asked if they could perform tasks that are related to PHP prior to completing the usability (See Table 2). S1 has experience with accessing mentor server using SSH; using basic UNIX commands; and changing file permissions. S2 has experience with changing file permission. S3 has experience with all the tasks. However, our usability showed that S3 did not know tasks 5 through 8 (See Table 2).

Table 2: Users perception of the tasks they can perform

Users perception of the tasks they can perform	
Tasks	Subjects
1. Able to access Mentor Server using SSH	S1 and S3
2. Able to use basic Unix Commands	S1 and S3
3. Able to change file permissions	All users
4. Able to use Pico editor on Mentor for simple text editing	S1 and S3
5. Able to use Homesite editor for HTML and PHP script editing	S3
6. Able to change Homesite setting for Unix file format and PHP file types	S3
7. Able to debug scripting errors	S3
8. Able to use basic PHP scripting language to create online forms with feedback	S3

### Location and Length of Sessions

The usability tests were conducted in various locations. While the usability test was primarily paper based, the users did use the computer to complete practice sections in the lessons. One usability test was conducted at the residence of a design team member. This user connected to their IU accounts, using a 56kps modem. The other two usability tests were conducted in the School of Education, using UITS computers.

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The usability test lasted 2 hours for all users. The users completed a pre-assessment, the instructional materials on PHP, a post-assessment, and a reactionnaire. Below are the findings of the usability test based on instructional effectiveness and satisfaction with instruction (See table 3).

Table 3: Instructional Effectiveness and Satisfaction with Instruction

Instructional Effectiveness					Satisfaction with Instruction	
Subject	Pre-assessment Mastery Level (Total Score = 100)		Post-assessment Mastery Level (Total Score = 100)		Reactionnaire Mean Score	
S1	1		22		3.76	
S2	1		25		3.07	
S3	11		66		4.36	
<b>Overall</b>	<b>mean</b>	<b>Standard deviation</b>	<b>mean</b>	<b>Standard deviation</b>	<b>Mean</b>	<b>Standard deviation</b>
	4.3	5.6	37.6	24.5	3.76	0.65

From the means of the pre-assessment (4.3) and post-assessment (37.6), there was an increase in the scores. This shows there was some instructional effectiveness. In general all subjects were able to complete the first task in the post assessment, and subject 3 was able to complete task 2, create a quiz. The standard deviation of pre-assessment (5.6) and post-assessment (24.5) varied substantially. The standard deviation of the post assessment may be large as S3 scored a lot higher than the other subjects. This user has programming experience in C, ASP, and Perl, which may have helped S3 in understanding PHP code despite the design of the instruction. Overall all subjects performed better in the post test than the pre-test. But the difference is not very significant.

In terms of satisfaction with instruction, the mean was 3.76. This mean indicates that users felt the instruction ranged from "Agree" to "Undecided". The standard deviation is 0.65. One explanation for the mean and stand deviation, is that one user "strongly agreed" that the instruction met their goals and objectives, as this user was very keen to learn PHP. This user also had a background in other programming languages that helped in learning PHP. The other two subjects were novice programmers. S1 was somewhat satisfied with the instruction, but S2 was not satisfied with the instruction as a whole (See table 4).

Table 4: Reactionnaire Comments

Reactionnaire Comments			
	Subject 1 (S1)	Subject 2 (S2)	Subject 3 (S3)
1. Did you have any problems with this web based tutorial?	"Yes, there is a long pre-knowledge section (PHP at IU) before lessons on PHP are explained"	"Yes It was unclear to me when I was supposed to do activities vs. just reading. I made some minor coding errors that I would not have been able to fix without the help of the usability test implementers."	"Yes A little bit because I prefer simulation based tutorials instead of text based ones."
2. Which part did you like best in this web based tutorial? Why?		"I liked being able to practice the programming procedures on the spot because I usually learn best by "doing"."	"I liked the screen shots because I could see it in the real situation"
3. Which part	" UNIX part is too	"I did not like having to re-	"Text parts,

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did you like <b>least</b> in this web based tutorial? Why?	<i>long</i>	<i>type code, line by line when it was considerably long. I'd prefer to copy and paste long passages of code (maybe I could choose from multiple sets of code so I have to determine which is written correctly"</i>	<i>because I had to read it through"</i>
4. How can the instruction be improved?		<i>".. Be clear when, using headings, when the content is meant to be read or if it's an activity. Find ways to avoid learner making small coding mistakes that are difficult to debug"</i>	<i>"Make lessons more simulation based"</i>
5. Any other comments or suggestions?		<i>"To motivate learner, give a clear explanation up front of why PHP is worth knowing and using and is better than the other common web programming methods (Dreamweaver, transform, etc.)"</i>	<i>"Good!"</i>

**Instructional Process and Product Usability**

Based on our usability test, below are the findings of our observations of our users' behavior towards completing the instructional paper prototype on PHP. It also includes the apparent problem with the design and states the priority the design team feels for fixing the program.

*Table 5: Instructional Process and Product Usability*

<b>Instructional Process and Product Usability</b>			
<b>Activity Task</b>	<b>Observation of Subjects behavior and conditions</b>	<b>Apparent Problem with the Design</b>	<b>Priority for fixing the Design</b>
<b>All</b>	The design worked well in areas where there were screen shots for the user to see and do, but not when the user had to read a lot of textual explanation.	Visuals, diagrams, were easier to understand. For web based instruction text must be clear and concise.	Must Fix
<b>Home Page</b>	The design did not allow the user to go back a page	Remove the back navigation arrow on the home page	Must Fix
<b>PHP at IU</b>	The design did not remain consistent in terms of stating when to practice and when to review the instruction. Users tried to anticipate when they should practice and complete a task. When	The design does not make it clear when to PRACTICE and when to just REVIEW the materials	Must Fix

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	they could not find the practice, they felt frustrated.		
<b>PHP at IU</b>	In the design, the user was instructed to "exit" from mentor. This prevented the user from completing the next task of using the Pico editor.	Pg 20, Users can exit mentor, but were not able to go to the next task of using the Pico editor	Must Fix
	The design did not make it clear for the user to save the file using Pico.	Pg. 22 The design did not include instruction on how to save a file using Pico.	Must Fix
	The design did not make it clear how to save the file in the "www" directory	Pg 23. The design did not include instruction on how to save the file in the "www" directory	Must Fix
	The instruction for the screen shots were difficult to understand, users had a hard time figuring out that the alphabets related to the screen shot alphabets	p. 28 The fonts that were used in the screen shots were different from the ones used in the explanation.	Must Fix
	The numbering of titles, practice sections were not clear	The numbering system of titles and practice sections were complicated such as 2a.1.	Must Fix
	There was no overview explanation or "why" it is important to understand the content of PHP at IU. When the users tried to complete the practice sections, they had difficulties, and were not able to troubleshoot the problem	The instruction at PHP at IU did not provide an overview of how PHP is used to create dynamic web pages. For the practice sections, users were referred to "Common Errors in PHP." But this was not consistently shown or referred too.	Must Fix Must Fix
	Users were not familiar with computer terminology that was used in the design.	Terms such as "execute" or parent directory, were not explained in the program.	Should Fix
	Typos in programming threw off some of the users.	Pg 22 in the Screen Shot </head> tag is missing	Must Fix
	Pg 23, Users spent time typing text for the phptest.phtml example.	Pg 23, The phptest, phtml example is text intensive.	Nice to Fix
	Pg 26 In the design, some users found the many ways to generate file permissions confusing.	Pg 26 Too many examples for file permissions (e.g. 777, 700, rwx, etc)	Should Fix
	Users felt that the <i>PHP at IU</i> section was too long. They spent an average 45 minutes to complete this section	The design repeats the materials on file permission for both SSH and Unix.	Nice to Fix
	In the design, users were not sure if they should "apply" changes to the file settings in Homesite	Pg 31 The design does not state to click "apply" on the Homesite File setting screen, for screen shot 3a.4	Should Fix
	Users found that the arrows used in some screen shots were different from other screen shots	Pg 28 Use of Arrows for all screen shots was not consistent.	Nice to Fix
	The design does not make explicit why the user should use Homesite over Dreamweaver Front page, etc	This piece of information was missing in the instruction.	Should Fix
	In the design, users were not clear how to go back to the "edit" mode in Homesite. Users were not able to switch between files as they were trying to create html and phtml files.	Pg 32. Pg. 32, Screen shot 3a.5, the design does not make it clear how to go back to the "edit" mode in Homesite. Also there is no explanation of the file buttons at the bottom of the screen.	Should Fix

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<b>Lesson 2 : Basic PHP syntax</b>	Some users found Basic PHP syntax lesson to be too short.		Will be fixed when other...
	The design did not remain consistent in terms of when to practice and when to review the materials; this made it rather confusing for the user.	The design does not make it clear when to PRACTICE and when to just REVIEW the materials	Must Fix
	In the design, the users were not able to complete scenario 1 as the code did not match with the task.	Scenario 1 code did not match task 2.	Must Fix
	In the design, the outline for each lesson was confusing, learners were not sure if they could jump to that section.	The design did not underline the text, to show that they were hyperlinks in the paper prototype.	Fixed when other problems are fixed
	The design did not make it clear for the Users to know when a section ended.  The design did not provide all the steps for the users to complete the task on pg 37.	The design had the practice section and new topic on the same page.  Pg 37 The steps to complete this task "Create a file on IU campus" were not exhaustive.	Fixed when other problems are fixed Must Fix
	The design did not allow the user to be able to access the www directory to save their files.	Pg 37 When users access Mentor through Homesite, the "WWW" directory is not explained.	Must Fix
	The design did not allow the users to easily navigate between lessons.	The lessons are presented sequentially in the paper prototype.	Fixed when other problems are fixed
	The design did not state that the users should change file permissions for task on pg 43.	Pg 43 does not include instruction to change file permission.	Must Fix
	The design did not provide all the steps for the users to complete the task on pg 43.	Pg 43. The instruction in the practice is not explicit	Must Fix
<b>Lesson 3: creating a Quiz and Survey</b>	The design was text intensive. Users felt they were being tested for their typing skills, rather than their knowledge on PHP.	In the design, users were asked to type text, so that they could make sense of the code. <i>This may be a complete re-design.</i>	Must Fix
	In the design users were not able to complete the task on pg 45.	In the design, explanation of the script variables was not given. Such as \$first name \$ sign.	Must Fix
<b>Common Errors</b>	The design does not have examples in the common errors section.	The design does not have examples in the common errors section.	Nice to fix
<b>Assessment</b>	In the design there was no explanation on how to debug PHP code, yet there is a question in the assessment.	Additional instruction needs to be added on how to debug PHP. This instruction was missing.	Must Fix

Based on our findings, here are some recommendations the design team has suggested to fix the instructional program (See table 6).

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Table 6: Recommendations for how to fix the design.

Priority	Apparent Problem with the Design	Recommendations for how to fix design
Must Fix	Visuals, diagrams, were easier to understand. For web based instruction text must be clear and concise.	Make the text clear and concise and use more visual representation such as screen shots.
Must Fix	Remove the back navigation arrow on the home page	Remove back
Must Fix	The design does not make it clear when to PRACTICE and when to just REVIEW the materials	Upfront explain the PRACTICE / REIVEW format in the introduction page, and then in each lesson.
Must Fix	Pg 20, Users can exit mentor, but were not able to go to the next task of using the Pico editor	Provide instruction on how to reconnect to mentor.
Must Fix	Pg. 22 The design did not include instruction on how to save a file using Pico.	Using screen shots provide step by step instruction on how to save a file using Pico.
Must Fix	Pg 23. The design did not provide instructions on how to save the file in the "www" directory	Include instruction on how to save the file in the appropriate directory
Must Fix	p. 28 The instruction for the screen shots were difficult to understand, users had a hard time figuring out that the alphabets related to the screen shot alphabets	Use the same font in the screen shot and in the instruction
Must Fix	The numbering of titles, practice sections were not clear	Use Roman numerals to identify the various lessons, and number titles and practice sections accordingly
Must Fix	The instruction at <i>PHP at IU</i> did not provide an overview of how PHP is used to create dynamic web pages. The design did not motivate the user to learn PHP.	In the introduction page, demonstrate the uses of PHP, to motivate the learner. Explain why it is important to learn this programming language.
Must Fix	For the practice sections, users were referred to "Common Errors in PHP." But this was not consistently shown or referred too.	Give a Help page for instructing how to use the website and refer "common errors in PHP" consistently
Must Fix	Pg 22 in the Screen Shot <code>&lt;/head&gt;</code> tag is missing	Put <code>&lt;/head&gt;</code>
Must Fix	Scenario 1 code did not match task 2.	Change task 2 in the test
Must Fix	Pg 37 The steps to complete this task "Create a file on IU campus" were not explicit.	Provide step by step instructions using screen shots.
Must Fix	Pg 37 When users access Mentor through Homesite, the "WWW" directory is not explained.	Provide instruction on how to save the files under WWW directory in Mentor using Homesite.
Must Fix	Pg 43 does not include instruction on how to change file permission	Give the instruction on how to change file permission. OR provide a link to the section on changing file permissions.
Must Fix	In the design, users were asked to type text, so that they could make sense of the code.	The user should be able to copy the html code, and only type the necessary script in the file.
Must Fix	Pg 45 There was no explanation for Variables	Explain the term Variables. Also place this terminology in the glossary

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Must Fix	In the design, variables used in the script were not explained. Such as: \$first name, \$ sign.	Explain the variables used in the script
Must Fix	In the design there was no explanation on how to debug PHP code, yet there was a question in the assessment.	Provide instruction using a scenario on how to debug PHP
Should Fix	Terms such as "execute" or "parent directory", were not explained in the program.	Explain "execute" Also place this terminology in the glossary
Should Fix	Pg 26 Too many examples for file permissions (e.g. 777, 700, rwx, etc)	Delete redundant file permission examples
Should Fix	The design does not make explicit why the user should use Homesite over Dreamweaver, Front page, etc	Before the instruction on Homesite, explain why Homesite should be used instead of Dreamweaver.
Should Fix	Pg 32. Pg. 32, Screen shot 3a.5, the design does not make it clear how to go back to the "edit" mode in Homesite. Also no explanation is provided of the file buttons at the bottom of the screen.	Using Screen shots, explain how to go back to the "edit" mode, and explain how to access files at the bottom of the screen in Homesite.
Should Fix	Pg 31 The design does not state to click "apply" on the Homesite File setting screen, for screen shot 3a.4	Provide the instruction to click the "apply" button
Nice to Fix	Pg 23, The phptest, phtml example is text intensive.	Reduce the text, but maintain the purpose of the example.
Nice to Fix	The design repeats the materials on file permission for both SSH and Unix.	Repetition may be necessary.
Nice to Fix	Pg 28 Consistent Arrows for all screen shots	The arrows in the screen shots should be consistent
Nice to fix	The design does not have examples in the common errors section.	Give examples
Fixed when other problems are fixed	The lessons are presented sequentially.	This will not be the case when this is a web-based program
Fixed when other problems are fixed	The design did not underline the text, to show that they were hyperlinks.	This will be rectified in the computer based design
Fixed when other problems are fixed	The design had the practice section and new topic in the same page	This will be rectified in the computer based design