

# Heuristic Evaluation Method: A Proposed Workflow

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**Abstract**—In this paper, we proposed an optimized workflow for Heuristic Evaluation (HE) process. This workflow allows experts in usability engineering (especially in the field of user interface design) to apply Heuristic Evaluation method and use all of its advantages in a shorter time and more reliable way.

The proposed workflow divides Heuristic Evaluation into 9 steps that cover whole process. It also specifies roles involved in each step in addition to artifacts generated as outputs and how all elements link to each other. One of the most important advantages of this workflow is that all the connections and inter-connections between steps, roles and artifacts are well defined.

As a result, we applied our proposed workflow in the process of developing the latest version of our software, which brought us better final results and fewer problems during running of the method.

**Index Terms**—HCI, heuristic evaluation, usability engineering, workflow.

## I. INTRODUCTION

Heuristic Evaluation (HE) is an informal method for Usability Inspection in the field of Human Computer Interaction (HCI) and helps experts to identify usability problems in software design (especially in user interface design) [1]. In other words, the main goal of this method is to identify problems associated with the design of UI and reported by users.

Heuristic Evaluation was developed by Jakob Nielson with Rolf Molich in 1990 on the basis of experience in teaching and consulting about usability Engineering [2]. The final set of Heuristic Evaluation which is still in use was released in 1994 and contains important concepts [3]. There are ten more general principles for user interface design in Nielson's Heuristic [4], and are called "heuristics" because they are more in the nature of rules of thumb than specific usability guidelines. The most important advantage of applying this method is that Heuristic Evaluation is a time saving and not very expensive method in the software design process [5]. The output can also be useful in the whole software development process.

Manuscript received September 20, 2012; revised November 11, 2012.

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Since then, many experts have worked on the subject and presented a lot of papers to improve the results of the method [6]. However, most of them have focused on improving the output, which are usability problems it identifies. We believe, one aspect of gaining a good result in a process is how we run that process. Unfortunately, no unified approach or workflow has been introduced to explain the running of the process in details and clearly identify the steps, people, artifacts and links between them.

In this paper, we proposed a workflow for the process of Heuristic Evaluation. The rest of the paper is organized as follows: Section 2 will introduce our workflow. In Section 3, we will explain how the elements in the workflow will collaborate together, and applying the workflow in a development process will be presented as a case study in Section 4. Consequently, Section 5 will end the paper with summaries.

## II. OUR PROPOSED WORKFLOW FOR HE METHOD

The workflow we are presenting here consists of four elements: *Steps*, *Roles*, *Artifacts* and *Links*. These items have been put together in such a way that cover the whole HE process and optimize the final results. Fig. 1. shows the overall workflow.

Before explaining each element in detail, we describe them as follows:

*Step*: Each step explains a set of tasks that must be done by one or more roles in a specific place in the workflow.

*Role*: Each role represents a person who has specific responsibilities and performs some tasks in each step.

*Artifact*: artifacts are outputs produced in each step by roles.

*Link*: links connect steps, roles and artifacts in such a way that shows how the whole process starts, how each step navigates to the other steps, what roles are involved in the steps and what artifacts are produced.

## III. ELEMENTS IN THE WORKFLOW

In this section, we look at the workflow in more details. It starts with *User Information* step in which *Primary Evaluator (PE)* who is responsible for performing the overall process joins *User Experience Researcher(s)* to collect essential information of end users. The *User Information* artifacts will be used in next step to write appropriate scenarios for evaluating the interfaces.

In *Scenario Writing* step, *PE* and *UX Researcher(s)* join *UX Designer(s)*, *People* from other departments (such as Marketing and Support) and if necessary, the *End User(s)* to write scenarios (the output will be *Scenarios Artifact*) that when applied they can cover all aspects of the product for evaluation.

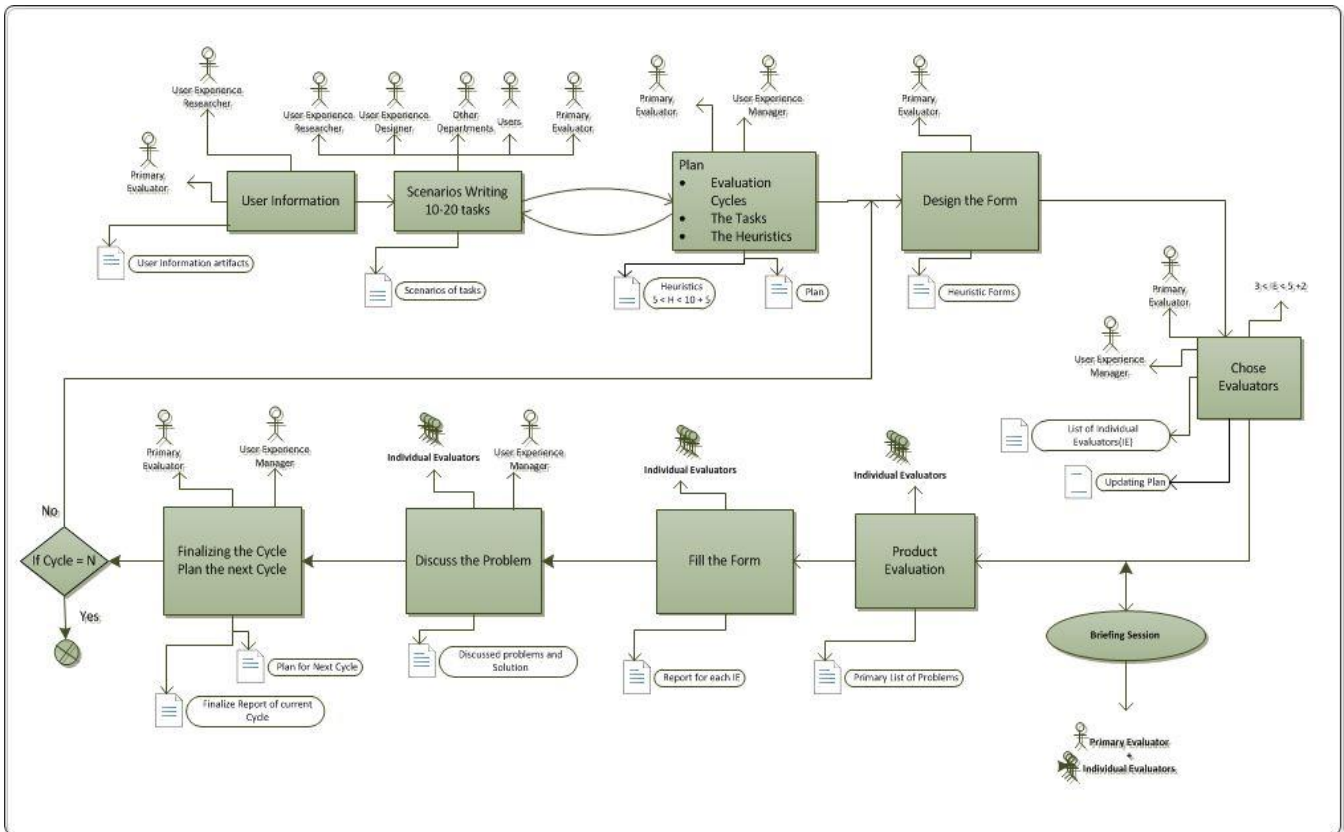


Fig. 1. Our proposed heuristic evaluation workflow.

*Planning Step*, which comes after “Scenario Writing”, is where planning and managing the main steps begins. *PE* & *UX Manager* (or other managers who are responsible for the product development) will come together to plan the rest of the process, which includes *number of evaluation cycles, tasks* to be run for evaluating the product and specifying the *heuristics*, which will be used in evaluation process to identify issues. The output will be *Heuristics Document* and *Planning Artifacts*.

After “Planning”, in *Design Evaluation Form* step, *PE* will design an *Evaluation Form*. This form will be used later to collect issues that will be reported by Evaluators.

After “Planning” and “Designing Evaluation Form”, the next step will choose *Individual Evaluators (IEs)* who are people responsible for evaluating the product. These People are usually experts in the field of usability engineering and will report usability problems of the product. *PE* and *UX Manager* will choose IEs together, and *List of IEs* will be produced as the output artifact. “Planning Artifacts” from previous steps will be updated according to the “List of IEs”.

By specifying the IEs, now it is time for *Product Evaluation* step in which the product will be evaluated, and issues will be reported. However, before getting into the step, a *Briefing Session* must be held between *PE* & *IEs* in order to make the IEs familiar with goals, heuristics, forms and all other essential materials. After the session, the *IEs* will start the “*Product Evaluation*” step and prepare the *Primary List of Problems*.

When IEs prepared the primary list of issues for the product, they should fill the problems in an evaluation form (*Fill the Form* step) that *PE* designed in previous steps. It is important to mention here that this step can be merged into

last step, and IEs can identify, fill in the form and report the issues all at once. The output for this step or both steps (the current and previous one) will be a *Report from each IE*.

Afterwards, *PE* and all *IEs* can come together and *Discuss the Problems* and issues reported by each *IE*. They will talk about each issue and decide whether to have it in a final report, omit or save it for more reviews in next cycles. List of discussed problems and probable solutions introduced by IEs will be gathered in a document called *Discussed Problems & Solutions of Evaluation* artifact.

As a final step in the process, *PE* will provide the *Final Report* and plan the next cycle (if required) with *UX Manager*. If any more cycles are required, the workflow will jump back to step 4.

#### IV. CASE STUDY

In order to test the efficiency and effectiveness of our workflow, we applied it in a software-development process, which was a production of a new version of an Office Workflow Software. Before we proposed this workflow, we had applied HE method in that development process once, but during the running of the method, the UX team responsible for this project faced a lot of issues (which is why we decided to propose this workflow). In both runs, one Primary Evaluator who was also UX Manager, six IEs, one UX Researcher and one UX designer were involved.

In the first run without the workflow, the process took 10 days from the start to the end and 126 hours of work (including management, running, writing and ...). Unfortunately, because the roles, responsible and outputs

were not clear enough, most of the times, the team faced with misunderstanding, wrong information and even wrong problems, which led to overdo or repetition of many tasks and also overlapping between them.

In the second run, we employed the workflow and the process finished in seven days took 88 hours of work (including management, running, writing and ...). We also had 40% reduction in management problems, misunderstandings and so forth during the run. Even the cost of running the whole process had 22% reduction due to fewer meeting hours, fewer amounts of overdoing work and less time spent on the process. As a result, Table I. presents a comparison:

TABLE I: COMPARISON BETWEEN RUNNING WITH AND WITHOUT WORKFLOW.

	1 <sup>st</sup> Run	2 <sup>nd</sup> Run (with Workflow)	Comparison
Total Time Spent (Hours)	126	88	-30%
Management (No. of Problems)	25	10	-40%
Cost	\$8500	\$6630	-22%
Problems Reported	26	30	15%

The reason for increase in number of problem is for briefing session which let the IEs to discuss about the Heuristics, goals and what they must have really looked for.

## V. SUMMARIES

In this paper, we proposed a workflow for running Heuristic Evaluation method smoothly, in shorter a time and more reliable way. Our workflow divides HE method into nine steps and presents involved roles, artifacts must be produced and links between each step and other elements. Steps, People, Artifacts and Links are selected and connected in a way that can bring a clear path from the start to the end of the process. It clearly identifies the responsible for each role and the outputs that must be generated. In order to test the efficiency and effectiveness of this workflow in practice, we applied it in a software-development process. The results showed 30% time reduction in running the method, 22% reduction in cost and 40% reduction in management problems and even 15% increase in finding problems. However, we believe as a future work, our propped workflow can become better by adding more steps and detailing more aspects of them. It can also be integrated into a bigger workflow employing Usability Testing to increase accuracy of final results.

## ACKNOWLEDGMENTS

This work could not be done without the support and help from Chargoon Company. We would like to thank Chargoon for providing us the opportunity and support for development of this workflow. We would also like to thank all the

colleagues and users who helped us in different ways during heuristic evaluation process & writing this paper.

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