USABILITY CERTIFICATION METRICS FOR BANKING SOFTWARE

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Software usability certification within a banking software organization is required to benchmark software for its usability and customer focus. This brings in a culture of consistent product improvement and enables incorporation of user centered design process (UCD) into product development lifecycle (PDLC). The challenge has been to develop a holistic certification metrics which will include - UI, usability, visual appeal and customer focus in terms of incorporation of user and functional feedback and requirements.

The usability team conducted usability tests and reviews of existing software and compared the features and behavior with the best in class experience. Based on this, a multi-level certification metrics was devised for banking software to be a market leader from usability and customer focus perspective.

This method has helped the product teams to understand where a banking application stands and what is required for the software to become best in class from usability and customer focus aspects.

Keywords: HCI, Human factors, Design methodology, User centered design, Usability Analysis, Interaction design, Heuristic evaluation, Banking & financial software design, User experience design, Usability metrics.

1. INTRODUCTION

Banking industry has seen more and more use of IT in its daily activities to cut costs and deliver services quickly to its customers. It is very critical to improve the turn-around time for banks and financial institutions to win more customers and increase sales.

A traditional bank has activities and workflows planned out as back-office, mid-office, front office, self service kiosks and self service portal. Banking software has grown in the past and now understands the need of this workflow distribution to adhere to banking processes and audit requirements.[1]

Banking software were being designed with traditional banking process in mind which uses paper as medium of communication and workflow. Not much importance has been given to the needs of different layers of users and workgroups. Such software take a lot of time to complete simple processes as there is a tendency to mimic the manual world.[2]

With advent of IT into banking domain, internal banking processes now take much less time and effort. But the banking software still hasn't got out of the traditional mindset of software design. Due to stiff competition, banks and financial organizations have been working hard to improve the turn-around time of banking services and enhance employee and customer satisfaction by improving banking software.

Need of software workflows to suit requirements of each layer of banking staff has been a critical issue which is looked at by all major banking software vendors. Software usability has been around for the last 10–15 years, but the banking domain has started to understand its value only recently.

It is important for banking software vendors to consistently improve the software usability to meet varied requirements of different banking institutions and user types which not only include a huge banking staff but the customers of the bank as well.

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It is extremely difficult for banking software vendors to baseline their banking software as there is no banking usability standard or metrics available in the market. Generic usability standards and metrics are available, but they need customization to meet specific requirements and needs of banking domain.

1.1. Objective

The objective of this paper is to arrive at "Usability Certification Metrics/Criteria" for banking software.

This paper also explores the relevance of usability certification criteria by testing it on existing banking software being revamped for over a year.

1.2. Need

Many IT companies have been using usability processes for product improvement. This has limited success ratio as there is no comprehensive usability approach or strategy which includes all the software products together. Usability processes have been effective in product improvement where the focus may not be on how well it will integrate with other products and whether after incorporation of usability inputs, the product ranking will improve with respect to its competitors.

The "User Centered Design" (UCD) process followed by usability group needs to be integrated with "Product Development Life Cycle" (PDLC)[1]. Traditionally usability is not an integrated activity in PDLC for most organizations. It is a recent phenomenon which has got attention due to changing user requirements and needs. Usability has picked up visibility in the last decade. Quite a few case studies have been floating around which elaborate business benefits and cost saving by incorporating usability into PDLC.

A traditional bank has activities and workflows planned out as back-office, mid office, front office, self service kiosks and self service portal.

The users of back-office banking application need fewer clicks and display of all possible details on a single screen without a page scroll. Increase in productivity by reducing number of mouse clicks and ease of finding relevant data on the screen are some of the main requirements of back-office banking user. Whereas the user of front-office banking applications like Teller application needs simple, linear and guided workflows.

In order to design a usable and accessible banking software, one needs to understand various user types who will use banking software and also understand the nuances of banking domain like workflows based on access rights, "maker-checker" validations, high level of security and maintenance of audit trails.

To manage varied functional and user requirements of a banking application, a comprehensive usability certification model is required to be implemented. A certification model should be a "one-stop-shop" for all banking requirements - functional and business requirements, UI/usability and user requirements.

In this light, it helps to use usability certification to benchmark a banking application. If a banking application passes all the certification criteria and it at the highest level of compliance, it can be easily said that the usability processes have been integrated well and that they will sustain without any support.

1.3. Scope

The scope of the paper includes:

- Development and completion of certification criteria based on a pilot evaluation
- Usability certification for Product-1 from a banking suite.
- Repeat certification of Product-2 from the same banking suite
- Use of existing reference documents like UI guidelines and Pattern Library

The scope does not include validation of certification criteria with software from Banking Software Suite-2 and creation of specific reference documents if they are not available.

1.4. Methodology

Methodology used for developing usability certification metrics is similar to the user centered design process (UCD), except that it went through a couple of rounds of modification and refinement based on software product development environment and a pilot certification of a product. The process used for arriving at usability metrics needs to closely follow an IT company's software product maturity and how well the usability and PDLC processes are being followed.

Certification metrics needs to include already available usability criteria and heuristics and incorporate the process and aesthetics aspects into it to make it holistic in nature. The aspects of usability which are loosely adhered in existing PDLC also need to be included in the certification metrics.

UCD has three stages — analysis, design/synthesis and evaluation[3]. UCD also works as problem solving process, but needs alteration[4] to suit the requirements of banking domain.

1.4.1. Analysis

The following activities may be taken up in the analysis phase:

- Study banking domain
- Study competition
- Study user profile
- Study banking software workflows of a banking software organization
- Evaluate usability maturity of banking software and banking organization
- Evaluate if all the stages of UCD are integrated with PDLC. If not, then this can be taken up as an activity to be addressed and measured by certification criteria.
- Understand strategy of banking software organization and what is the expected ranking of software with respect to its competition
- Gather all standards, end user feedback, issues list and usability inputs related to banking software

1.4.2. Design

The following activities may be taken up in design phase:

- Design comprehensive usability criteria
- Inputs are required from:
  - UI guidelines and Pattern Document
  - Product roadmap (direction and targets for the next 1-2 years)
  - Inputs from earlier deployments and sale pitches
- Maturity level of usability process vis-à-vis PDLC
- Incorporation of end user feedback into software
- Devise an evaluation approach for each criteria
- Collate all the relevant supporting documents (like UI guidelines, product roadmap, etc)

Reference documents like guidelines and process details required for conducting usability certification can be downloaded from the usability sections of popular websites like, Microsoft, IBM, Sun, Apple, Web Style Guide[5] and W3C. One can also refer to Nielsen[6] and Mayhew's[2] publications for more insights.

1.4.3. Evaluation

The following activities may be taken up in the evaluation phase:

- Select an appropriate application where usability activities have been undertaken
- Test the usability criteria based on related documents
- Validate level of the software (outcome of usability criteria testing) and maturity of usability processes

- Adjust pass percentage
- Validate the same with a different banking software and check it the certification results are similar
- Revisit the pass percentage
- Publish certification criteria

2. USABILITY CERTIFICATION CRITERIA

Usability certification criteria can be selected from established usability heuristics. In addition, some aspects of UCD process can also be incorporated. If there are missing processes and documents on end user feedback during earlier product deployments, it can also be taken up as usability certification criteria. Usability certification criteria needs to achieve three most-important requirements of banking software – speed of task completion, sense of reliability and visibility of system status. Usability certification should include qualitative and quantitative goals and parameters.[2]

2.1. Main Usability Criteria

Usability team needs to select those criteria for the metrics that would yield relevant, accurate, and useful information about the process and the product[7]. The metrics need not be elaborate and exhaustive.[7] Some of the criteria can be:

- Look and feel (aesthetics)
- Consistency with other products of the banking software suite
- Adherence to existing standards & Guidelines
- Incorporation of end user/client feedback
- Adherence to the latest usability and accessibility standards
- Following UCD process as a part of overall PDLC

2.2. Criteria Details

Each usability criteria has been selected based on current state of software and the processes in a banking organization. The following five level deep criteria definition is proposed:

Usability Aspect > Usability Criteria > Usability Sub-criteria > Definition > Assessment Value (Pass Percentage) > Measurement Approach (based on existing or proposed documents like UI Guidelines)

Criteria details help usability analyst as well the usability team members to clearly articulate aspects which need to be captured and the perspective behind each usability criteria. McCall's model[7] on hierarchical relationship between quality factors, quality criteria, and quality metrics is very useful basis to build usability certification criteria.

Usability certification criteria needs to be detailed out and defined such as in Figure 1. Each of these details needs to be captured as a score with the help of supporting documents as in Section 1.4.2.

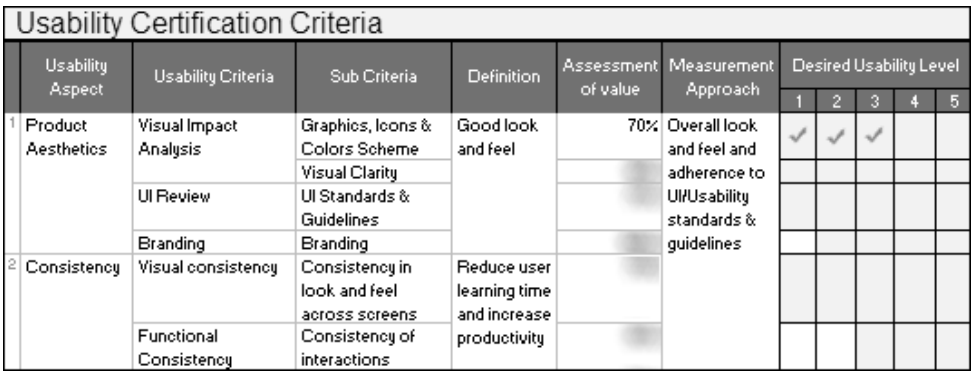
In order to effectively plan and schedule usability certification process, the usability team needs to prepare an additional document on time and effort requirement.

This document may also contain details on scoring criteria which will be useful to usability analyst conducting usability certification for the first time. This document needs to be prepared based on resources in the usability team and defined such as in Figure 2.

3. USABILITY CERTIFICATION PROCESS

Usability certification process is similar to the UCD process and takes cues from the following usability activities:

- Preliminary review based on UI, aesthetics and usability guidelines
- Heuristic evaluation



Usability Certification Criteria

	Usability Aspect	Usability Criteria	Sub Criteria	Definition	Assessment of value	Measurement Approach	Desired Usability Level				
							1	2	3	4	5
1	Product Aesthetics	Visual Impact Analysis	Graphics, Icons & Colors Scheme	Good look and feel	70%	Overall look and feel and adherence to UI/Usability standards & guidelines	✓	✓	✓		
			Visual Clarity								
		UI Review	UI Standards & Guidelines								
		Branding	Branding								
2	Consistency	Visual consistency	Consistency in look and feel across screens	Reduce user learning time and increase productivity							
		Functional Consistency	Consistency of interactions								

Figure 1. Snapshot of usability certification metrics (part-picture).

Certification Parameter	Deliverable to Product Teams	Scoring Criteria	Time Required	Supporting Documents Required
Principles of visual design, UI & Usability guidelines	Report based on heuristic evaluation	Range = 0-X%	2-4 days for product understanding	UI guideline
Heuristic Evaluation		Min. Pass%= Y%	5-7 days	UI + Usability Guidelines
		Equal weightage to all parameters	5 days	Design guidelines
		Total	2-4 weeks	Heuristic Checklist

Figure 2. Snapshot of time and effort estimation and scoring criteria for usability certification (part picture).

- Detailed product understanding
- Scenario based task analysis
- User analysis
- Functional review
- Competitor analysis
- End user testing

3.1. Usability Certification Process

Following steps need to be undertaken to conduct usability certification:

- Understand usability certification criteria
- Understand user profile
- Identify top 10 most critical and important tasks
- Validate each certification criteria from the usability certification metrics by testing it on the banking application
- Refer to supporting documents like UI guidelines to arrive at scores for usability level
- Repeat the process with another module of banking application with the help of another usability specialist

3.2. Refining Usability Certification Process

Usability certification is an evolving process where the certification criteria need to be constantly enhanced and updated to make it relevant and useful. The maturity of the software has an important bearing on the selection of certification criteria. The resistance to change[2] is an important factor to be attended. At the end of the day, the objective of such a metrics is to benchmark the software from usability perspective and define roadmap with next steps. The usability certification criteria needs to be refined based on the processes and the usability maturity within the banking organization. Usually it takes couple of iterations for the criteria and rating scores to be finalized.

To standardize banking software product rating, logical limits and levels need to be looked at. Usability studies suggests that systems with "good-usability" typically have a mean rating of 4 on a 1-5 scale and 5.6 on a 1–7 scale.[8] The certification level scores were classified into five levels from 1 to 5, 5 being the highest level. The in-between scores were rounded off to the nearest digit. Usability certification levels were designed to make it easy for the product teams to understand the current product level and fix a target[9] for the product certification levels.

Usability certification is an evolving process and the following steps may be taken up to refine it:

- Pilot run on an application module
- Certification on "Product-A"
- Adjust scoring criteria based on gaps identified (whether to make it more stringent or make it more lenient)
- Certification on a similar "Product-B"
- Validate relevance and exactness of scores of "Product-B" with "Product-A", such as in Figure 3
- Make modifications or additions based on the issues identified

4. ANALYSIS

The certification model underwent subsequent rounds of up-gradations and has come closer to being called generic usability certification criteria, which can be adopted by similar banking software organizations.

Usability certification rating of the selected product came out to be at Level-3. The original product roadmap requirement was to be among Top-4 banking products. The usability certification at Level-3 highlighted a few gaps like - it needs rigorous incorporation of end user feedback from usability, functionality and end user customization perspectives.

Usability certification rating was compared with the Product-A's standing with respect to the competitors in the banking domain. The confirmation that the Product-A was among the top five products in banking domain validates that certification model is indeed an effective benchmark tool.

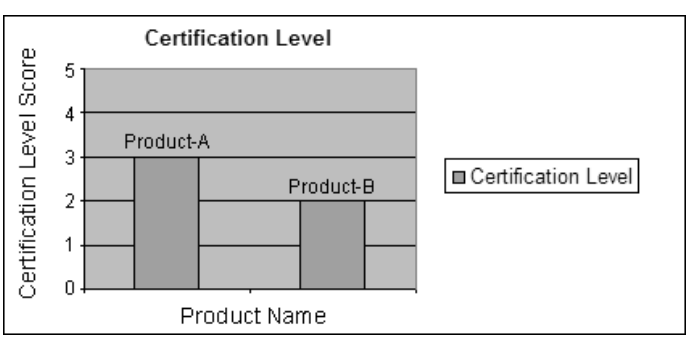


Figure 3. Comparison of usability certification level scores of two banking software - A & B.

If the product roadmap targets the product to be among the top two banking software, usability certification needs to be at least at Level-4. As a first step, the certification level of Product-A needs to be evaluated and subsequently adjusted (if required) based on Product-A's standing in banking market. High product standing in the banking market should ideally result in high certification level and vice-versa.

A schematic diagram of proposed usability certification model:

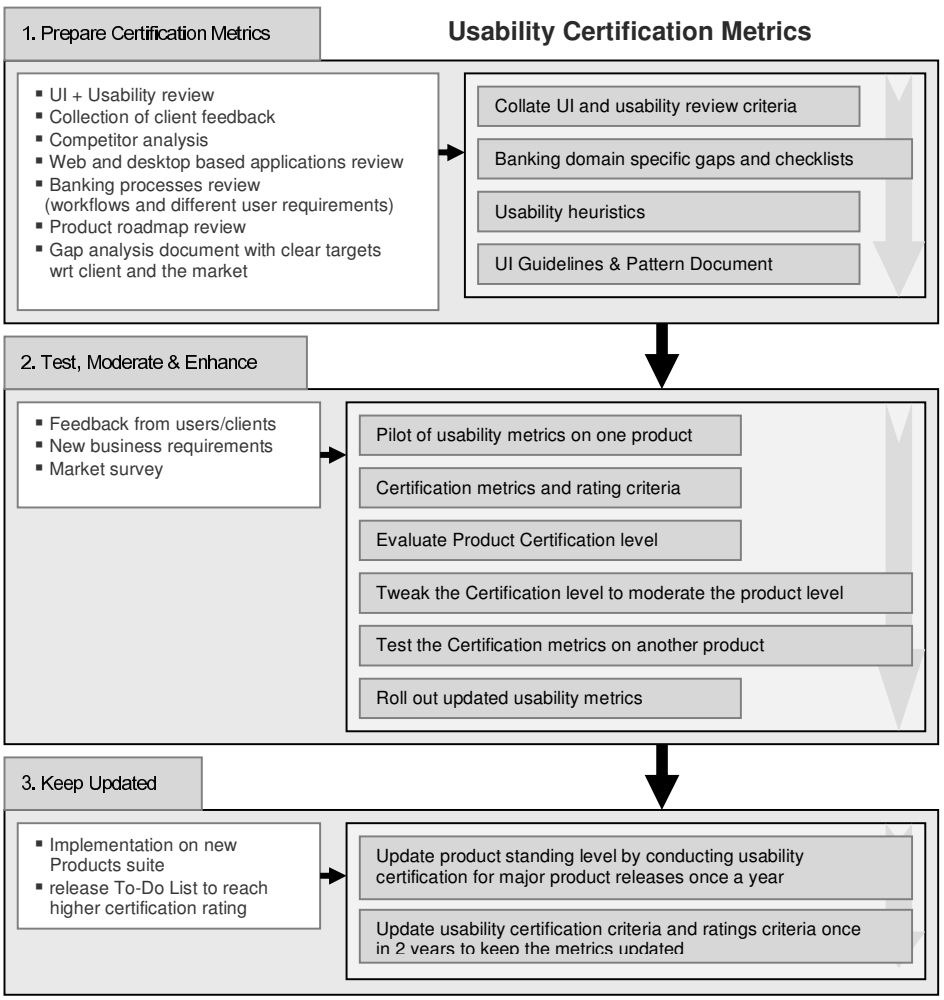


Figure 4. A schematic diagram of proposed usability certification model.

5. INFERENCES

Creation and implementation of usability certification helps in adapting standard usability guidelines and principles into day to day activities and processes of a banking organization. This is an effective tool to build a process where dormant documents like UI guidelines and pattern library are revived and used effectively as a part of overall usability certification.

Making banking software usable needs an understanding of the workflow of a banking organization. Usually, the workflow starts from the end user or the front-office layer. In some cases the workflow

can be completed at front-office level, but in most cases, the front office is just a medium to collect request which is completed by mid-office or back-office application layer.

While the end user interactions need to be clean and simple, the mid-office and back-office interactions need to be a one-stop-shop to do all major tasks. Completing repetitive tasks quickly is critical for the mid and back-office users. To make banking software more usable, one needs to adhere to a process where usability and consistency of interactions is evaluated at each stage rather than towards the end of the product development[1].

Usability certification is a tangible tool to trigger product benchmarking from usability perspective. It helps the product teams to understand the gaps which need to be bridged in order to be on top of the value chain within the organization as well as with competition. The gaps and targets are often reflected in the product roadmap.

Usability certification rates a banking product from Level-1 to Level-5, Level-5 being the highest and toughest to achieve. Usability certification model is very useful tool to institutionalize usability[1] practice across all the stages of PDLC and triggers competition among product development teams to boast better software products than other groups within the organization as well as outside.

Usability certification is a process which needs constant updations and as per the current experiment, validation of usability certification criteria with software from two different product suites is most desirable and effective.

6. NEXT STEPS

The next step is to make the usability certification metrics more robust and generic in nature. For this, there is a need to validate the certification criteria with another banking software suite. The Product Suite-2 may have legacy as well as new software clients. Any discrepancy found in the certification criteria needs to be updated post this validation.

Product-A, which underwent usability certification, also needs to be tracked as is gets deployed for multiple clients. Feedback and recommendations from client deployments will help validate the relevance and efficiency of certification metrics.

The usability team may also look at other models for quality[7] like - Total Quality Management (TQM), The Capability Maturity Model (CMM) and Humphrey's Personal Software Process Model (PSP) to further refine and update usability certification metrics.

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