Guidelines for Increasing Usability Awareness in Pakistan IT Industry and Academia

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ABSTRACT

This paper reports selected results from three studies to find out the existing stage of usability in IT industry and of HCI in Pakistan academia and produce some guidelines to prompt usability awareness in industry. The participants were from different areas with different education background. Our findings demonstrate that usability is partially involved in IT industry and HCI is at birth stage in Academia. Results of this study shows that experience of IT professionals does not influence on usability awareness level. The perceptions of computer programmers need to be change about usability.

Keywords: HCI, usability, awareness, Pakistan IT industry, Pakistan academia, perception about usability.

1. INTRODUCTION

Association for Computing Machinery the Special Interest Group on Computer Human Interaction describe Human Computer Interaction (HCI) as discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of foremost phenomena surrounding them (SIGCHI Curriculum Development Group). For developing technology HCI familiarity has appeared as a crucial requirement to help human's mental and physical skills [1]. HCI is playing a very important role from 1980 in IT industry in Europe and United States [2].According to [3] Practice of Usability is Called HCI. Usability is an attribute of a product's e.g. easy to learn and easy to use [3]. Usability is a quality characteristic of the whole system it is not only related with user interfaces [4]. When transitions turned from windows to Internet and mobile phone since that usability becomes essential. Throughout the world scholars are paying an enormous attention on usability [5].

Usability awareness is an observable fact that is dedicated on usability attributes; learnability, efficiency, memorability, errors and satisfaction. According to Elizabeth Rosenzweighthe founding director World Usability Day, usability awareness is "Designing for a sustainable World". There are8 stages of usability of implementation by an organization according to JakobNileson. He calls them the usability maturity level of an organization. Of course there is a unremitting admiration and approval for usability in companies. We can discover how to increase the assurance to usability on projects by implementing the 8 stages, after implementing the 8 levels of usability maturity the system will be sufficiently usable that the end user will not required any training for using the system, instead the system itself will tell the user how to use me [6].

In distinguish with developed countries, Pakistan existing level in usability and HCI is raising. On the other hand uprising Information Technology and decreasing prices of telecommunication and information technologies in the World encouraging the HCI and usability in Pakistan. For that reason, author conducts this research to find the existing stage of HCI/Usability in Pakistan

academia, IT industry respectively. This paper is divided into eight sections. First section introduces the problem of the study. The next section explains the existing models to identify the level of usability awareness. Third part of the paper describes the methodology. Section four presents the results of this study. Fifth section of this paper contains the discussions. Section six presents the guidelines. Section seven presents limitations and future work and last section of the paper contains the conclusion of this paper.

2. LITREATURE REVIEW

In Malaysia a survey study was conducted. The participants were software developers, system analysts, sales men, marketing persons and IT students. Overall 72 respondents were involved in this survey, IT professionals were 23, IT students 27 and 22 of them were non IT participants. Result of the study reveals that there is no differentiation on usability awareness between IT professionals, non-IT practitioners and IT students. Result show that usability is considered as natural skills and common sense knowledge for all types of professionals [7].

At undergraduate and postgraduate level HCI is considered as a core subjects. Collaboration do exist in Malaysia between industry and academia to provide better view to students about HCI. To convey the real view of HCI to students Professionals are invited from industry in different universities. A Government organization MIMOS Berhad is focusing on HCI and usability in Malaysia. The alliance among academia and industry at MIMOS is seen via much imitative e.g. deliver lectures and evaluating student's projects; offering internship to students. Even though these initiatives are loosely linked. To promote HCI these initiatives are mandatory to be taken by the whole Malaysian industry [21].

Another Study was conducted in UAE where participants were end users and IT managers. Results reveals that the participants don't have too much knowledge about usability, according to respondents usability is not one of the software problems, they do not recognize it an important factor for software development, they have basic information about usability. Found no

usability staff in organizations and end user is not involved in design phase [6].

Study was conducted in Korea. The respondents were software development professionals and UI/Usability professionals. The study results reveals that awareness of usability better as estimated but usability has not yet been implemented in the projects. Study finds some issues e.g. Time and cost effective usability methods and lack of usability professionals found in the study [8].

User Experience (UX) is considered as a key issue in leading Chinese companies. Most top Chinese organizations have possess their Usability Engineering staff and research laboratories e.g. Intel, Baidu, Lenovo, Samsung electronics, Huawei, Tencent, Nokia and China mobile etc. More than 21 HCI/usability research laboratories are active in China. About 200 professionals are working in these laboratories. Professionals have diverse backgrounds e.g. HCI, Interaction design, industrial design, SE, psychology, human factors etc. (Liu et al, 2011). Companies like Oracle, VERITAS, HP, SAP, Intel, General Electric and Adobe have their offices now in India. All these companies have their design group [9].

The organized number of seminars and conferences shows that awareness about usability is rising. University Academia, Government and industry should be educated top romote the usability Awareness. Specialized degrees should be offered in HCI. HCI/usability society should be established and members should communicate with each other's [12].

Another survey study has been conducted in France. The respondents were HMI, usability ergonomist and HCI professionals. The result of the study shows that after getting number of years of experience professionals get aware about UCD methods. Results shows that UCD methods not used by young professionals at their earlier stage of their professions. Engineering schools professionals are much aware about UCD methods as compared to other professionals but they are not interested to use the methods [10].

Another study conducted in Germany results of this study shows that usability is considered as a key characteristic of the system. In public institutions in 2001 interview held to observe the usability existing practices. Only 15 institutions participated. Most organization opens for suggestion and ideas for the improvement of usability. Most of the institutions don't feel competent for implementing usability methods their own. Usability budget were assumed to be small. Hardly usability activities are barely accepted. At the end of interview four institutions were ready for getting help from professional regarding usability. The other interview held of German web agencies. A total of 45 agencies were contacted. Only 31 out of 45 participated in the interview. 90% participated agencies consider usability methods in their products. Twenty-two out 31 companies have usability staff. In shortly most agencies consider usability important but for some specific product [13].

3 .METHODOLOGY

Various usability maturity evaluation models have been developed to examine the usability of a firm. In this paper we are using the Usability Maturity Model (UMM) briefly explained in Table 1. Latest studies [7] in Asia have adopted the UMM to find the level of usability awareness in the company.

A. Respondents Profile

Two survey Studies has been conducted in IT Industry of Pakistan. The goals of the studies were to seek the current state of usability in IT industry. Another third survey study has been conducted in universities operating in Pakistan. The aim of the study was to find the current state of HCI in Pakistan academia, to find out HCI professionals serving in universities, which courses are offered relating to HCI, is there any Usability laboratory, which degree is offered in HCI, related research activities in HCI. The participants were from different areas and different universities of Pakistan. Participants were from different areas of Pakistan having different educational backgrounds. The participants did not receive any financial support to contribute in the studies. Questionnaire was sent through an email some universities filled live from faculty of Computer Science, Information Technology and Software Engineering. Questionnaire was sent to more than 150 faculty members of different 48 universities located in different cities of Pakistan including top 20 HEC ranked universities in general categories in 2014.Government and public sectors universities both were targeted. The study concentrated analysis of data collected from the respondents. Total 33 respondents took part in the survey of different 30 universities of Pakistan.

B. Design

- The participants did not receive any financial support to contribute in the studies. Questionnaire was sent through an email in all three studies and some respondents filled live. In third study some respondents filled live from faculty of Computer Science, Information Technology and Software Engineering. Questionnaire was sent to more than 150 faculty members of different 48 universities located in different cities of Pakistan including top 20 HEC ranked universities in general categories in 2014.Government and public sectors universities both were targeted. The study concentrated analysis of data collected from the respondents. Total 33 respondents took part in the survey of different 30 universities of Pakistan.

- Most of the questions found in study are closed-ended questions, which are followed by response options. However, some open ended-questions are also asked in the questionnaire to find out the answer of the respondents. Following questions were asked in IT industry practitioners in Study 1 and 2.

    Q#1: Do you think your current working system user interface is error free?

Q#2: Something incorrect with the system interfaces but not sure what was the issue and don't know how to fix it.

Q#3: Does your company consistently produce usable products?

Q#4: This Company starts to set up specialized group to handle user interface issues. Q#5: Is there any Usability Budget in your organization?

Q#5: Is there any Usability Budget in your organization?

Q#6: The top decision makers in this company have started focusing on design for human use rather than inner technology.

C. Usability Maturity Model (UMM)

UMM is used to find out the usability understanding level of any company. UMM is explained in Table1.

Table 1: Summary of Umm [17].

UMM Levels	Process Attributes	Explanation
Level X: Unrecognized	No Indicators	At this level of UMM the staff in a company believe that product they have build have no issue on the subject of usability.
Level A: Recognized	Problem recognition	At this level staff of an organization recognize issues concerning usability in their developed product.
	Performed process	Staff of an organization know that Usability covers whole system. does not concern only with interface, which is used by end user.
Level B: Considered	Quality in use awareness	Members believe that excellence of product comes through the chain of HCI process by gathering the end user requirements.
	User focus	Keeping an eye end user is not practical as compared developing team during developing product that.
Level C: Implemented	User Involvement	Involve end user at all phases of the product.
	Human factor technology	Use suitable HCI methods.
	Human factors skills	Hire suitable staff.

	Integration	Integrate HCI processes with each other.
Level D: Integrated	Improvement iteration	Make sure changes according to feedback and get feedback on suitable time.
Level E: Institutionalized	Human centered leadership	Make implementations according to HCI patterns.
	Organizational Human centeredness	Identify appropriate roles for each skilled person in team.

D. Linkage of UMM with Study Questionnaires

Mapping of questionnaires with UMM is explained in Table II. Each level of UMM is mapped with a question asked in survey from the respondents. Each question represents a level of UMM.

Table 2: Linkage of Umm with survey questionnaire

UMM Level	Questions	Explanation
Level X: Unrecognized	Q1	No issue with system interface
Level A: Recognized	Q2	There is an issue in user interface but donot recognize what is genuine problem and donot to know how fix it.
Level B: Considered	Q3	This company regularly produces usable products.
Level C: Implemented	Q4	This company solving usability related complications from HCI/usability Professionals.
Level D: Integrated	Q5	This organization has a usability Budget (conducting seminars for awareness, training of employee regarding usability etc.)
Level E: Institutionalized	Q6	Top decision makers decided to stress on user centered rather than inner technology oriented.

4. RESULTS

A. Survey Study one Results

Table 3: Results of survey study one

Sr #	Asked Question	YES	NO	Mean
1	Whether heard about Usability or not?	22	18	**1.450**
2	End User Involved In Design Phase?	27	13	**1.325**
3	Do you think your current working system is usable?	30	10	**1.250**
4	Something incorrect with the system interface but not sure what was the issue and don't know how to fix it	16	24	**1.600**
5	Does your company consistently produce usable products?	26	14	**1.325**
6	This company starts to set up specialized group to handle user interface issues?	11	29	**1.525**
7	Is there any Usability Budget in your organization?	17	23	**1.575**
8	The top decision makers in this company have started focusing on design for human use rather than inner technology?	6	34	**1.875**

B. Survey Study Two Results

Table 4: Results of survey study two

Sr #	Asked Question	YES	NO	Mean
1	Whether heard about Usability or not?	108	9	**1.076**
2	Have you ever heard about Human Computer Interaction (HCI)?	99	18	**1.153**
3	End User Involved In Design Phase?	88	29	**1.247**
4	Do you think your current working system is usable?	97	20	**1.179**
4	Something incorrect with the system interface but not sure what was the issue and don't know how to fix it	94	23	**1.786**
5	Does your company consistently produce usable products?	80	37	**1.316**
6	This company starts to set up specialized group to handle user interface issues?	57	60	**1.512**
7	Is there any Usability Budget in your organization?	60	57	**1.495**

8	The top decision makers in this company have started focusing on design for human use rather than inner technology?	40	77	**1.487**

C. Survey Study in Academia

An indication of priority and awareness of HCI/usability problems judged by the research activities in universities and program offered at under graduate and post graduate level is explained hereunder.

Public and private Universities offered many courses at under graduate and post graduate levels. The following courses offered in Computer Science, Software Engineering and Information Technology departments.

Human Computer Interaction (HCI), Intelligent User Interface, 3D Interaction Technique, Augmented Reality, Usability Engineering, Advance Human Computer Interaction, Web Usability, Information Retrieval, Information Architecture for the World Wide Web Information Authoring, Optimized Input Methods, User Interface Design in Global Perspective Information Foraging, Recommender Systems, Information Visualization and Introduction on HCI, HCI and Usability.

Classic examples of under graduate courses in Pakistani Universities are Advance HCI, Intelligent Computer Peripherals, Introduction to HCI and Intelligent User Interface. In most universities HCI is offered as subject at under graduate level. However, there is no degree program offered at under graduate and post graduate level.

Research is not active in HCI and related issue in Pakistan. There is no journal or conference held regarding HCI and related issue in Pakistan so far. A research group is active in Federal Urdu University of Arts, Science and Technology Islamabad (FUUAST) under the supervision of Dr Mahmood Ashraf regarding Web usability and Mobile Usability.

Survey results reveals that currently there is no Usability testing laboratory in all 30 universities. There is no research laboratory as well in any of the university. Usability tests like Heuristic Evaluation and Think Aloud Protocol Test which are performed in Muhammad Ali Jinnah University Islamabad (MAJU) at undergraduate level to make student aware about the real usability issues.

Number of Usability professionals in 30 universities is very low. We asked a question in survey "How many HCI Professionals are present in your faculty?" On average, there is only 1.33% HCI professionals are working in each university. In eight

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(26.66%) universities there is no single HCI professional.

5. DISCUSSIONS

Before starting this research study author assumes that HCI and Usability are entirely involved in IT industry and partially involved in Pakistani university academia. But unfortunately after analyzing the data and results of this research we find that usability is partially involved in IT Industry of Pakistan. HCI is at birth stage in Academia. In this research study we use two different terms for academia and IT industry. Human Computer Interaction (HCI) was used for academia and Usability was used for IT industry. The reason of using two different terms is that after studying and analyzing the literature HCI was mostly used for academia perspective because HCI is broad term. HCI is huge field in the world. Usability was used for IT industry mostly in ICT industry of Developed or developing country.

After studying the literature HCI and usability are getting a huge attention in the world. Research is active in academia and industry in developed countries and in developing countries like China India etc. many subjects are taught in the field of HCI and Usability in academia at undergraduate and postgraduate level round the world.

Because of organizational and cultural differences are exist throughout the world. Therefore the tools and techniques developed in developed countries may not work accurately in developing countries. Research is not sufficiently active about HCI and Usability in Pakistan. Therefore peoples are not mindful HCI and Usability in Pakistan. Problem is not sufficiently highlighted in Pakistan.

To increase awareness about HCI and usability in Pakistan we assume that first we need to find the current level of HCI and Usability. Then we need to propose the tools, techniques and theories to increase the awareness. Once the professionals think usability and HCI are very important for project success then usable product will be produced. Therefore first of all we need to find the current state of HCI and usability respectively in academia and IT industry.

To perform this research first of all a questionnaire was designed to find out the current state of usability. It was a pilot study questionnaire was sent to open house software through emails and dedicated persons. After data collection results reveals that in overall organization usability was no considered important. HCI and Usability Professionals were not hired. End user was not involved in design phase of the study.

In most of the organizations IT professionals were needed to be trained about usability of the software system. Developers mind are needed to be changed about usability. Developers' perceptions were not satisfying regarding usability. They are not aware about usability of the system is equally important as inner functionality but unfortunately they don't think so.

Software engineers have good perceptions about usability as compared developers and computer programmers. This is why because software engineers have more interaction with end user as compared developers and computer programmers. Before starting this study we assume that experience should have big influence about usability. But unfortunately internee, juniors and seniors developers have same level of perceptions about usability.

Another study was conducted in IT industry of Pakistan to find the current level of usability. In 2nd study some guidelines were mined to improve usability awareness. The participants of 2nd study were different from 1st study conducted in IT industry. The results of 2nd study are different from 1st one. The mind-set of developers in both studies is same. Either they are confused about usability or they don't precept usability accurately. They don't think training of developers is important for usability.

The perceptions of software engineers about usability are nearly same in 1st and 2nd study. Their concepts about usability are satisfied. They think training of all IT professionals is very important for usability. As compare software engineers to developers there is big difference in mind set of them. Software engineers interact with end user that's software engineers are very clear about usability.

Results of the research study reveals that in open software houses usability is not currently involved. In open software houses usability awareness is in at unrecognized and partially at recognized level of Usability Maturity Model (UMM). While on other side registered software houses with Pakistan Software Export Board (PSEB) usability is involved. In these organizations usability is considered very important for project success. If we link PSEB registered IT companies with UMM usability awareness level is at least at recognized level and partially at others higher levels.

Another study was conducted in Pakistan Academia to find the current activity of HCI and related terms. In most of the universities research in HCI is not active. HCI, IUI, Web usability, usability Engineering, Interaction designer etc. subjects are offered in most of the universities at undergraduate level in computer science department. Specialization in HCI programs in undergraduate or postgraduate levels or not offered even in a single university. There is no single usability laboratory in any public or private university. From survey in Pakistani Academia some guidelines were extracted.

Other important point noticed from this research study is that background of IT professionals matter or can change the perception of IT professionals about usability. Perception about usability of all IT professionals graduates

from Federal Urdu University of Arts, Science and Technology (FUUAST) very clear about usability. They define usability and they consider usability equally important as inner technology of the system. All they think usability is very important for project success.

6. GUIDLINESS TO IMPROVE AWARNESS ABOUT HCI AND USABILITY

Some recommendations and guidelines to swift usability awareness accomplish from this study are. By developing usability websites to prompt usability, By involving of end user in designing phase of the system, Organize events on usability (Usability day etc.) in organizations, Make sure usability testing before delivering the product to end users, Hire usability expert in each and every organization, Educate application developers about usability importance by changing the mind set of developers about usability is equally important as functionality of product and making developers aware about the fact that usability is key for success, awareness will be increased by giving proper training to developers and other employees about usability, through Social Media campaign, through Seminars, via Demo lectures, with training, by observing the operational users/end users, By following international standards to improve usability, Workshops should be conducted not only at the industrial level but at the graduate level so that people related to IT have proper idea about how to design the user interface of the system, More research about who are the system users and most importantly usability and HCI awareness will be swift by offering of subjects and degree programs at graduate and post graduate level.

7. LIMITATION AND FUTURE WORK

The participants of this study were only IT professionals. Marketing professionals and end users of the system should be included in research for finding out their perceptions about usability.

We try our best to include participants through Pakistan. But zero participants were included in this study from Baluchistan due to time and resource limitations. This research is focused on to find the current level of awareness of HCI and usability in Pakistan university academia and IT industry. Further research can expand to introduce usability testing methods for Pakistan IT industry. Additionally research can expand to implement global usability testing methods in Pakistan to find out to the effectiveness of those methods in Pakistan. Further research should be conducted to inspect the association among higher management and end users influence the design planning and IT development process.

8. CONCLUSION

We have provided an indication of current state of art of usability in Pakistan. Although usability and user-experience (UX) have gained much consideration from scholars and industrial specialists in other parts of the world (Idyawati e*t al.,* 2010) but still the exercises and existence of user centered design towards usability is not mature in environment of Pakistan. The paper presents three survey studies to find out the current state of HCI and

usability in academia and IT industry of Pakistan respectively. In this research author suppose that level of experience in development sector of IT industry will have an effect in usability awareness, whether or not IT professional have had HCI education. But results show that the level of experience has no major effect with usability awareness. Software engineers are comparatively more influence with usability awareness from application developers. HCI education has had great influence with usability awareness. Overall organizations are partially involved HCI and usability. But mind set of application developers need to be change usability is equally important as inner technology. In academia usability laboratories are need to be installed in institutions. Specialization in HCI should be offered.

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