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Role of Human Factors in Software Engineering

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Abstract

In the last decade, human factors have been disregarded in the fields of software engineering and in the later stages of development as well. This area has been overlooked by the scholars and researchers as compared to the other fields of business in which their most concern is with the customers. Moving from the pre-planned to the agile process of development, there is going to be further involvement of human factors according to researchers.

History

The final years of 19th and early 20th century motion & time engineers signalled the initiation of human factors as a science during World War II (Wickens & Hollands, 2000). As the hardware and software had become gradually more dependable, the human input to accidents (such as TMI) had become more obvious. The science of Human Factors, previously somewhat 80 years old, let the human element i.e the human factor, also the technology to be addressed [6]

Introduction

- Human factors play a very significant role in the software development lifecycle and software engineering overall.
- A software engineer should always have in mind the target audience and to make things as straightforward, easy to understand and as simple as possible [1].

What is Human Factors?

Human factors is the science of psychology which attempts to construct a relationship between human and technology. It mostly focuses on various different topics such as Human computer interaction, Ergonomics, workplace safety and security, to understanding human abilities, and then smearing this knowledge to the equipment's' designs, systems, tools and work processes which reduces human effort [12]. Human Factors is a massive umbrella under which human-computer interaction (HCI), ergonomics, and usability comes. Usability overlaps with both ergonomics and HCI [11].

Human-Computer Interaction & Ergonomics

- Human-computer interaction (HCI) is a multidisciplinary field which focuses on the design of computer and interaction between computer and Humans [9].
- Ergonomics is the discipline related with design and comfort for human compatibility. Examples include: wireless keyboards, hand tools, wireless mouse, etc [12].

Why Human Factors is important in Software Engineering?

- High user satisfaction
- Reduced user effort
- Reduced training cost and time
- High performance of system
- Reduced operating cost
- Enhancing safety & security



Issues and Limitations

- To identify end-users & requirements
- To understand the psychology of end-users
- Performance & Quality
- Approach to Human Factors-Biased: This happens because people regard Human factors as common sense.
- Most of the companies disregard the fact that the presentation of their product should be easy to understand & implement [5].



Improvements

- The industry of software should make efforts to understand the issues related to Human Factors within data collection and the entire process of development.
- People from different diversity of people and their ideas are good for the betterment.
- Team conflicts: Sometimes team members blame each other for the software failure or the requirements were not good enough. Therefore, building the software teams should be kept into consideration [3].



Findings

- Software Developers must be focused:** Software developers should work in distraction free environment. For e.g working on multiple files at the same time.
- Larger Teams means Code is less secure:** Statics reveals, that Apache web server files with 9 + developers were 117 times more susceptible. Therefore, in my opinion working teams should be small.
- Human Performance gets affected by excessive work hours:** Research shows that prolong working hours lower an individual's performance and one should not work more than 11 hrs a day.
- It matters what time of Day the Code Is Written:** Code written between midnight & 8 AM, afternoon till 4 PM have work with more errors.

Conclusion

In conclusion, for a software to be successful, a software engineer should always have the end user (who is going to use) in his/her mind. He should create the software which is easy to understand, use and learn, within the budget. Therefore, Human factors play a very essential role in the software development. Moreover, Human factors in Software Engineering is a field of both challenges and rewards. It is challenging due to the difficulty of the several problems this field faces. Conversely, it is rewarding as the researchers work on improvements that could have an actual impact on individuals.

Future work

- Justifying the necessity to focus on the topics like Human Factors, Human Computer Interaction and Usability is not too difficult—they would obtain positive feedback from the one's involved in the field.
- As software ergonomics & human computer interaction are pretty new concept in the field of software engineering, they both have a widespread possibility of getting established in near future [10].

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