Evaluating Collaborative Technologies used by Academics: Case Study of Loughborogh University, UK

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ABSTRACT

This study identifies a sample of academics from Loughborough University who collaborate as part of their research and teaching activities, and explores their use of technologies in supporting their collaborative activities. This study investigates how collaborators evaluate collaborative technologies they have adopted for use. This study uses Loughborough University as a as case study. Seventeen academics were interviewed to capture their opinions and experiences, as they relate to the aims and objectives of this study. Documentary evidence, such as spreadsheets of technology requirements, provided by the eLearning Centre at Loughborough University and archived materials, such as emails, provided by the research participants formed part of the data gathering and analysis. The findings show that that users tend to evaluate collaborative technologies after implementation and the three main evaluation approaches are currently used the 'heuristic approach', 'cost benefit approach' and 'break down method'. The findings also show that no single evaluation technique alone was appropriate across the range of activities and groups identified as part of the case study.

General Terms

Collaborative Technologies for Academics

Keywords

Collaborative Technologies, Frameworks, Models and Evaluation

1. INTRODUCTION

Evaluation of collaborative technology is the process of determining the significance of a collaborative technology and comparing the technologies against some criteria in order to improve plans for future implementation [10].

Though, evaluating collaborative technologies requires the evaluator to draw out and reflect on users' experiences about collaborative technologies. A group of researchers in the field of human-computer interaction argued that, the three main goals of evaluating a system are; to assess the extent and accessibility of system's functionality, to assess users' experience of the interaction, and to identify any specific problem with the system [3] [p319].

A scenario based approach was used to evaluate a set of collaborative technologies and the result of the study indicates that, effective evaluation of collaborative technologies remains an elusive goal for researchers and practitioners in the field of CSCW [6].

Whereas, Neale and others [8] share a different view that, in order to adapt to the pace of evolving human computer interaction, the approaches of evaluating collaborative technologies need to change from the cognitive functioning where a user sits alone in front of a computer screen and, and they further argued that, it is difficult to use one single evaluation techniques to assess collaborative technology. This research will identify several models for evaluating collaborative technologies.

2. REVIEWED LITERATURES

2.1 Frameworks for Evaluating Collaborative Technologies

There are different frameworks for evaluating collaborative technologies which have been developed by different studies.

2.1.1 'Heuristic approach'

This approach was developed by Nielsen and Molich in 1990 and has been used by many researchers in the field of computing and CSCW, to evaluate systems [12]. The 'heuristic evaluation approach' encompasses the usability of collaborative technologies, ease of learning, and the satisfaction derived for using a system. The heuristic approach argues for the involvement of users in designing systems.

Lack of consideration of users at design or selection stage leads to system failure post-implementation, as a consequence users do find a way around the system, by developing their own way of doing things [1]. The heuristic approach is user focused way of evaluating collaborative technologies.

2.1.2 'Awareness model'

Neale, Carroll and Rosson developed the 'Awareness model', which focuses on distributed collaborative groups [8]. The 'awareness model' structures the communication and activity awareness of distributed collaboration. The proposers of the 'awareness model' are concerned about collaborators that are not working at the same time and place (for example; asynchronous distributed activities), and the need to maintain continuous support for them to remain aware of the presence, tools and resources of their counterparts even when they maybe multitasking.

2.1.3 'Concept oriented framework'

Pinelle, Gutwin and Greenberg developed the 'concept-oriented framework' for evaluating collaborative technologies [11]. The 'concept oriented framework' describes the specific method that can be adopted to measure some concepts like; effectiveness of communication of collaborative technologies, awareness (such as social awareness, action awareness,

situation awareness, presence awareness, workplace awareness) and trust. The concept oriented framework is similar to the awareness model because the two models assess the awareness of collaborative technology.

2.1.4 'Cost benefit model'

The 'cost benefit model' is a method that investigates the cost and benefits of having new collaborative technologies or upgrading existing one [4]. The 'cost benefit model' assesses the productivity of the collaborative technology in relation to the financial cost, which makes 'cost benefit model' ideal for the early stages of adopting collaborative technologies. In addition to assessing the costs, it further advocates the use of scenarios, whereby the new collaborative technologies are piloted with a group of potential users.

2.1.5 'Breakdown method'

The 'breakdown method' is based on assessing how collaborators encounter problems with the technologies they use [5]. The first approach in the 'break down method' is to understand the activities of the group, which is followed by developing a measure that will provide support for the group activities.

3. METHODOLOGY

For the purpose of this study and, in order to collect qualitative data, Loughborough University was used as a case study. The focus of this study leads itself to qualitative data gathering and analysis. It has been argued that qualitative research is mostly used in social science research and it is expected to gather in-depth information [2]. Qualitative research does not rely on numbers or statistics. Instead, qualitative research involves the analysis of unstructured information which could be from interviews, documents, emails, feed backs, telephone conversations, notes, photos and videos [7].

A total of twenty eight participants were sampled for this study. Request for interview was sent out to potential participants via electronic mail. Twenty eight (28) participants were invited to participate in the interview. Five (5) participants declined the invitation, seventeen (17) participants were interviewed and six (6) participants did not respond to the invitation. A follow up email was sent out to the participants that did not respond to the first invitation.

Interviewees were categorized base on their job role and the kind of activities they are involved in. For the purpose of this research interviewees were classified as: Lecture, Research, Scholar and Project. Table 1 describes the job role of the interviewees.

Table 1: Description of activities of interviewees

Participants	Collaborative activities	Faculty
A	Project (Technical support)	Engineering
B	Project	Engineering
C	Lecture, Research and Scholar	Social Science
D	Lecturer	Science
E	Project	Library
F	Lecture and Research	Science
G	Project	Social Science
H	Research	Science

I	Research	Science
J	Lecture	Science
K	Lecture	Science
L	Research and Project	Engineering
M	Lecture and Research	Science
N	Research	Engineering
O	Research	Engineering
P	Lecture and Research	Engineering
Q	Project	Engineering

4. FINDINGS

This research identifies three methods of evaluating collaborative technologies among it case study. The models of accessing collaborative technologies in this research are presented in three (3) categories in Table 2. Some of the participants have not evaluated any collaborative technology. Interviewee F, G, I, N, P and O haven't participated in evaluating collaborative technologies. Table 2 illustrates the findings of this study.

Table 2: Findings of the study

	Heuristic approach	Cost-benefit model	Break-down method
Interviewee(s) that have participated in evaluating collaborative technologies	A,B,E,L and Q	E,H,M	C, K, J
Type(s) of collaborative technologies that have been assessed using an evaluating model	1. Elluminate LIVE	1. wikis such as: *pbworks*, *google site* and *yammer* 2. video conferencing system: Skype	1. Scholar1
Summary of participants' view on the models of evaluating collaborative technologies	This model considers the following: 1. users' requirements need and priorities; 2. the kind of tasks the collaborators will be involved in; 3. technological background of the users. 4. consumes resources and time and 5. not suit for repetitive process.	1. This model allows collaborators to work with the lowest common denominators of technology. 2. This model is cost effective	1. This model provides better understanding of the collaborative technology been evaluated 2. This models allow users of the technology to participate in the design stage of the collaborative technologies 3. This model was used by publishers that were interviewed for this study

5. DISCUSSION OF RESULTS

There are different techniques for evaluating collaborative technologies; 'heuristic approach' [12], 'awareness model' [8], 'concept oriented framework' [11], 'cost benefit approach' [4] and 'break down method' [5] but the findings of this study identified only three approaches of assessing collaborative technologies.

The 'heuristic approach' was discovered to be a technique used when selecting collaborative technologies for large groups of users. For example the eLearning Center used this approach when recently selecting a web conference system. The findings of this study revealed that when conducting requirements analysis, users are requested to specify their needs, and then certain technologies that meet users' requirements are selected for consideration. This fits in with the 'heuristic approach' [12], which urges the involvement of users when designing or selecting collaborative technologies.

The 'heuristic approach' allows the prospective users to state their requirements irrespective of their technological background, as shown in this study where users from different departments in Loughborough University were asked to specify their requirements for a video conference system.

Some participants argued that the 'heuristic approach' gives a better view of users' expectations and is more efficient because their needs are taken into consideration before selecting a technology. Though, some participants who were responsible for conducting requirement analysis suggested that the approach is satisfactory, but it is time and resource consuming. It could take up to four months depending on the size of the group.

This study has shown that three of the participants are in favour of the 'break down approach' [5] which argues that users of collaborative technologies should be observed, their problems should be identified, then measures should be developed to design a system that supports their activities. The participant that uses scholar 1 and two other participants strongly recommended the 'break down method' because they prefer designers of technologies to seek their opinions before selecting collaborative technologies for them.

The 'break down method' is used when users of collaborative technologies are well experienced with technologies and they suggested that, designers of collaborative technologies should seek the opinion of users before developing a system. The 'break down method' requires the users to have some proficient knowledge about the design process of collaborative technologies or the users should be well experienced with the technologies. While 'heuristic approach' requires users to just specify what they need from collaborative technology irrespective of their technological background.

This study has identified some participants that have successfully used the cost benefits approach [4] which argues that collaborative technology should be demonstrated to potential users before adoption. One particular group of collaborators that participated in this study described how they adopted pbworks after demonstrating different types of wikis to the potential users. One group also adopted Skype after demonstrating how to use Skype to the group.

6. CONCLUSION

This study primarily aimed at examining how collaborative technologies are evaluated once implemented. In order to achieve the aims of this study, it was necessary to identify the range of collaborative activities a sample of academics at Loughborough University were engaged in and the technologies used to support those activities.

Evaluation of collaborative technology allows the appropriateness of a collaborative technology to a particular activity to be assessed, comparing the technologies against some pre-agreed criteria in order to improve plans for future implementation.

Heuristic approach should be used when selecting collaborative technologies for a large group of users because it gives a better view of users' expectations and it is more efficient, although 'heuristic approach' is time and resource consuming, and should not be repeatedly used.

The 'break down method' enables the working system to be studied, then suggests ways of supporting the relevant activities with technology. A disadvantage of the approach is that it requires users to have proficient knowledge about the design process or that the users should be experienced with the technologies. Whereas, the 'cost benefit model' can be use to evaluate collaborative technologies if the users possess little or no technological background.

It is important to note that, user requirements vary across individuals and activities, it will be difficult to have one single approach to evaluate all technologies across all activities, instead appropriates approaches should be used in order to effectively evaluate collaborative technologies once implemented. For example, heuristic approach should be use to capture user requirements then cost benefit model should be use to demonstrate the collaborative technologies and assess the cost effectiveness of the technology.

7. FURTHER STUDIES

As with most research, this study has had certain limitations. Further work will be important to understand the requirements of users while selecting collaborative technologies and the evaluation of collaborative technologies. Some recommendations towards these are:

- A broader study on users' requirements and evaluation techniques for collaborative technology, with sufficient timing and a larger sample of participants, will give a broader set of finding that can be generalized for educational institutions.

- A study on collaborators that are not willing to use technologies to support their activities and how they intend to collaborate without collaborative technologies

8. ACKNOWLEDGMENTS

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