A Strategy for Managing Apathetic Users During Requirements Definition

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*Abstract –*Requirement elicitation is the most important software development activity that determines the success of a software development project, and the quality of a software product is highly dependent on the correctness, completeness and conciseness of the outcome of this phase. Users play a key role in this process and the associated outcome which makes it imperative to involve them throughout this phase. Different categories of users were identified during a requirements elicitation activity, as input from all the groups was required to gather adequate requirements that was representative of the users' needs. There is the risk of poor requirements gathering if any category of users shows apathy or lack of interest in expressing their needs regarding a software product. Participants for this study was derived using purposive sampling. A qualitative approach was adopted, comprising a semi-structured interview with key informants, after an informal interactive session with them to educate and acquaint them with their significant role in the success of the project. This paper reports the risk management strategy adopted in the management of these apathetic users during requirements definition process to ensure they made the needed contribution and elicited their needs. This intervention helped to obtain requirements from all categories of users of the intended software product. The resulting software product was well accepted and used by all because their needs were captured and incorporated in its development.

Keywords- software development projects, requirements elicitation, apathetic users; user profiling, software failure, software development risk

I.   INTRODUCTION

People are a major capital, competitive advantage, and a success component of any organization, they play a vital role in software development projects which are heavily human dependent activities [1]. They are a major source of reliable information that is needed to design useful and usable software systems as they have the domain knowledge needed to build the intended systems. This makes it imperative to involve them in all activities undertaken to successfully gather requirements, so they can reveal exactly what they need from the software system. Their collaboration must be highly solicited, especially those whose behavior show indifference, disaffection and disenchantment, as anything short of this leads to gathering incomplete requirements [2].

According to [3], apathy gives rise to negative consequences for both the individual and the organization, including poor motivation for working, inefficiency, irresponsibility and a sense of insecurity. It is advisable therefore, to make appreciable effort to stir up the interest of apathetic users in a project and get their input, to ensure they are not left out and for organizational benefits to [4].

Software development is a high-risk activity, making risk management an important concern in software engineering, due to the high rates of failure reported in software development projects. Every phase of the software development life cycle has its own associated risks; hence proper and adequate risk management strategies are required to build quality software products. The risk mitigation strategy adopted to ensure adequate participation of the group of users categorized as apathetic users in this study and the resultant effect on the requirements obtained is discussed.

There is a paucity of studies on this category of users, even though software developers encounter them often during software development projects. This research addresses and seeks to fill this gap in a bid to improve the outcome of software development projects in the face of continuous reported failures [5].

The aim of this study is to reduce risks of software project failure associated with incomplete requirements, and the objectives include determining (i) their general knowledge, perception and usage of computer (ii) the reasons for the apathy exhibited by a category of software users, and (iii) spur them to elicit their requirements for the software projects. Subsequent sections of this study are organized as follows: section II is a review of related works, followed by the methodology in section III and findings from the responses of participants, then a discussion based on an in-depth exploration of the results. A recommendation

for further studies is made before the conclusion of the study.

II. RELATED/PREVIOUS WORKS

Software development projects are more likely to fail than other types of projects because of uncertainties in software development environments [6], and associated risks and complexities [7]. It was observed by [8] that most risks associated with software projects were requirements-related and the risks increased if not detected early [9], [10]. It was also noted by [11] those poor requirements management is a major risk and threat to the success of software projects, emphasizing the need for users to be properly managed during requirements gathering. [12] opined that identifying the exact users of a software system is key to the elicitation of quality requirements, an assertion that was further corroborated by [13].

According to [10] the heterogeneity of software users complicates requirements elicitation, different users have different interests in a software project as clearly observed during requirements elicitation process, and this highlights the consideration for user diversity to reduce risks of software failure [14]. Difference in personalities also influences what they expect from a software system and their behavior during requirements elicitation [15], [16]. There are several factors which influence the attitude of users and their level of cooperation as they participate in software development projects. Some of these include their knowledge of how to perform various tasks using computers [17], level of understanding on how the system to be developed will solve their problems or ease their work [18], organizational environment [19] and other organizational peculiarities [20].

Requirements are elicited from the diverse user categories of software users to ensure satisfactory project outcomes and sustainability of the product. Therefore, the first step in the requirement's engineering phase is to identify the various user groups and their behavioral characteristics. [21] profiled software users into four (4) major categories: novice users, specialized users, apprehensive users and experienced users based on their experiences with computers and their applications. A major finding from that study was that the apprehensive users were apathetic to the system and hence needed to be studied further.

Paper prototype was used as a tool to motivate the users and foster engagement during interactions. This tool helped to demonstrate the features of the proposed system to participants as real users who have and know their specific needs from the software.

The utilization of paper prototyping for user study during software development projects was examined in [22]. This approach has evolved with advancements in technology and experts have continuously leveraged on its use to achieve their desired goals in the various areas ([23], [24], [25], [26]). It has also been applied by researchers, developers and designers as a reliable and low-cost way of discovering aspects where users encounter challenges in early stages of using a system. It also serves as a tool for improving social interactions

in the creation of final products and receiving feedback from analysis.

III. MATERIALS AND METHODS

The population for this study comprises of thirty-one (31) software users who were observed to be uncomfortable with a software development team and unwilling to participate in requirements gathering activities for the development of a proposed software system for an institution (TABLE I). Their attitude showed indifference, lack of enthusiasm and no concern to the project.

TABLE I.   DEMOGRAPHICS

ITEM	RESPONSE
Sex	Male – 14 (45.2%)
	Female – 17 (54.8%)
Work Experience	0 – 5yrs = 4 (12.9%)
	6 – 10yrs = 9 (29.0%)
	Above 10 yrs = 18 (58.1%)

Fourteen (45.2%) of the respondents were male and seventeen (54.8%) of them were females.

A. Step 1: Key Informant Interview

The initial phase of this study was focused on determining the root cause of apathy of software users, displayed towards the project. This was done using a qualitative approach that encouraged the respondents to explain the reason(s) for their nonchalant attitude. A session was organized for an informal interaction with them as key informants, to engage them, for needed support/motivation and informed intervention [27], and thereafter a semi-structured interview with each participant was conducted.

Only seventeen (17) 54.8% of the thirty-one (31) apathetic users identified and invited for the interactive session were present (See TABLE II).

TABLE II.   DEMOGRAPHICS

ITEM	RESPONSE
Sex	Male – 4 (23.5%)
	Female – 13 (76.5%)
Work Experience	0 – 5yrs = 1(5.9%)
	6 – 10yrs = 2 (11.8%)
	Above 10 yrs = 14 (82.4%)

Four (23.5%) of the respondents were male while thirteen (76.5%) of them were females. Most of them (82.4%) had more than ten (10) years' work experience.

Some general questions were asked to determine their views and ascertain their attitude towards the proposed system (TABLE III). A controlled observation was used to gather data due to its high validity [28]. This is an approach where participants are watched in a controlled/enclosed environment and data is collected directly from the observed source.

The questions were carefully worded to eliminate the feeling of intimidation or any form of unease. The interaction was conducted individually in the respondents' natural environment to create a calm/relaxed atmosphere and give the respondent a measure of control over the discussion. Response to some

questions led to further conversation, that not only revealed but explained the cumulative effects of their behavior.

The questions asked covered thematic areas ranging from general computer knowledge and usage to specific questions relating to the proposed system. Each session lasted about forty-five minutes.

Their responses were recorded, transcribed and filled in a questionnaire for the purpose of analysis.

Three (3) of the respondents did not give complete responses hence fourteen (14) respondents were used for the final analysis. The table below shows the questions asked and the data collected, which was analyzed using frequency analysis.

TABLE III. RESPONSES FROM APATHETIC USERS

S/N	Areas/Questions	Responses			
		Yes	%	No	%
	KNOWLEDGE				
1	Have you had access to computers at all?	4	28.6	10	71.4
2	Have you ever been trained to work with computers by your organization?	3	21.4	11	78.6
3	Have you ever enrolled for any computer related training on your own?	4	28.6	10	71.4
4	Do you have a laptop or desktop for doing office work?	3	21.4	11	78.6
5	Do you think computer knowledge is beneficial to your work?	3	21.4	11	78.6
6	Have you had any negative experience with computers in the past?	5	35.7	9	64.3
7	Do you think computers make work faster?	2	14.3	12	85.7
8	Do you know that most processes today are now automated?	13	92.9	1	7.1
	USAGE				
1	Have you had any reason to use a computer for personal reasons?	14	100	0	0
2	Have you had any reason to use a computer in your office?	8	57.1	6	42.9
3	Did you use it successfully when you had a reason to?	*4*	*28.6*	*10*	*71.4*
4	Did you need somebody to help you work on the computer?	*11*	*78.6*	*3*	*21.4*
5	Do you enjoy working with computers?	*3*	*21.4*	*11*	*78.6*
6	Are you afraid to use computers?	*5*	*35.7*	*9*	*64.3*
7	Will you like to type any character from the keyboard?	12	85.7	2	14.3
8	Do you now think users are relaxed working with computers?	8	57.1	6	42.9
9	Do you think a training on the use of computers will be helpful to you?	12	85.7	2	14.3
	SPECIFIC QUESTIONS RELATING TO THE PROPOSED SYSTEM				
1	Do you think your organization is spending enough on computers?	6	42.9	8	57.1
2	Do you think the effort of the Organization to promote the automation of various processes is worth it?	6	42.9	8	57.1
3	Do you think using software to carry out tasks create problems?	9	64.3	5	35.7
4	Do you think using computers to work leads to neglect of some staff?	11	78.6	3	21.4
5	Do you think there is anything beneficial about automation of processes?	4	28.6	10	71.4
6	Do you have any reservation contributing to the software development team?	5	35.7	9	64.3
7	Do you think there is anything the organization can do to encourage users to be part of the project?	14	100	0	0
8	Is there anything the software development team can do to encourage users to be part of the project?	12	85.7	2	14.3
9	Do you think your contribution can make a difference to the success of the project?	11	78.6	3	21.4
10	Are you motivated by this interaction to actively participate in this project now?	11	78.6	3	21.4

Analysis of the responses obtained showed that eleven (11) 78.5% of the fourteen (14) participants became interested in working with computers and the project after the informal interactive session, as the experiment proceeded, they had a better understanding of working with computers, what tasks the software system developed was intended to perform and how it would ease their work and solve obvious existing problems. They were also made to know the benefits they would derive from automating their activities and how their experiences on how they previously performed various tasks manually would be an advantage for them if they made contributions towards the requirements gathering for the new system. They were able to understand that they would be left out and behind from new opportunities that may arise if they did not change their attitude.

Findings from the interview showed that they were manually carrying out some of the tasks that were about to be automated. Some of them were also previously in charge of some duties that were no longer going to be necessary following the introduction of a new system deployed, hence their attitude. Their apprehension stemmed from a subtle neglect, feeling of irrelevance, and lack of assurance by their employers that they would be re-designated to units within the organization where their services would be better appreciated. They were motivated due to the time dedicated to communicating with them and making them feel important to achieve success in gathering complete requirements for the project. The interview allowed them to express their plight, where they were assured that they would be carried along and trained to be well

acquainted with the new system within reasonable time and they could be happy on their jobs again.

B. Step 2: Paper Prototyping

The next stage was targeted at gathering requirements from them for the intended software system. A paper prototype system was used for this activity. The participants were briefed on what a paper prototype is and its purpose which was to help them better understand the proposed system as adapted from [29], and [30], where a paper prototype was used as a tool to learn new things, get feedback and motivate users through engaging interactions. This technique helped to explain better the features of the proposed system to the participants (based on their level of computer knowledge and usage) during the interactive session. It also gave them a clearer understanding of the system, as it focused on addressing users' fears, reframing the process as collaborative [31], [32] and building trust.

C. Step 3: Requirements Gathering

It was observed that they were thereafter relaxed and able to elicit better requirements as expected of them during the project. They were able to relate the above experiment with the tasks they perform regularly and note what was important and need to be included in the system to be developed. They asked questions that were helpful and revealed further requirements. They were happy too that they could make reasonable contributions to the requirements gathering.

IV. FINDINGS FROM OBSERVATION DURING THE INTERATION WITH USERS

During the informal interaction with the users, intermittent excitement was noticed as the users' answered questions, and they were also more relaxed using the computer. These categories of users could eventually elicit meaningful requirements after the informal interaction where they were introduced to the system using paper prototype and working on the computer systems. This technique also helped them to build trust in the system considering the extra effort made to involve them in the process, making them understand the importance of the proposed system and establish a good user-developer interaction with them [33]. The following reasons were identified for user apathy.

1. Previous experience of users with software developments/developers.

2. Inadequate skill to use computers.

3. Phobia for computers/fear of damaging the computer.

4. Lack of motivation from organizations and project managers/developers.

5. Unwillingness to learn new methods in which case their apathy can be viewed as a defense mechanism.

6. Lack of knowledge of the benefits of the proposed system hence, lack of confidence in the system.

V. DISCUSSION

The experience of users with computers played an important role in their attitude to intended software systems. Most of the apathetic users did not have access to a computer always, hence the disaffection. Those that had access to computers but were not using them may not be tech savvy as opined by [34]. These categories of users may have been opposed to change, hence preferred using routine manual methods for their tasks. It's also likely that those who were willing to use computers had not been properly trained in the use of computers. These categories of users can be motivated by improving their access to computer systems, organizing periodic training for them and creating an enabling environment for them to use computers for their jobs.

Observation showed that despite all the gains that accrued from the use of computers, some people used it primarily because they had no other option. However, some other respondents still had difficulties, as they had phobia for technology because even after interacting with them, they still did not believe it was easy to use computers. More exposure was necessary to help these users have a better understanding, be able to relate paper prototype to the software system and improve their confidence in computer usage as recommended by [35]. Most respondents preferred the use of terms they could relate with in their day-to-day tasks to be used in the software products. Proper interaction between developers and stakeholders is necessary to prevent ambiguity [36]. Simplicity in designs is key, and it is recommended.

If users are well motivated and allowed more access to computers, they would be more likely have a change of attitude towards working with computers [37] and [38]. Most responses obtained agree with findings from [39] about the eight conditions likely to cause indifference in staff, which could be useful in the management of similar situations of apathy. These conditions include employee development, employee attitude, job motivation, organizational environment, organizational culture, attitude and manager's performance, nature of work and work environment.

Three of these eight factors including organizational environment, organizational culture and workplace conditions were identified as underlying factors and valid reasons for the attitude of the apathetic users in this study.

VI. RECOMMENDATION

This study should be conducted using bigger projects with larger population to determine what percentage of anticipated computer users in an organization display apathy. This will help to develop standard strategies for managing them and the risks they pose to the outcome of such projects. This is also a viable way to promote user-developer interaction and reduce software project failure. It is worthy of note that no single method can help reduce the risks associated with software projects, so a combination of approaches and development of more requirements definition related risk management strategies is necessary.

CONCLUSION

There are always users who display apathy towards any development project. Ignoring them places the project at risk of failure from inception, as the requirements used to develop the intended system will be incomplete and not a true representation of user's needs. Identification of the reasons for user apathy, personalized engagement with them for better understanding, and motivating them to become interested and involved is key to developing a management strategy that will reduce the negative impact of their behavior during software development projects. Extra effort is therefore needed from requirements engineers to create a proper communication channel, by intentionally laying foundation for continuous interaction, until they become knowledgeable enough to elicit their requirements. This will curb threats arising at different stages of software development especially at the requirements gathering phase.

This ultimately plays a role in improving software project outcomes, encouraging ownership of software products and promoting sustainability.

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