Learner Centric Models for Enhanced Learning through E-learning Strategies

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Abstract---E-learning is not intended to replace the traditional classroom environment, but providing new ways for sharing the concepts between students and instructors. The electronic learning or e-learning usage is increasing in many higher educational institutions, universities in India. E-learning supported by computer technology. There is myth that the e-learning fail addressing the learners perspective of learning This paper addresses the learner centric models to learn efficiently, Non-proprietary development processes the distinction between users and developers is blurred and these two figures may easily converge. On this basis, Non-proprietary software started to spread in every sector, including e-learning. Anyhow, with the diffusion of Non-proprietary software there is no guarantee that users and developers still converge, therefore the assumption on the base of which the hypothesis that Non-proprietary development processes contribute do a better output is not valid. The aim of this pilot study is therefore investigating end users' quality perception on the Moodle Non-proprietary e-learning platform (in terms of Usability, Functionality, Reliability, Efficiency and Quality in Use).

Keywords--E-learning,Non-proprietary,Efficiency,Reliability,Functionality,User-Perception

I.　Introduction

Technology always has been a strategic investment in the higher education sector validating its missions and graduate attributes. To challenging the traditional teaching paradigms, the technology (media) needs to play a major role. Until now, there exist many constraints to encourage these two areas as "islands of innovation". The digital networks development now arises the question of further development, maintenance and calibration of those options as pathfinders of our future virtual universities. Online education makes it very rich information medium, not just because of the multimedia capacity, but it is very interactive. The advantage of e-learning technology has made training, teaching and learning feasible across the Internet recently. E-learning is any form of education on that the Internet and supported by its technologies, and encompasses the use of the World Wide Web to support instruction and to deliver course content. Support instruction and delivering course content. E-learning uses the electronic devices to learn, to delivery the content via Emedia such as internet, audio or video, satellite broadcast, interactive TV, CD-ROM,and so on.[10].

II.　Related Works

Researchers acknowledge that Non-proprietary software has a high impact potential on economic and social infrastructure [2]. On this assumption, Non-proprietary Software development processes contribute to a better output when compared with traditional development methodologies [3, 4, 5], several studies started investigating the adoption of Non-proprietary based solutions in different environments [6, 7]. Large part of available studies are focused on the internal perspective of the Propertitary software usage, without considering the end users Assuming this, Non-proprietary software usage is to spread in different contexts and environments, including e-learning. Frequently used Non-proprietary software in e-learning contexts is the Moodle e-learning platform. Moodle is e-learning can rely on a large and stable community. According to the data publicly available on its website, Moodle is used in 199 countries with 46,773 registered installations, serving a total amount of (circa) 25 millions of users.

　　　A relevant characteristic of the Moodle e-learning platform is its flexibility which allows the user to configure it in many ways. This paper has introduced a pilot study on the perception of the end user on the Moodle e-learning platform. The aim of this study is to identifying the main factors that affect users perception on the platform quality (in terms of Usability, Functionality, Reliability, Efficiency and Quality in use). This article structure is as follows: after the research design, a brief literature review will describe the theoretical framework and will introduce the results of the pilot study. A discussion of findings and a conclusion will follow.

III.   Research Methodology

In our study the Moodle e-learning platform was used by a group of 80 students attending the "Computer mediated Training" course in a department of computer Science. These students used the platform for one year, both to download/upload contents and creating contents in training courses: as a matter of fact, they played, in two different roles, student and teacher in the Moodle platform.

We created a survey using the focus group technique (involving about the 10% of the final sample size) defining the most relevant aspects perceived by the users. The users' derived dimensions were confronted as indicated in the ISO 9126 and ISO 25000 software quality model as a reference. We decided to adopt these models to in-depth the understanding of our case, mainly because they include the usability as a dimension, but also the, interrelated, areas. We excluded from the dimension covered by the survey those that, cannot be evaluated under the end user's perspective (ie: Maintainability and Portability). As a result the survey covers the following areas as mentioned standards: Functionality, Reliability, Usability, Efficiency and Quality in Use. In the survey we added another variable called Global Satisfaction as a control variable explaining the other dimensions. Before submitting it to the end users, the survey was tested with a separate sample of users to ensuring that the text was very clear.

IV.   Analysis Framework

In Non-proprietary Software development process, the user can easily turn into a developer,in tradition contributing to the project by submit-ting a patch, writing a piece of code or doing other activities in support for the development. It can therefore be said that the Non-proprietary Software development process relies on the assumption that users and developers may converge. The diffusion of Non-proprietary Software outside the development community contributes sharpening the distinction between these two groups beginners and advanced learners that are not equivalent. As a matter of fact, they are nowadays very different [9]. In the traditional organization of an Non-proprietary Software development process, users outside the community are not taken into consideration during the development. This call for major involvement of human computer interaction expert inside Non-proprietary Development projects, as the interface design might not be treated with the same openness that is used for the source code [9].

V.   Findings and Results

Data is obtained from the surveys that have been analyzed using descriptive statistics. We calculated the Cronbach's alpha as a reliability index measure for the survey results. The survey value is 0.84, which is high enough for an explorative study The user's profile from the survey is as follows. Almost two third of the respondents (69%) have an age between 23 and 32 years, 61% use the computer less than 23 years, and 57% have been using the Moodle platform at least twice a week. In general, the respondents don't have good experience with other Non-proprietary Software because, on average, more than half of the respondents have not used other Non-proprietary software before.

Variables	Obs	Mean	Std Dev	Var	Min	Max
Functionality	59	3.12	0.59	0.35	2	4
Reliability	59	2.92	0.82	0.66	1	4
Usability	59	3.33	0.71	0.50	1	4
Efficiency	59	3.25	0.68	0.46	2	4
Quality in Use	59	3.29	0.58	0.33	2	4
Satisfaction	59	3.41	0.53	0.28	2	4

Table 1. Descriptive statistic (1 min – 4 max)

The results are shown in table 1: the variables scores have been obtained by calculating the average score of each group of questions (in the survey) that were specifically referred to the variables indicated in table 1. These results show a good level of satisfaction of the respondents with Moodle which is at the same time confirmed by the low level of the variance and of the standard deviation. Anyhow it is taken into consideration that the short Likert scales (from 1 to 4) tend to foster low variation.

Table 2 illustrate a correlation matrix among the five areas covered by the survey (Functionality, Reliability, Usability, Efficiency and Quality in Use) and the control variable called Global Satisfaction. The matrix shows positive correlation among the dimensions and significant values for the Functionality, the Usability and the Quality in Use areas.

	Funct.	Rel.	Usab.	Eff.	Qual.
Satisfaction	0.61	0.39	0.56	0.38	0.56

Table 2. Correlation matrix

The results of the regression model to affirms us that there is a predictive linkage only for three variables: Functionality, Usability and Quality in Use. Out of these three, the functionality is the one for which the linkage is the strongest. Reliability

and Efficiency show a negative value. The importance of the proposed linear regression model is partially validated by the F test study which is higher than 1 (13, 50) and allow us not to accept the H0: $\beta=0$ hypothesis (the absence of a linear regression linkage among variables taken into consideration) and implicitly accept the H1: $\beta\neq0$ hypothesis (the existence of a linear regression linkage among variables). Furthermore, the Adj R-squared index shows that only 52% of the total variance can be explained by the linear regression model.

Variables	Obs	Mean	Std. Dev.	Var	Min	Max
Functionality	23	3,09	0,73	0,53	2	4
Reliability	23	2,95	0,71	0,50	2	4
Usability	23	3,39	0,58	0,34	2	4
Efficiency	23	3,21	0,67	0,45	2	4
Quality in Use	23	3,34	0,57	0,33	2	4
Satisfaction	23	3,39	0,58	0,34	2	4

Table 3. Beginner users perception

The p-value indicator (that gives us information on the validity of the null hypothesis) shows us the low probabilities for the Functionality (less than 1%), the Usability (around 5%) and the Quality in Use (around 3%). The p-value for Reliability confirms the existence of a negative value while for the Efficiency we can hypothesize the total absence of relationships. Further information is be obtained by dividing the respondents into two groups. We adopted the division in two groups as a mean to identify which could be the impact on users' quality perception of the two following variables: the experience of users with the computer and the intensity of the platform usage. The scores for the two groups of users formed distinguishing between beginners and advanced are indicated in table 3 and 4.

Variables	Obs	Mean	Std. Dev.	Var	Min	Max
Functionality	36	3,14	0,59	0,35	2	4
Reliability	36	3,25	0,87	0,76	1	4
Usability	36	3,50	0,77	0,60	1	4
Efficiency	36	3,28	0,70	0,49	2	4
Quality in Use	36	3,44	0,61	0,36	2	4
Satisfaction	36	3,42	0,5	0,25	3	4

Table 4 Advanced users perception

The two groups were based on the total number of years of computer usage. The scores indicate that, on average, advanced users are satisfied more than beginners in the use of the platform. The value of the standard deviation index confirms the homogeneity for the two samples.

	Funct.	Rel.	Usab.	Eff.	Qual.
Satisfaction	0,56	0,26	0,60	0,24	0,66

Table 5 Beginners users correlation matrix

	Funct.	Rel.	Usab.	Eff.	Qual.
Satisfaction	0,67	0,47	0,55	0,47	0,50

Table 6. Advanced users correlation matrix

Table 5 and table 6 indicates the correlation matrix between the global satisfaction and the other five variables considered in this study. The first table (5) shows that, for beginner users, the variables that are mostly linked to the global satisfaction are the Quality in Use, the Usability and, as a third option, the Functionality. Data collected from this survey allow us to formulate some consideration regarding users' perceived quality of the Moodle Non-proprietary e-learning platform. On

average, the platform performed very well, because scores were quite high for all the dimensions, except one that has a lower score is the Reliability. In our sample of respondents, the regression model allow us to state that, among all considered quality dimensions, Functionality, Quality in Use and Usability are the one that are linked to the Global Satisfaction of the end user. These three dimensions cover the following aspects. The Functionality is concerned about the features in the software that should satisfy stated or implied needs. The Usability is concerned with the effort required by the software to the user in order to use its feature mainly. Finally, Quality in Use, indicates the external quality that user has perceived while interacting with the software. According to the results of our survey the user is not interested in Reliability (which covers aspects like correctness or capability to maintain an agreed level of performance) and Efficiency (which indicates the relationship between the software performance and the amount of resources used to deliver it).Investigating user's experience and intensity usage on the final quality perception we can formulate further considerations. For both groups (Beginners/Experts, High/Low usage intensity) the Functionality is a dimension that is always relevant. Adding to this there are others perceived relevant from respondents. For Beginners uses the Global Satisfaction is mainly linked to the Quality in Use and Usability (functionality has to be added to these dimensions, as indicated in the previous paragraph). Advanced Users, instead, are more aware of platform Usability. Regarding these two groups of users it has to be noticed that, on average, advanced users' perception has registered a lower score comparison with the beginners'. Since the difference between advanced and beginners has been made on the base of past experience of these two groups of users with the computer, we can say that advanced users can either be under the effect of a *de facto* standard or do not find the features they desire in Moodle. Our results say that, on average, users have a high satisfaction, but the areas that impact on perceived quality vary when the experience and the usage intensity vary. In particular: the Functionality is, among all the dimensions measured, the one that is always perceived as relevant; along with the Functionality, beginners users perceive the Quality in Use as relevant, while advanced users are interested in its Usability; advanced users are, on average, less satisfied than beginner users with the Non-proprietary Moodle e-learning platform; regarding usage intensity, intensive users are much more concerned with Functionality while seldom users pay more attention to the Usability.

VI.   Conclusion

Non-proprietary software has now reached users outside the development community and these users may have different needs than those expressed by traditional ones. There is no guarantee then that Non-proprietary software development processes can contribute a better output. Anyhow, of assuming this Non-proprietary based solutions spread in every environment, including e-learning. In this research paper we have introduced a pilot study on end user perceived quality on Moodle, a commonly used Non-proprietary elearning platform. We have investigated the end user perception by means of a survey that has been submitted to a sample of 80 users (59 respondents) who have used the platform for about one year. The end user perceptions were evaluated on the basis of the following dimensions: Functionality, Reliability, Usability, Efficiency, Quality in Use and General Satisfaction. This paper shows the relevant dimensions affecting end users' perceived quality on the Moodle e-learning platform. Moreover it represents one of the first studies of end users' perceived quality on Non-proprietary software.

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