



Use of AJAX to Improve Usability of Online Information Systems

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GJCST-C Classification : *H.3.5*



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I. INTRODUCTION

An information system allows the use of information technology to support various business operations like decision making etc [12]. Usability of an information system enables the users to perform a task accurately and completely without any frustration and improves the productivity of the information systems and may affect the success or failure of the system [6]. Usability reduces training time, data input errors, staffing requirements and staff turnover. Usability helps to improve user productivity and satisfaction [8]. Thus it becomes very important to consider usability while developing an information system.

II. USABILITY

According to Jakob Nielsen [10], usability is defined by 5 quality components:

a) Learnability

The users of the information system should be able to accomplish the basic tasks easily within stipulated time period interval at their first use of the information system [10]. The system should be easily understandable and it's functioning should be obvious. Some professionals may save themselves by giving alternatives like users will be trained for the use of information systems or help/documentation will be provided for use of the system but every user is not expected to go through training or help/documentation to perform the basic tasks. Moreover learnability is concerned about performing the basic tasks easily. Studying help/documentation should not be necessity for use of the system but should be considered as a helping tool to perform the tasks.

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b) Efficiency

The expert users should be able to perform defined typical tasks rapidly. Shortcut keys can be provided for most frequently used functionalities to improve the efficiency of the system.

c) Memorability

Memorability refers to ability of a casual user to remember the use of information system when he is away from the system for a time interval [10]. System feedback and visual cues are two methods to improve memorability. Icons, symbols and images should be used to provide visual cues to the users about the system functionality. Understandable text instructions specified in simple and short sentences can help to improve memorability.

d) Errors

The average rate with which errors appear in the system and how rapidly the users are able to recover from the errors. Proper validations should be provided to avoid errors as prevention is better than cure. On screen instructions like expected format of data etc. can also help to avoid errors. On occurrence of any error, instead of describing technical jargon help should be provided in a language understandable by the user e.g. in case of primary key violation error, the user should be explained that a particular value for the data already exists and some other value should be provided for the same data, instead of describing the technical specification of primary key violation error.

e) Subjective Satisfaction

Subjective satisfaction refers to overall satisfaction of the user in using the system. Feedback is one of the methods to determine the subjective satisfaction of the system.

III. AJAX

AJAX allows partial page update without the need of refreshing the full page [7]. Google Maps, Youtube, Gmail are certain examples of use of AJAX.

IV. USE OF AJAX TO IMPROVE USABILITY

AJAX can help to improve usability in many situations while implementing an online information system. Some have been discussed below by the author:

1. AJAX allows the partial page updates which improves the efficiency of the information system [7]. Consider a case study of implementing a search employee functionality based upon different search criteria. Out of various possible search criteria let us consider country location criteria. The country names have been displayed using check boxes. On select/deselect of a particular country check box, the displayed search results can get updated automatically using AJAX without need of refreshing the full page or waiting for the user to press the submit button. The partial page update will reduce the time taken to complete the task and thus improve efficiency of online information system. The recently updated results could have been highlighted also to let the user know the changes that have taken place.
2. While filling a form with AJAX support in an online information system, the users will get to know the validation errors in the form before actually submitting the form. Although certain validations like mandatory field validation, range validation etc. could have been implemented with only Javascript but there may be cases where data is required to be posted to server to validate the data like ensuring availability/non-availability of UserID while filling a registration form. In such cases AJAX may help to post the data to server to ensure availability of UserID and coming up with possible suggestions in case of non availability of filled UserID. Use of AJAX to perform validation at an earlier stage will help to improve efficiency and satisfaction level of users. In the above discussed example, without AJAX support, to ensure availability/non-availability of UserID, user may get frustrated if the filled UserID, tried differently multiple times, is unavailable. Moreover whenever there is a round trip from client to server and server to client, data filled in certain fields like password may get empty and user will have to fill the data every time.
3. AJAX can be used during CAPTCHA verification to allow partial page update instead of refreshing full page when the filled image characters are sent to server for verification.
4. Various AJAX Controls are available in different front ends to provide different functionalities like providing watermark on textboxes, determining password strength etc. These AJAX controls help to build a more usable and intuitive interface.

V. PROBLEMS WITH AJAX

To work with AJAX, Javascript must be enabled. So if the users of the information system, to work on, may have old browsers which do not support Javascript or browsers with disabled Javascript, AJAX features may not work properly. For such users, alternative pages

without AJAX features should be provided for better accessibility, satisfaction and thus usability.

VI. CONCLUSION

The paper has highlighted some of the real time instances where AJAX can help in improving usability of online information systems. The paper has also highlighted major problem in use of AJAX. Despite of limitations in use of AJAX, AJAX has introduced a new and successful paradigm for Web development.

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