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Methods in User Data Searches Simplified Approach to Web Searches

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ABSTRACT

The purpose of this study is to provide a solution for the unpleasant experience caused when the user wants to learn an unfamiliar word while reading online. We propose to build a cross-browser built-in dictionary extension called Word Detector. This allows the user to look for all the word details like the definition, synonym, word origin, pronunciation, etc. on the same web page in a small pop-up box. Also, Word Detector incorporates a Self-Education Component (SEC) feature which allows the users to store the difficult words and revisit them to enhance their vocabulary. For the evaluation of our prototype, we have used Two-Group Experiment method, comparing our prototype with Google's popular Google dictionary as the baseline. We assessed our prototype on three core concepts viz. ease of use, better learnability, and customization. Word Detector not only makes the user's reading experience hassle-free and quicker, it also enhances user's English vocabulary.

Keywords – Built-in dictionary, Cross-browser extension, Flash Card, Self-Education Component (SEC).

INTRODUCTION

English is an international language and understanding this language is important. Especially people whose native language is not English find this task very difficult. Also, these days the usage of Internet to know or learn about new things has become common. The problem we propose to solve in this paper would be the unpleasant experience caused when a user tries to learn a new word while reading an article or an e-book or simply anything on the web. Generally, when we come across a difficult word while reading something online, we either open a new tab or go to a web application which provides the meaning of a word. This whole process causes us to leave the current page we are working on, go to a new tab/window every time we come across a difficult word, resulting in slower reading, reduced focus, and deviation from the original task. There are similar applications such as Google Dictionary, Word Lookup, Word web etc. in the marketplace [1]. Some of the main drawbacks of the current similar applications are 1) browser-specific, 2) user needs to leave the current page of the task involved, 3) have poor dictionary content and 4) do not support all types of files such as Adobe PDF [2]. Our concept is to provide users a cross-browser application, which supports different web browsers such as Google Chrome, Mozilla Firefox, Internet Explorer etc., so that the users can use our application on any browser they prefer to use.

One of the previous studies which inspired us to provide different information for a word (definition, synonym, origin, pronunciation) was Batia Laufer's and Monica Hill's study [4]. In this study, a computer assisted language learning program was created which provides a multiple lexical information for a selected word. The study concludes that providing multiple lexical information for a word not only improves the retention of a word but also the user's interest and curiosity to learn the English language is increased. So, to improve our user's proficiency in English language, we propose a concept that allows users to view different word details such as definitions, synonyms, word origins, pronunciation, etc. just by double-clicking on the word. Also, unlike the other apps, we propose a feature known as Same Page Layout, where the user can view all the details of a word in the same page he /she is working. When a word is double-clicked, a pop-box appears which displays all the information required to learn about a new word. This would avoid the deviation from the current page and provide a quicker and more efficient reading experience.

We propose to integrate a Self-Education Component (SEC), also called "Flash Card" feature in which the user can store the words they recently looked for. This will help the users to improve their vocabulary by saving the words and revisiting them for further use which ensures better learnability. Another similar set of software that uses a flashcard feature is Quizlet. This allows users to create predefined word and definition and post it on the website [3] There are applications that gamify Quizlet to help users remember better by talking out loud. The main difference though is that Quizlet relies on users to create new sets of flashcards while ours the user can create flashcards inside their browser with updated definitions without going to external sites.

Apart from these basic functionalities, we will allow the user to customize the extension through better control settings like how to present the popup box (on double click, right click, etc.), which dictionaries to use, what word details to display in the pop-up etc. Furthermore, we incorporated several rich dictionaries such as Thesaurus, Dictionary.com, etc. into our application as they provide better linking of words. In summary, all the above proposed features were implemented in a prototype known as Word Detector a browser built-in dictionary that is not only easy to use, feature-rich, but also intuitive and offers a rich user experience.

RESEARCH QUESTION

What are the factors responsible for an online learning system to enhance the self-education component and memorization in English language context?

METHODOLOGY AND PROTOTYPING APPROACH

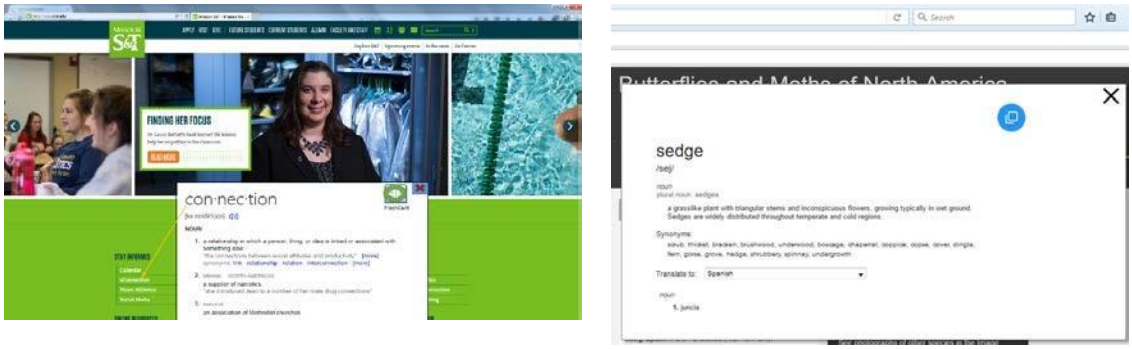
For our design methodology, we adopted an iterative prototyping approach, to establish a proof of concept [5]. Our first step in this process was a paper walkthrough which showed the basic functionalities of our prototype such as what would happen if a user clicks on a word. Our second prototype was a PowerPoint with hyperlinks that the user could click on to see the definition of that word. Our third and the final prototype is an Axure prototype which further allows the user to click on words and customize more user options. Throughout the prototyping process, objectives and goals were refined to better distinguish and improve the overall layout and design.

After brainstorming through the entire development process, only the best ideas were being implemented into the prototype. Our initial idea was to make Word Detector as a desktop application. However, this was fairly limited which did not match one of our core functionality i.e. same page layout in which the user does not lose focus by switching the frames. Limited in ways such as requiring another program to be open for the user to look at and configure the application to work properly. The main design plan behind the prototype was to create one that is simpler and more consistent than existing word searching software. Thus, we decided to make it a browser extension.

We implemented three core functionalities in our prototype, Word Detector. They are to have the 1) same page lookup,2) Better Learnability by incorporating a flash card feature (SEC- self education component) which can help the user learn new words, and 3) increased ease of use/transparency in settings. Same page lookup allows the reader to view the word information on the same web page unlike other methods of word search which includes opening a new tab and searching for the word, searching via right click with default browser or going to a dictionary website and searching for it there. The Flash Card feature allows the user to store the looked-up words in history. The Flash Cards are viewable inside the browser extension where the user can

revisit if he wants to learn or look back at the searched words. This allows the user the fastest recall time in comparison to other extensions that offer this similar feature. (Google Dictionary with word history, though to view its word history, it must be exported to a Microsoft Excel in a very complicated format).

Figure 1: Iterative prototyping, Left image: PowerPoint, Right Image: Axure



INITIAL INVESTIGATION

To get a better understanding of the current scenario, what people use to look up words, an initial prototype was built and a survey was conducted asking participants a few general web browsing question. The prototype was a paper prototype (showed how the user would click through to search for words) then it was converted into digital format through use of Microsoft PowerPoint. That version then included a sample page with words that the user could click on to bring up a word box with the definition. For instance, the survey asked what web browser they use, their preferred search engine. The PowerPoint walkthrough also included a settings page with settings that users could change and to find out which settings were relevant and which were not. The survey also included still images of the initial prototype and the participants were asked what they thought of the layout. With the feedback obtained from the initial survey, the prototype was changed to better match the user feedback.

EVALUATION

For our first prototype evaluation, we used Questionnaire to gather information from respondents as this ensures a wider reach, cost-effectiveness, anonymity, and objectivity. Since our Word Detector application is for web browsers, we chose Missouri S&T students as our participants as they truly represent the sample population. No indication was given to the participants regarding the main purpose of the prototype, which avoided hypothetical guessing.

After analysing the results for the first prototype, we decided that "Word Detector" will support three prime browsers that users use: Google Chrome (57.1%), Mozilla Firefox (28.6%), and Internet Explorer (14.3%). The results also showed that the user want word definition, synonym and word usage as the three primary elements to be seen in the pop-up box. However, we also received some negative response which was important to us and was our prime reason for our evaluation. 42.9% respondents felt that the prototype has some areas of improvement, especially for our Self Education Component (SEC) where only 57.1% of respondents felt that SEC feature was useful.

After a lot of brainstorming, we planned to implement three main core concepts into our second prototype: Customization, Ease of Use and Better Learnability. To help the user with extension-customization, we incorporated an extension menu to control the settings such as how to present the popup box (on double click, right click, etc.), which dictionaries to use, what word details to display in the pop-up. All word details being displayed in the pop-up ensured the ease of use as the user did not have to open a new window or tab to search for the word details. Thus, making the user reading experience smooth and quicker. For better learnability, we decided to integrate SEC feature where the user can store the words he/she look for and revisit them for further use or to enhance his/her vocabulary.

For our final evaluation, we decided to use the two-group experiment method, where one group tests our prototype (Word Detector) and another group tests the baseline (Google Dictionary). There were two surveys for each group, a pre-survey and a post-survey. The pre-survey was the same for both the groups. Then, they were given the same tasks to run through. Lastly, each group was given a post-survey with related questions, although with different terminology.

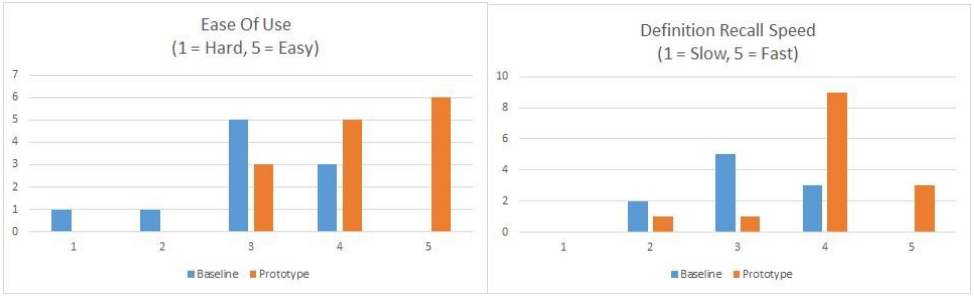
We considered a sample size of 30 for our final evaluation which consisted of random students from Missouri S&T University. We had 15 female participants and 25 male participants. The sample size was a mixture of graduate and undergraduate students, who have a minimum knowledge in English language.

ANALYSIS AND RESULTS

The tests were conducted between November 2nd and November 7th with a total sample size of 30 test participants across the two tests. In the process of analysing the collected data, we considered the data related to 23 participants and did not consider the other 7 participants data. The reason we did not consider the data of 7 participants was they had some discrepancies, which would affect our result. We had 10 female participants and 13 male participants data. T-tests were calculated on questions of interest to further test and get values.

To evaluate the effectiveness of our prototype in accordance with our goals we asked our participants to rate their perceived ease of use, its ability to aid in self-learning, and the participants' willingness to use the tool on a regular basis. By analysing the bar graphs and T-test for these questions we can see that the prototype has a clear advantage among users in all aspects.

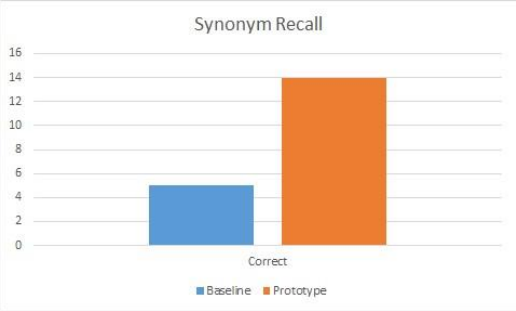
Figure 2: Ease of Use and Definition Recall Graphs



When asked participants the question "On a scale of 1-5, with 1 being hard and 5 being easy, how was the overall ease of use," A majority of users of the prototype thought that it was easier to use (M= 4.23, SD=0.69) than the baseline (M=2.89, SD=0.86); t(16)=-6.07, p=0.00. Thus, we could conclude that the evidence does suggest that our model was easier to use than the baseline tool by a significant margin.

When we asked the participants "While using the word history, how quickly were you able to recall the definition? With 1 being least able and 5 being very able" after using the tool, there was an overwhelming difference between the prototype (M=4, SD=0.67) and the baseline (M=3.11, SD=0.61); t(18)=-5.47, p=0.00. With this information, we could conclude that the evidence suggests our model allowed users to perform better at recalling definitions than the baseline.

Figure 3: Synonym Recall Graph



We asked our users to give a synonym for the word "sedge" after going through the tasks. All participants who used the prototype could give a correct answer, while only half of baseline users could.

Lastly, we asked users whether they would be likely to use the tool that they utilized in their test. Here, we saw another significant difference in the responses between our prototype (M=4.29, SD=0.37) and the baseline (M=3.2, SD=0.4); t(19)=-4.2, p=0.00. This suggests that our model outperforms the baseline example significantly in potential user return rate. Though we performed the analysis on a smaller sample size of 23, we got what we expected to achieve in this paper.

LIMITATIONS

Since the initial planning and design of the Word Detector extension, a few limitations existed in the realm of the prototypes. The primary limitation is the inability to provide a right click while selecting a word in the two digital prototypes (PowerPoint and Axure). The original plan was to have the user select a word, then right click the selected word which opens a context menu for the selected word. Afterward, the user could click a button relating to the Word Detector extension which pops the definition box. To overcome this in the prototypes the user simply should click on a word which displays the definition box relating to that word which makes it efficient for the user to click through. There are some downsides to this, though, the user could accidentally click on a word that they already know and do not want to see the definition. The user could try to click a hyperlink which may follow the link and not display the definition box.

Another limiting factor in the prototype design was that the words in all the scenarios were static and not realistic. The definitions came from a preselected range of words on the webpage that would be used in the prototype. Though the scenarios were designed around those specific words, asking them to search and click their way through the prototype and report back the results.

CONCLUSION

We believe that our prototype is a better alternative than its present competitive applications in the marketplace. Our main evaluation criterion was to examine our prototype on three key measures: ease of use, better learnability and quick response with least hindrance possible resulting in smooth and better reading experience for the user. It is our belief that the prototype we have created fulfils these requirements by incorporating features such as Self Education Component, same screen word information availability and customized control settings. Giving control to the user increases user engagement and thus, they are more likely to use the app. The SEC feature will be extremely useful for people whose native language is not English and are actively trying to learn it. Overall, Word Detector is a cross-browser built-in dictionary that is intuitive, easy to use and provides a smoother, hassle-free and better reading experience. In future we would like to test the prototype's actual website by considering two specific user groups such as one group for whom English is the primary language and the other English is the secondary language. Also, we look forward to comprehend to what extent an online learning system can enhance one's self education component and memorization.

REFERENCES

1. Gruenstein, A., McGraw, I., & Sutherland, A. M. (2009, September). A self-transcribing speech corpus: collecting continuous speech with an online educational game. In *SLaTE* (pp. 109-112).
2. Laufer, B., & Hill, M. (2000). What Lexical Information Do L2 Learners Select in a CALL Dictionary and How Does It Affect Word Retention?.
3. Nunamaker Jr., J.F., Twyman, N.W., Giboney, J.S., and Briggs, R.O. Creating High-value Real-world Impact through Systematic Programs of Research. Management Information Systems Quarterly (2017)
4. Retrieved from https://chrome.google.com/webstore/detail/google-dictionary-bygoog/mgijmajocgfcbeboacabfgobmjgjcoja/reviews?hl=en
5. Retrieved from https://play.google.com/store/apps/details?id=com.icechen1.wordlookup#detailsreviews