

Project created on 09.09.2016 00:08.

Report for project Senior Design

Task created on 04.11.2016 03:52.

Evaluate User Interface Solutions

No due date

We will investigate the User Interface of similar existing products as well as principles and steps these designers followed to ensure the final product is both visually appealing and functional with options like color, font size, spacing, and etc. chosen to maximize the attention and ease of engagement of the children without being overwhelming or a contributor to additional disruption.

Task tags: *No tags*

* Research on User Interface Design Created by Tong Yu on 04.11.2016 03:57.

Source 1: Large, Andrew, Jamshid Beheshti, and Tarjin Rahman. "Design criteria for children's Web portals: The users speak out." *Journal of the American Society for Information Science and Technology* 53.2 (2002): 79-94.

This study used a focus group of boy and girls from 10-13 years old to investigate what they found appealing and unappealing about four different websites targeted toward their age group: Ask Jeeves for Kids, KidsClick!, Yahoo!igans!, and Lycos Zone. The first three are search engines, just sub-website of their adult counterpart like Ask.com and Yahoo.com. Lycos zone, intended for age 3-12, is a website that features link to 16 contents and also to other websites. The contents are selected by the teachers to fit the in class materials, and there is a directory of subjects like math. Lycos Zone is of interest to our group because it works like a storyboard and the user can navigate materials on the web much easier, but the preference of the kids on all aspects of these design parts and websites are of interest in our own design.

The experiment dealt with factors contributing to a "successful design" from the children's perspective. First off, the website name is very important. It has to be catchy, relevant, and highly visible on the website. For example, Lycus Zone did not have a strong name presence because there were too many graphics that overshadowed the title.

In general, the children especially enjoyed colorful background and foreground, animation, and a dramatic, very eye catching design. For example, KidClick has a more simple layout compared to the other three, and the children found this design boring. For the background, white should be avoided. However, problems arise with color because what is deemed "attractive" depends on each child's preference. Gender must be considered because girls and boys not only liked different websites but may prefer different color schemes. Therefore, the option to have customizable layout background and color (such as in gmail.com) should be considered.

Larger fonts are favored, and the kids wanted an incredibly heavy amount of animations. It is also important to associate icons and navigation images with something the children have ease of recognizing. For example, Ask Jeeves uses the Reginald Jeeves character, the valet from a series of famous books. The children could not understand the reference, and suggested using dogs as mascots instead.

The children prefer less layers when searching through the sites, and when searching by typing, they preferred doing single word searches rather than complete sentences. Layout should be done to maximize ease of retrieval, and ads should be avoided.

Source 2: Kamaruzaman, Muhamad Fairus, et al. "Developing user interface design application for children with autism." *Procedia-Social and Behavioral Sciences* 217 (2016): 887-894.

This source dealt with the design of TaLNA app, an assistive app for children with autism to learn simple math concepts like counting from 1 to 10. While this is a touchscreen app on mobile phones and our own project may not end up with the same platform, this source includes important design guidelines and step-by-step process in its development of the User Interface which is valuable to our own project design.

The designers followed 9 steps in the development of this app. The app had multiple tasks for the user like "Recognizing the Number" where they have the option to learn 1-5 or 6-10, so inserting customizability in the content choice here. Furthermore, all of these are triple reinforced through visual, word, and voiceover. During the design process, it is important to research existing interfaces not only to brainstorm ideas but to measure the effectiveness / success of the UI later on, based on how often the users prefer to use this novel product compared to the other ones.

The designer of this app followed 5 important design principles, all of which our group is interested in following. First, is "Clustering Principle", which states that buttons or items on the page with similar functionality should be grouped together to increase ease of navigation for the user and also to enhance the user's recognition and learning of the layout of this app. Second is "Visibility Reflects Usefulness". Basically, functions that the user uses frequently will be brought up easier and become more visible, whereas the less used ones will be hidden. This is done to increase the efficiency, and to make the design less messy as well. Third is "Intelligent Consistency Principle", which states the designer should create a layout for the whole app, and then only tweak slightly for different subparts of the app in order to increase consistency. Fourth is "Colour as a supplement", which states color should be used to emphasize info. For example, in the task of counting from 1-5, the numbers are in dark blue which the background is bright orange. This high contrast design emphasizes the number to the user. Lastly, "Reduce Clutter" says the simpler the design, the better.

There is a slight disagreement about UI between these two sources. The latter paper stresses the importance of efficiency, decluttering, and simplicity of design. However, the first paper with the focus group suggests children like bright, more complicated design with tons of animations. The difference could be due to the fact the first paper is with developmentally normal children whereas the latter is specifically for autistic children, and therefore need to be less distracting than for normal users. Nevertheless, the ease of navigation is critical, as is the consideration

of bringing out certain parts of the layout (like title of website or more frequently used features) more prominently based on the user interaction history. Finding a middle ground between simplicity and engaging design must be done to ensure the design is not too overwhelming but still aesthetically appealing for the children's taste. Customizability is a possible resolution to the difference in user's design preference.

Task created on 04.11.2016 04:19.

Evaluate Symbol Systems Solutions

No due date

Many of the special needs students that we are working with are non-readers, or have very weak reading ability. In order to compensate for that, we will need to use symbols and pictures along with words in our interface so that it is able to be used by the children. There are many picture systems that have been developed for augmentative and alternative communication (AAC) devices, and we will consider the advantages and disadvantages of each of them to decide which one to use, or to create one ourselves for the interface.

Task tags: *No tags*

* Sclera Symbol System Created by Yanlin Ho on 04.11.2016 04:21.

The Sclera symbol system was developed by a Belgian program for students with cognitive disabilities, similar to the special needs students we are working with at Southview School. The benefit of the Sclera system is that most of the symbols are designed as a black on white symbol system. This was designed with the benefit of colour-blind students and students with other visual disabilities in mind. This could be helpful in the program if we decide that accommodating for colour-blindness is very important. However, at the same time, it will be hard to use this symbol system in conjunction with any other symbol system, because the two-colour or black and white scheme for the Sclera symbols clash very badly visually with the other proposed symbol systems.

Source: <http://www.sclera.be/en/vzw/home>

* Widgit Symbol System Created by Yanlin Ho on 04.11.2016 04:21.

Widgit symbols are developed by Widgit Software. This symbol system uses more cartoon-style drawings to represent concrete concepts such as "apple" or "house", but uses some logical symbols as well for more abstract concepts such as using a plus sign to represent "and". This could be useful in some areas of the program if we incorporate stories, where these more abstract concepts need symbols to represent their meanings as well. However, this would also need more testing with the special needs students and the teachers to see if the children are able to associate these abstract symbols with their meanings, or if we should stick with using symbols that represent concrete concepts.

Source: <http://www.widgit.com/index.php>

* DynaSyms Symbol System Created by Yanlin Ho on 04.11.2016 04:20.

DynaSyms was created by Poppin and Company, and mainly aims to use more

realistic drawings to convey different meanings. DynaSyms is interesting because not only are there over 5000 symbols in the system, different symbols can be combined to create more meanings. The DynaSyms symbol system can also be used in Boardmaker, and therefore also together with the PCS symbol system. This could be helpful if the PCS symbol system is insufficient in providing enough symbols for different buttons and words in the interface of the program.

Source: <http://languagesymbols.com/dynasyms.html>

* Picture Communication Symbols (PCS) Created by Yanlin Ho on 04.11.2016 04:20.

The Picture Communication Symbols were developed by Mayer-Johnson, and is used in many of the products developed by that company. The entire symbol library includes over 12,000 symbols, and can be used both in low-tech devices such as laminated communication boards, or more high-tech programs such as Dynamyte. Mayer-Johnson also provides a program called Boardmaker that allows a user to create their own board using Picture Communication Symbols. While this is helpful, it is most likely not useful in regard to the project, since we will not have to be creating our own communication board. However, the overall symbol system is encouraging, especially since the Southview Special Needs School already uses this picture system in some of their classroom work.

Sources: <http://www.mayer-johnson.com/category/symbols-and-photos>
<http://atcoalition.org/article/picture-symbol-systems-aac>

Task created on 28.10.2016 03:37.

Evaluate Data Storage Solutions

No due date

Any data that we will need for the application will need to be kept somewhere. We need to evaluate both how the data is stored, and where the data will be stored in order to decide on a final program or solution for data storage for this project.

Task tags: *No tags*

* Mongo DB Data Storage Research Created by Carlie Abraham on 04.11.2016 04:44.

Data Format

Data is stored in documents. Documents are data records in BSON format, a binary representation of JSON. The data is stored in field value pairs similar to JSON data. The value of any field can be of any of the BSON data types (listed below), as well as other documents, arrays, or arrays of documents.

Documents that are stored in a collection require a unique `_id` field that acts as a primary key for the document. If this `_id` is not specified, MongoDB uses `ObjectId`s (defined at the creation of the data) instead.

BSON Data Types:

Double, String, Object, Array, Binary Data, Undefined, ObjectId, Boolean, Data, Null, Regular Expression, DBPointer, JavaScript, Symbol, Integer, Timestamp, Min key, Max key

Common Query Selectors

\$eq (equal to), \$gt (greater than), \$lt (less than), \$lte (less than or equal to), \$gte (greater than or equal to), \$ne (not equal to), \$in (match any value in array), \$or, \$and, \$not, \$nor, \$mod (mod operator), \$regex (match regular expression), \$text (perform text search), \$where (match documents that satisfy JavaScript expression), \$elemMatch (select documents if element in array field matches all specified in elem match conditions), \$size(size of array)

* SQL Lite Data Storage Research Created by Carlie Abraham on 04.11.2016 04:43.

Data Format

Data is stored in table format as a relational database. Data is usually stored in key value pairs, where the key is some unique identified of the data, and the value (or values) is other data associated with the key.

Data Types Available

CHARACTER (fixed length string), VARCHAR (Variable Length string), NCHAR (fixed length character, internationally compatible), BIT (Array of bits, fixed length), BIT VARYING(array of bits, variable length), INTEGER, SMALLINT, BIGINT, FLOAT, REAL, DOUBLE PRECISION, NUMERIC (with precision and scale), DECIMAL(with precision and scale), DATE, TIME

Data Operators

= (equal to), <> (not equal to), > (greater than), < (less than), >= (greater than or equal to), <= (less than or equal to), BETWEEN, LIKE, IN, IS, IS NOT DISTINCT FROM, AS

Data Table Query Operators

FROM (retrieve data from specified table), WHERE (comparison predicate), GROUP BY (groups rows by certain property into sets), HAVING (filter rows by property), ORDER BY, SELECT

Task created on 28.10.2016 00:53.

Evaluate Platform Solutions

No due date

Platforms are the method of website hosting. They range from cloud-based solutions to website builders. Platforms are evaluated on the cost of hosting, the flexibility of website construction, and the platform security. Cost of hosting refers to the cost of holding the website domain name, as well as the cost of any website building tools the platform has. These costs are normally on a subscription basis. Because of this, costs will be evaluated on a year basis. Flexibility of website construction describes how well a website platform will allow custom code. Some website tools (such as weebly) are great at constructing websites quickly and efficiently with their pre-made themes and content. However, our project will involve more specific code and plugins that require custom code. Any website platform we will use shall need to accommodate this. Thus, a website builder or hosting platform must need to have a more customizable website building tools. -Security refers to how secure our data/custom code will be on a website platform. There may be student or teacher-specific information stored on the website, and this information must be protected. Thus, each hosting option shall be evaluated on

their security.

Task tags: *No tags*

Platform Pugh Chart Created by Carlie Abraham on 28.10.2016 01:05.

	A	B	C	
1	Category Description	Weight	AWS / LAMP / DNS	A / B / C / D
2	Cost of Platform	8	7	7
3	Cost of Domain Name Aquisition	6	5	5
4	Flexibility of Custom Code	9	10	8
5	Security	10	10	10
6	Interoperability between Platform and Data Storage	10	10	10
7	Total Weighted Points	430	376	350

* Pugh Chart Analysis Created by Carlie Abraham on 04.11.2016 04:05.

Different platform options are being evaluated on the cost of the platform (in years) based on the following scale: \$30 and Below: 10, \$40 and Below: 9, \$50 and Below: 8, \$60 and Below: 7, etc.

Cost of domain name acquisition is evaluated on the following scale: \$0: 0, \$0.01-\$20: 5, \$20.01+: 0 Cost of domain name is separate from the cost of the platform. In the case of bluehost, domain name acquisition is included in the cost of the platform, so the extra cost of the domain name is considered to be 0.

Flexibility of custome code scoring was done qualitatively based on extra steps needed to allow custome code. In the case of the LAMP stack on Amazon Web Services, custom code is very easy to include in any website. It requires no external outlets or API's to integrate with custom code. Thus, it gets a 10 on this scale. For the cases of Wordpress on AWS and Bluehost, custom code, while possible, requires some extra API's and external plugins, and therefore gets a lower score of 8 in this category.

Security refers to both the data protection of a website, and the settings control of a website. Amazon Web Services gives more control over to the user over administrative and security features, and therefore will receive a 10 in this category (for both the LAMP stack and wordpress options). Bluehost, while keeping data secure, gives the user less access to the security features, and thus gets a 8 in this category.

Iteroperability between platform and data storage options refers how readily available different data storage options (such as SQL Lite) connect to the platform. Amazon has ensured that easy connection between SQL and noSQL database options, whereas for Bluehost it requires some extra plugins to connect to the data storage. Thus, Amazon gets a 10 in this category while Bluehost gets a 7.

Overall, the scores for platform selection are very close as the options available have many features that would enable our group to make a website with custom content. However, the AWS LAMP stack offers the most flexibility and control to our team. This is very beneficial to us, as we will need to write custom code to meet our clients need.

