

Project created on 09.09.2016 00:08.

Report for project Senior Design


Task created on 28.10.2016 10:05.

Evaluate Device Solutions

No due date

The device must be carefully chosen in order to best optimize the resources available and consider the benefit of each to give us a better starting point for the production of our product. We investigated and compared the different devices (laptop, tablet, and mobile phone), their benefits to children's learning, as well as the pros and cons of these interactive multimedia devices compared to the traditional in-person instructions given in schools. Furthermore, we compared the iOS versus Android and also website versus app.

Task tags: *No tags*

 Pugh Chart for Device Solution [*correct_pugh.jpg*]

Uploaded by Tong Yu on 11.11.2016 03:49.



* Analysis of Pugh Chart Result Created by Tong Yu on 11.11.2016 02:17.

The availability to the client is incredibly important, since our proposed solution will be used inside the school. Not all the students have personal mobile phones, and while some therapists do have tablets, these are not widely available either for the students. However, there are computers in many of the rooms, and are available to both the students and the teachers.

Display is also important because the product must be both visually appealing to the students and also large and clear enough so that any students can see and understand the materials easily. While tablets have better display quality, laptops have wider screens. Both are equally rated on the display criteria. However, mobile phones have small screens that are hard to see and thus is the least suitable. The cost of the device must also be taken into account. While there is variability in the cost when considering different brands (Apple versus Asus, for example), in general tablets and mobile phones are cheaper than laptops.

For storage, laptop wins by a landslide in terms of GB while mobile phones and tablets have much less GB. For connectivity, laptop is also the best option because there are multiple USB ports, while mobile phones usually do not have many options for plugins like switches and tablets also have a limited set. Mobile phones and tablets have better battery life than laptops, but laptop has the greatest RAM, which allows for better multitasking.

Overall, from this Pugh Chart analysis, we have found that laptop is the most suitable

device for this project.


Task created on 11.11.2016 02:06.

Create mockup designs

No due date

These are preliminary mockup designs for the website. As we do more research and receive more feedback, these designs will be refined until one is chosen as the final design. The mockups were created using a free online program called NinjaMockup.

Task tags: *No tags*

 Mockup Idea 1 [*Senior_Design_Mockup_Idea_1.jpg*]

Uploaded by Yanlin Ho on 11.11.2016 02:06.



Comments for result Mockup Idea 1

Yanlin Ho on 11.11.2016 at 02:11: This mockup shows a sample page layout for an unregistered user on the website. The activities are grouped by categories (music, video, news, and stories), and the user can switch between categories easily using the tabs. The idea behind this design is to keep the number of clicks required to get to an activity to a minimum, because the teachers feel that the special needs students will lose focus quickly when the activity takes too long to set up. However, the downside to this design is that the active used space on the screen is limited to only the window in which the activities are.

 Mockup Idea 1 (Signed in) [*Senior_Design_Mockup_Idea_1.1.jpg*]

Uploaded by Yanlin Ho on 11.11.2016 02:12.



Comments for result Mockup Idea 1 (Signed in)

Yanlin Ho on 11.11.2016 at 02:13: This mockup is identical to Idea 1, but shows the options in the top right corner for if a teacher logs into their profile. It would allow them to set up a schedule of activities, set up a profile for interaction with students and other teachers, and change between background themes and other accessibility needs in the settings

 Mockup Idea 2 Home [*Senior_Design_Mockup_Idea_2.jpg*]


Uploaded by Yanlin Ho on 11.11.2016 02:15.



Comments for result Mockup Idea 2 Home

Yanlin Ho on 11.11.2016 at 02:21: This is the home page of the second mockup idea. The user can sign in on this page, or if they don't want to or haven't yet created an account, they can go straight to the activities by selecting one of the four categories. The background of this homepage

would include some moving animations, with the idea that the teacher would be able to bring this page up and still keep the students interested while they were doing something else, or to prevent a student being too bored if they were tired of doing other activities. Having a homepage also serves as a more traditional website design than just jumping straight to selecting activities. The downside to having a homepage is that it is another navigation step that the teacher would have to go through before getting to the activities

 Mockup Idea 2 Activities [*Senior_Design_Mockup_Idea_2.1.jpg*]

Uploaded by Yanlin Ho on 11.11.2016 02:21.

 Comments for result Mockup Idea 2 Activities

Yanlin Ho on 11.11.2016 at 02:26: This is a sample activities choice page for the second mockup design. The left sidebar will remain static as the user scrolls through the different options, and allows for quick navigation to another category, or back to the homepage. The benefit of this design is that it makes much more effective use of the screen space, and allows the placement of items to be more spread out. This is helpful for special needs students that have problems controlling motor movement. This design also makes better use of empty space so that the page looks simpler and less cluttered.

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*

 MariaDB Data Storage Research Created by Carlie Abraham on 11.11.2016 03:27.

Maria DB

Maria is a relation database. It was created by the same people who worked on the original versions of SQL tables, and thus has many of the same features and qualities. For example, most of the same data types available for SQL tables are available for Maria DB tables. It has the exact same SQL structure of storing and inserting data.

Data Types Available (You'll notice that many of these data types are also data types of SQL tables)

CHAR (fixed length string), VARCHAR (Variable Length string), NCHAR (fixed length character, internationally compatible), BIT, INTEGER, SMALLINT, BIGINT, FLOAT, REAL, DOUBLE PRECISION, NUMERIC (with precision and scale), DECIMAL (with precision and scale), DATE, TIME, DOUBLE PRECISION, MEDIUM INT, BLOB, TINY BLOB, TEXT, LONG TEXT, ENUM

Additionally, Maria DB has the same basic SQL commands for manipulating data. Here is a few examples of those commands:

CREATE DATABASE, DROP DATABASE, USE, CREATE TABLE, DROP TABLE, SELECT, INSERT, UPDATE, DELETE, REPLACE, TRUNCATE, WITH, IGNORE, UNION, DO

However, Maria DB also supports commands and interfaces that are more similar to NoSQL databases. These commands would be unavailable if a SQL database is used. Below is a few of these commands and their uses:

HANDLER: Handler is a command similar to SELECT, however it gives direct access to reading rows from tables. This command is faster than select, as less parsing and no optimizer is involved, as with SELECT.

HandlerSocket: This gives the user direct access to the InnoDB/XtraDB engine and SPIDER. By default, MariaDB uses the InnoDB storage engine, which is derived from XtraDB. InnoDB is designed to scale better on modern hardware, and is suited for high performance data storage. It is more scalable than XtraDB and is more efficient at memory storage. SPIDER is a storage engine that supports the partitioning of MariaDB tables onto separate instances. It creates a server that acts as an access point for multiple MariaDB databases on multiple devices/instances, and allows the user to access separate tables together. Because we do not expect our data storage to require more than one instance, these features are good to note (if expansion is every considered), but not necessarily a benefit for our project.

CONNECT: The CONNECT storage engine allows MariaDB to access external, local, or remote data. This is accomplished by using compatibility drivers (ODBC – Open Database Connectivity, and JDBC – Java Database Connectivity), which can integrate with other database systems. It can also connect to products such as Excel to pull data from local sources.

Dynamic Columns: This feature of Maria DB allows the user to store different sets of columns for each row in a table. Essentially, a set of columns is stored in a blob, and a set of functions manipulate the data. The use case for dynamic columns is when items that need to be stored have different attributes or properties, and the size of these attributes is very large or unknown.

Comparison of MariaDB and SQL:

MariaDB has all of the main functionality of SQL. So why is MariaDB different from SQL? A few reasons. One, MariaDB is open source, and therefore is more transparent with bug fixes and updates. Two, it is more compatible with other storage engines via plugins and drivers. The connections can be to SQL or NoSQL based databases. Three, MariaDB claims that it has a more optimized query engine, which can perform database queries faster.

All of that being said, the database community still has more people using SQL databases over MariaDB because it is older and more stable. More resources would be available for SQL databases over MariaDB, as MariaDB is comparatively new.

Sources: <https://mariadb.com/kb/en/mariadb/spider/>
<https://mariadb.com/kb/en/mariadb/nosql/> <https://mariadb.org/learn/>
<https://mariadb.com/kb/en/mariadb/sql-structure-and-commands/>
<https://seravo.fi/2015/10-reasons-to-migrate-to-mariadb-if-still-using-mysql>
<https://mariadb.com/kb/en/>

☒ Data Storage Pugh Chart Created by Carlie Abraham on 11.11.2016 03:43.

	A	B	C	D	E
1	Category	Weight	SQL Lite	MariaDB	MongoDB
2	Data Types Available	10	9	9	10
3	Connectable to Website	10	10	10	10
4	Query Speed	3	5	8	8
5	Drivers for Data Transfer	6	10	10	8
6	Flexible Data Storage Patterns	8	8	9	10
7	Total	370	329	346	346

* Pugh Chart Analysis Created by Carlie Abraham on 11.11.2016 04:10.

Data types available refers to the kinds of data that is able to be stored in the database. In this case, because SQL and MariaDB are both based on the same foundation, they have the same data types. MongoDB has all of the same data types as SQL, with the added function of an array data type. Thus, SQL and MariaDB get a slightly less score than MongoDB.

I did some research on how to install and run these database servers, and all of them are compatible to run on a linux-based server, which is what we will need to connect to our website. Thus, all databases get full scores for this category.

Query speed is based on some research into comparative query trials. MongoDB was found to be much faster than SQL databases, and MariaDB was found to be slightly faster than SQL. Thus, MongoDB gets the highest score and SQL gets the lowest score.

Drivers for Data Transfer refers to the plugins or data connectivity drivers that allow other databases or programs to interact with the data from the database. Because of how developed and ingrained SQL is in the data storage community, it has many compatibilities with other programs. MongoDB, which is not used as often, gets lower marks in this category, as it does not integrate with as many programs.

Flexible data storage patterns refers to how data can be stored in the database. Both SQL and MariaDB are relational databases, and thus has a more structured data storage pattern. MongoDB can store data in JSON-like documents, and thus has more flexibility of how to store data in different patterns, and gets higher scores in this area. MariaDB also has a slight edge over SQL as it can support Dynamic Columns.

Overall, SQL has the most limitations, as shown by the pugh chart. However, MariaDB and MongoDB have tied. MariaDB had more driver connections, but MongoDB has more flexible data storage options. In the end, we will most likely go with MongoDB because of its flexibility. This might change with further information.