

Guiders hub

B00637513



2016 - 2017

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Course: Computing Science

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**Chapter 1 - Literature Review**

* 1. **Introduction** 
     1. *Project background*

Girl guides is a scouting organisation for girls and women. It is quite similar to the scouting organisation for males and it is a worldwide organisation, operating in 145 countries. It is the largest voluntary organisation in the world. Within the UK there are a number of different guiding organisations that are running in local communities.

There are a number of local guiding units situated throughout Northern Ireland and these units are set up for girls and women in the community. The Guiders Hub will be a web resource for one local unit situated in West Belfast. The girl guides run a number of programs and activities to help with the development of a young person. They take part in summer camps and other outdoor activities, so it is essential that the parents have all details about the activities and its location. Throughout the year they have, a number of fundraising events and ceremonies such as award nights and enrolments, where members receive their scarf’s and badges. These events take a lot of organisation and it would be beneficial to share the information with all parents and members so they can confirm attendance.

Many units are relying on social media and other communication apps to connect members and parents. Examples of these include Facebook, what’s app and text messaging. There is no central resource used for communication, which means that information sent out to parents may differ.

Facebook is used to post news and photographs of what is going on in the local guiding unit, but as we are aware not every person is a member of Facebook and only those who have an account are able to access the guides own personal profile. Therefore, members that do not check Facebook regularly or are not Facebook members will miss out on information relating to the unit. The local units Facebook page is set to private so non-members cannot gain access, as there are 1.71 billion Facebook users currently active in 2016. (Statista, 2016). Therefore, personal or sensitive information relating to the local unit will not be viewed by users who have not been given access to view the contents of the profile.

Many parents have not grown up in the era of the smart phone so many may not have access to any device or are familiar with current apps. For example, Facebook messenger and what’s app. Therefore, those who have no access to such apps are excluded from this form of communication.

Any paper based documents sent to parents and members such as news articles and weekly updates have their disadvantages. Using copious amounts of paper is harmful to the environment, which goes against the guide’s ethical contract. One of the main disadvantages with the guides using a paper-based system is the lack of storage. The area, in which they store their records and permission slips etc, is very poorly organised. Therefore, if anyone needs extra copies about events, then the leader, who is in charge of typing up the documents, has to go home and search for that particular item on their pc. The guides rely on funding and fundraising for money to keep the place running. Paper, printers and stationary can be very costly, this money could be spent elsewhere that would be more beneficial for the young people.

*1.1.2 Project Aims and objectives*

The aim of this project is to develop an online resource that will incorporate all forms of communication together for a local girl-guiding unit. In addition, to create a social hub filled with information and photos for registered members of the organisation.

Objectives

1. Undertake a literature review to establish an understanding of the project.
2. Conduct thorough research into the current systems in the market that resemble the Guiders Hub.
3. Gather a reasonable amount of functional and non-functional requirements, by using appropriate methods to gather information.
4. Research technical solutions and provide a rationale for the choices made regarding software, languages and applications.
5. Choose software development process that will help schedule tasks in a specific order.
6. Establish the possible risks associated with the project and try to develop an appropriate way to mitigate the risks.
7. Implement a fully functional rich internet application that is fully secure.
8. Implement a database to store the appropriate information.
   1. **Market Research and existing solutions**

To make the web application more appealing to the users and to meet the customer’s needs it is advised to carry out methods to gather requirements. Requirements gathering can be carried out using interviews and questionnaires. To see which features to add into the application it would be best to speak to parents, leaders and members of the organisation.

* + 1. *Existing applications*

Guiders Hub web application will fill the current gap in the market. Despite the range of applications catered for the girl guides, none combats the issue of communication. These applications keep records, track progress, and are valuable resources to guiding leaders. Although no application has been developed for all those involved within a guiding organisation such as leaders, parents and members. (Moreau, 2016)

Google play store have a number of applications associated with girl guides and scouts. These applications share very few similarities with the Guiders Hub.

* Girl Guides Canada – Provides members and parents access to online badge trackers, calendar features, cookie selling and registration. The average rating of this application is three and a half stars.
* WAGGGS- WAGGGS stands for World association of girl guides and girl scout. This application is categorised as travel; the application provides users with information about the organisation as well as showing places of interest within London. This application targets members who are visiting London to see one of the World headquarters for girl guides. (GuestU,
* 2016)
* A girl guide of Trinidad – This application educates members on first Aid, provides information about guiding, has an online shop as well as some features similar to Guiders Hub for example chat and events. The average rating of this application is 3 stars.
* Scouts – This application provides users with recent news, videos and pictures of the scouts on an international level as it was developed for the World Organisation of the scout Movement. The average rating of this application is 3 and a half stars.
* Other applications on the Play store are badge trackers, which help users keep track of what badges they have or need. It also gives information on where to place the badges on the uniform.

Applications currently in the Apple market:

* Girl guiding Canada – This application is similar to the application available of the Google Play store.
* There are not as many applications on the app store; this may be because it can be expensive to publish apps on the Apple store.

Websites Available for girl guides and scouts: Images in appendix

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Features | | | | | |
| Applications | Login | Communication | Gallery | Event page | News feed | Personal profiles |
| World association of girl guides and girl scouts |  |  | x |  |  |  |
| Girl guiding Canada | x |  | x |  |  | X |
| Online guide manager | X | X |  |  |  |  |
| SendHub | x | x |  |  |  |  |
| compass | x | x |  |  |  | X |
| Slack | x | x |  |  |  | X |
| Scouts |  |  | X |  | X |  |
| Girl guides of Trinidad |  | X | X | X |  |  |

**1.3 Mobile web versus Native mobile applications**

*1.3.1 Mobile websites versus Native mobile applications*

Mobile websites are responsive webpage’s that are designed to be scaled to fit the screen dimensions of smart phones and tablets as well as touch screen capabilities. Mobile webpage’s are accessed through mobile browsers for example, IOS use Safari and Android devices typically use Google Chrome. (Angeles, 2014). Mobile applications are designed specifically for small, wireless devices such as tablets and smart phones; they are developed for use of specific devices and platforms. Mobile applications are installed on to devices, they can be found on the AppStore for IOS users and Google play store for Android users.

* + 1. *Benefits of a mobile website*

The main benefit of having a mobile website is that users can access websites at any time and it will not have an impact on their experience. These websites have the same elements as the normal desktop versions such as the content, images and style, with improved readability. Although the functionality is tailored for Smartphone’s and tablets such as touch screen and screen rotations. There are no updates, installations or downloads, which improves users experience.

* + 1. *Benefits of a native mobile application*

Installed applications have more control over their presence on the device, although applications that are not currently running still run in the background and gather data about the user’s behaviour. The application can send push notifications to the user to remind them or prompt them to use the application; this cannot be achieved on a mobile website. Mobile applications are more accessible that a mobile website, as it only requires the user to tap once on the app icon.

|  |  |  |
| --- | --- | --- |
|  | Mobile website | Native mobile applications |
| Immediacy | Instantly accessed through mobile browsers on across devices. (IOS, Android, Windows) | Apps must be downloaded and installed from app store before the content is accessible.  A significant barrier between initial engagement and action/conversion. |
| Compatibility | Mobile websites have a wide range of users from different platforms. | Separate apps must be developed for each platform. |
| Upgradability | Websites are more dynamic and updating the content can be more flexible. Updates are instant. | Updates are pushed to the users and they are required to download and installed in order to update. |
| Life cycle | Mobile websites are always available for users | Apps can lose their appeal and according to a study conducted by Adobe, an apps lifetime is 6 months after its release. (Fried, 2015) |
| Time and cost | More cost and time effective. | To support different operating systems requires the development of multiple apps. OS updates require developers to update apps frequently. |
| Maintenance | Maintaining a website over time is less costly. | Maintaining apps can be more expensive due to compatibility issues, testing and upgrades. |

(Summerfield, no date)

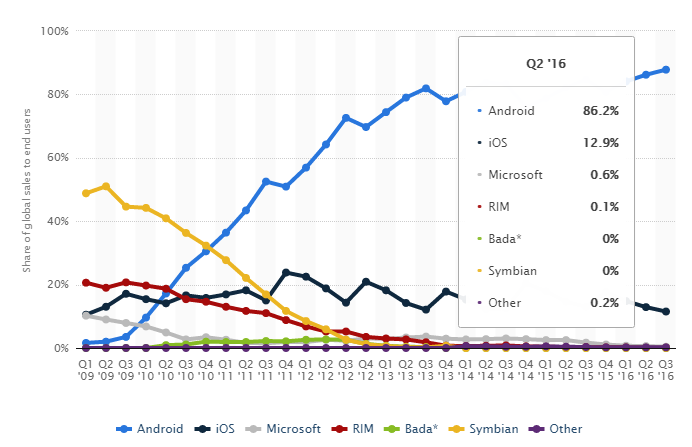
* + 1. *Conclusion*

Due to time restraints, I have concluded that it would be most beneficial to create a mobile website rather than a native mobile application. There are pros and cons about both applications but the main reason for developing a mobile website is that it is available to all mobile operating systems. I will not have to build numerous native mobile applications, which will inevitably take up a lot of time.

Figure 2 shows the leading Smartphone OS currently in the market, from the 2009 to 2016. By the end of 2016, Android had risen to 87.8% while IOS had fallen to 11.5%. These are the main OS used today, meaning that if I were to build an android application I would be excluding the 11.5 % of IOS users and vice versa. (Statista, 2015)

According to (editor \_goodworks, 2015) web applications are mainly use for social networking sites because of the simplicity and ease of use.

Another reason for creating a mobile website is due to the lack of resources that I have. The current phone that I am using at the minute is an iphone 6, which is currently using IOS. To create an IOS application I would have to pay(Mackenzie, 2012). If I were to build an android application is would be free of cost but I don’t own an android device so I would therefore have nothing to test on.

*Figure 2. (Statista, 2015)*

* 1. **Technical solution** 
     1. *What is an RIA?*

Rich internet applications (RIA) are web applications that share similar characteristics of desktop application software. RIA’s offer better user experience than the traditional web applications that use mainly HTTP and HTML, they are more visually appealing and interactive for users. They are, “the next generation in the evolution of web applications” (Eden IT Services Division, 2009).

RIA provides benefits to businesses as it broadens the interaction between the application and end user. They provide an easy and simply solution to reach out to millions of users. It increases the accessibility of the website, as they can be used anywhere.

* + 1. *RIA vs Traditional websites*

|  |  |  |
| --- | --- | --- |
|  | Rich internet application | Traditional web applications |
| Offline connectivity | RIAs can be accessed when the user has lost connectivity but only if the app can retain its state on the local machine. | Traditional websites must have |
| Presentation | When designed as one central interface RIAs can work best.  Data binding – reduces code, errors.  Well made RIAs can have a WOW effect on the end users. | Multi page sites require developers to link pages together. |
| Interactivity | RIA has many more assets such as video, audio, graphic, effects and transition. Meaning there is a lot of interaction between the app and the end user. | Traditional sites are mainly text based, with some images. Reply on third party service to render videos e.g. Youtube. |
| Rich client | RIAs install a runtime (e.g. browser plug in) on the client side; there is less traffic on the network, resulting in faster responses. | Traditional sites send a huge workload to the server, to process requests, maintain sessions and to render results. |
|  |  |  |

* + 1. *Framework comparison table*
    2. *ASP.NET Boilerplate Framework*

Boilerplate is a front-end framework used by google, ITV news, Microsoft, NASA and Nike. ASP.Net Boilerplate is built on ASP.NET MVC, ASP.NET core and other web APIs. I used a ASP.NET core template which included Angular (single page web app), module zero and Entity frame work.

NLayer architecture

Domain Application Presentation layer Infrastructure

Domain Driven Design

Repositories Entities DTOs Domain/Application service

(Kalkan, 2017)

Include advantages

* + 1. *Client side*

HTML less

Advantage and disadvantages of AngularJs

|  |  |
| --- | --- |
| Advantages | Disadvantage |
| Server performance :  If JSON and client-side caching is properly used then the server to client traffic is reduced.  “The server workload and traffic is reduced as the server only responds to API calls and serves static files. “  (Farcic, 2014) | **Page rendering :**  There is extra work for the DOM manipulation therefore, page rendering is slower. For example additional REST request and data binding. All the javaScript files need to be downloaded. Although PCs and mobile devices are now powerful than ever so clients will not notice the browsers workload increase. (Farcic, 2014) |
| Testing :  AngularJs is very testable. (Farcic, 2014) | **Browser compatibility :**  Older browsers may find it difficult to run. According to the AngularJs websites FAQs they support the latest versions of Safari, Firefox, Chrome and Explorer 9 to 11. (Farcic, 2014) |
| Faster development:  Code does not need to be re-complied, front end changes can be seen immediately. |  |

* + 1. *Server side*

ASP.NET core is a framework used for the development of websites and cloud applications.

Boiler plate

Node.js

Node.js is an open source server side platform that was built on Chromes Javascript runtime. (TutorialsPoint, 2017)

* + 1. *Database*

Microsoft SQL database on Microsoft SQL express using Entity framework

* + 1. *Version control*

Version control systems track changes made to files over time and users can revert files back to pervious states. Users can view information such as changes made, author, date of changes and conflicts. One of the main reasons for using a VCS (version control system) for Guiders Hub is to back up files. (GitHub, 2016)

* + 1. *Software used*

Visual Studio Code

I used VS code as it combines a simple code editor with developer tools, such as debugging and Microsoft’s intelliSense. (Code, 2017) VS code has support for hundreds of languages, including typescript, HTML and Less, which are the languages that I had chosen. VS code has the all the features that are desired when choosing a code editor for example bracket matching, keyboard shortcuts, syntax highlighting, file explorer and auto indentation. (Code, 2017)

*Microsoft SQL server management studio*

*“SSMS is an environment to manage a SQL Server infrastructure.” (Rouse, 2017) It is an interface with provides tools to interact with the Microsoft SQL server. (Rouse, 2017)*

|  |  |
| --- | --- |
| *Advantages* |  |
| *Navigation:*  *SSMS makes connecting to databases simpler. It provides a database hierarchy and it is connected to a master database.* |  |

*Visual studio community 2013*

VS is an IDE (integrated development environment) developed by Microsoft. VS community is a free version of Visual Studio professional used by students, individual developers and for small teams. It provides the features needed for creating non-enterprise apps. (Protalinski, 2014) VS community provides full access to all of the extensions that VS 2013 has to offer. “It provides professional editing, debugging support and code analysis.” (Lewallen, 2014)

* + 1. *Internet browser analysis*

### Human computer interaction

### *8 golden rules of interface design*

The eight golden rules of interface were designed by Ben Shneiderman in order to design a user-friendly interface.

1. *Consistency*

Standardise the layout of information and be consistent with colours, fonts and icons. Consistency helps users become more familiar with the production making it easier for them to achieve their goals. Providing confirmation on the delete command should be comprehensible. (Shneiderman et al., 2016)

1. Shortcuts

Reduce the number of user interactions by providing shortcut commands, abbreviations and function keys for expert users.

1. Provide informative feedback

Interface feedback should be given with every user action. For minor or frequent actions from the user, the response given should be moderate. For major or infrequent actions, the response given should be more meaningful and give more information regarding the action.

1. Design dialogs

Inform users of what is going on in the background, for example loading screens, thank you dialogs or receipt.

1. Error handling

Include as much error handing as possible so the user cannot make serious errors. If an error occurs, the system should be designed to detect it and offer help to handle the error. (Shneiderman, 2013)

1. Allow easy reversal of actions

Allowing users to undo errors can relieve anxiety and therefore users will be comfortable exploring unfamiliar areas of the website. (Shneiderman, 2013)

1. Allow users to keep control

Users prefer to be in charge of the interface and they expect the interface to response to their actions. Tedious data entries can be an annoyance to users.

1. Reduce short-term memory load

The human short-term memory can only retain on average five items at a time. Users prefer more simple websites and they recognise icons etc rather than recalling them from memory. A real example of this would include Apples four icons that sit in the app suggestions screen. (Wong, 2017)

**Chapter 2 - Requirements**

2.1 Requirements gathering

*2.1.1 Interview with Guide leader*

Interviews are one of the easiest requirements gathering techniques yet its most helpful in understand the needs of the stakeholder. (Eriksson, 2012) Interviews will help to improve the validation and verification of the system. After the completion of the product, it will be of a high quality and the users will be satisfied.

In the Guiders Hub, the stakeholder is the main leader of the guiding unit, who has a lot of influence over the final product. I thought it would be most useful to conduct an informal interview with the stakeholder. I prepared a number of questions to ask my stakeholder, these questions were open-ended meaning there was room for further discussion. As a member of the girl guides I was very familiar with the terminology used in the interview making it easier to communicate with the stakeholder. I made notes throughout the interview to help me with the requirements documenting later on. I asked questions such as:

* What features do you think will be beneficial to add to the system?
* What are the drawbacks with the current communication process?
* What features would they like to see? In addition, could you rank the features in order of preference?
* Who will use the system?
* Do the den (centre where the meetings are held), have access to the internet?

I gathered a lot of rich qualitative information using this technique, which helped me to begin drafting up requirements for the system.

*2.1.2 Survey*

Using questionnaires can be beneficial for the requirements gathering process as quantitative data is gathered from a large number of potential users. (Badri, 2010) Surveys should be accompanied with other requirement techniques. Results from questionnaires are easily quantified by a researcher or software package. Online surveys can be free or have very low costs and shared with many people via email, websites or social media. (Debois, 2016) Online survey tools allow users to create, publish and analyse surveys. Answers are collected and analysed and displayed in the form of graphs and tables. Examples of online survey tools include SurveyMonkey, Typeform, Zoho survey. (Marrs, 2016)

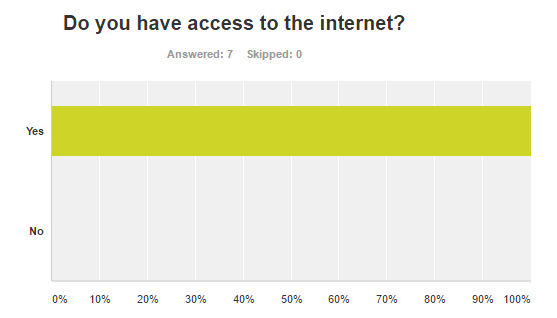
To conduct my survey I used a free version of SurveyMonkey as I had experience using this software previously. The questionnaires were sent to members of the local girl-guiding unit, whether they are leaders, parents or volunteers. I received seven responses from potential users.

*2.1.3 Survey Results*

From the results, I could see that only 60% of users had a smart phone, although all users had access to the internet (figure 1). This helped with my decision whether to create a mobile web application or a native app. Some users stated what they would like to see in the web application for example:

* Easy access
* User friendly interface
* Post section
* Instructions on how to use
* Events
* Messages

*Figure 1- GuidersHub survey, Survey Monkey*

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References

Angeles, S. (2014) Mobile Website vs. Mobile App: What’s the Difference? - See more at: Http://www.Businessnewsdaily.Com/6783-mobile-website-vs-mobile-app.Html#sthash.YypaJd13.Dpuf. Available at: http://www.businessnewsdaily.com/6783-mobile-website-vs-mobile-app.html (Accessed: 9 February 2017).

Badri, A. (2010) *Using questionnaires: For One on One requirements gathering processes*. Available at: http://www.seilevel.com/requirements/using-questionnaires-for-one-on-one-requirements-gathering-processes (Accessed: 22 February 2017).

Code, V. (2017). *Why Visual Studio Code?*. [online] Code.visualstudio.com. Available at: https://code.visualstudio.com/docs/editor/whyvscode [Accessed 28 Mar. 2017].

Debois, S. (2016) *9 advantages and disadvantages of questionnaires*. Available at: https://surveyanyplace.com/questionnaire-pros-and-cons/ (Accessed: 22 February 2017).

Eden IT Services Division (2009) *Rich Internet Applications Growth and Challenges*. Available at: http://www.edenispl.com/\_assets/whitepapers/ria.pdf (Accessed: 6 March 2017).

Editor \_goodworks (2015) *Trends and popularity of web application development services - GoodWorkLabs: Mobile App and software product development 2016*. Available at: http://www.goodworklabs.com/trends-and-popularity-of-web-application-development-services/ (Accessed: 22 February 2017).

(editor \_goodworks, 2015) – use when talking about RIA

Eriksson, U. (2012) *How to use interviews to gather requirements*. Available at: http://reqtest.com/requirements-blog/how-to-use-interviews-to-gather-requirements/ (Accessed: 22 February 2017).

Farcic, V. (2014). *Server vs client side rendering (AngularJS vs server side MVC)*. [online] Technology Conversations. Available at: https://technologyconversations.com/2014/07/10/server-vs-client-side-rendering-angularjs-vs-server-side-mvc/ [Accessed 29 Mar. 2017].

Fried, I. (2015) *Mobile Apps have a short Half life; Use falls sharply after First Six months*. Available at: http://www.recode.net/2015/9/2/11618236/mobile-apps-have-a-short-half-life-use-falls-sharply-after-first-six (Accessed: 21 February 2017).

GitHub, (2016). *Hello World · GitHub Guides*. [online] Guides.github.com. Available at: https://guides.github.com/activities/hello-world/ [Accessed 20 Mar. 2017].

GuestU (2016) *World Assoc.Girl Guides/Scouts*. Available at: https://play.google.com/store/apps/details?id=com.xtourmaker.WAGGGS&hl=en\_GB (Accessed: 13 October 2016).

Kalkan, H. (2017). *Welcome to ASP.NET Boilerplate*. [online] ASP.NET Boilerplate. Available at: https://aspnetboilerplate.com/ [Accessed 29 Mar. 2017].

Kay, R. (2009) *Rich Internet applications*. Available at: http://www.computerworld.com/article/2551058/networking/rich-internet-applications.html (Accessed: 6 March 2017).

Lewallen, K. (2014). *Visual Studio Community 2013 | Visual Studio*. [online] Visualstudio.com. Available at: https://www.visualstudio.com/en-us/news/releasenotes/vs2013-community-vs [Accessed 29 Mar. 2017].

Mackenzie, T. (2012) ‘App store fees, percentages, and payouts: What developers need to know’, *techRepublic*, 07 May. Available at: http://www.techrepublic.com/blog/software-engineer/app-store-fees-percentages-and-payouts-what-developers-need-to-know/ (Accessed: 21 February 2017).

Marrs, M. (2016) *7 best survey tools: Create awesome surveys for free!* Available at: http://www.wordstream.com/blog/ws/2014/11/10/best-online-survey-tools (Accessed: 22 February 2017).

Protalinski, E. (2014). *Microsoft debuts Visual Studio 2015 and .NET 2015 previews, free Visual Studio Community 2013*. [online] VentureBeat. Available at: https://venturebeat.com/2014/11/12/microsoft-debuts-visual-studio-2015-and-net-2015-previews-free-visual-studio-community-2013/ [Accessed 29 Mar. 2017].

Rouse, M. (2017). *What is Microsoft SQL Server Management Studio (SSMS)? - Definition from WhatIs.com*. [online] SearchSQLServer. Available at: http://searchsqlserver.techtarget.com/definition/Microsoft-SQL-Server-Management-Studio-SSMS [Accessed 28 Mar. 2017].

Shneiderman, B., Plaisant, C., Cohen, M., Jacobs, S. and Elmqvist, N. (2016). *Designing the User Interface: Strategies for Effective Human-Computer Interaction*. 6th ed. Maryland: Pearson, pp.section 3.3.4.

Shneiderman, B. (2013). *Shneiderman's "Eight Golden Rules of Interface Design" | Design Principles FTW*. [online] Designprinciplesftw.com. Available at: http://www.designprinciplesftw.com/collections/shneidermans-eight-golden-rules-of-interface-design (Accessed 23 Mar. 2017).

Statista (2015) *Smartphone OS global market share 2009-2016 | statistic*. Available at: https://www.statista.com/statistics/266136/global-market-share-held-by-smartphone-operating-systems/ (Accessed: 21 February 2017).

Summerfield, J. (no date) *Mobile Website vs. Mobile App: Which is best for your organization?* Available at: https://www.hswsolutions.com/services/mobile-web-development/mobile-website-vs-apps/ (Accessed: 21 February 2017).

TutorialsPoint, (2017). *Node.js Introduction*. [online] www.tutorialspoint.com. Available at: https://www.tutorialspoint.com/nodejs/nodejs\_introduction.htm [Accessed 31 Mar. 2017].

Wong, E. (2017). *Shneiderman’s Eight Golden Rules Will Help You Design Better Interfaces*. [online] The Interaction Design Foundation. Available at: https://www.interaction-design.org/literature/article/shneiderman-s-eight-golden-rules-will-help-you-design-better-interfaces [Accessed 19 Mar. 2017].