**Major Report: Ocean Sound College**

**Michael Coulter, Roshan Sahu**

**Sheridan College**

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**Professor Quintin Hewlett**

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1**.0 Introduction**

Ocean Sound College is a small liberal arts college on the east coast of Canada. The institution has approximately twenty thousand students and as the college continues to expand, the college's housing department is investigating how to redesign their information technology systems. The current housing system is essentially three paper binders: when a housing property listing is pursued by a student, the listing is removed from its binder. Landlords often need to be followed up in order for the college to gauge what listings they have to offer in the future. Further, ongoing housing policy dictates that students have to find their own off-campus housing if they are not placed in a spot in residence. Research and analysis will occur as to the business case for a new system, how to fund the project, and the technical specifications of a system that would increase its effectiveness. The requirements, specifications, and processes for a novel, digital system for the Ocean Sound College will be investigated and recommended to the institution's information technology department.

# **2.0 Business Case for Investing**

Little research has been conducted on the housing experience of university and college students in small towns (BCStudies, 2012). However, there is a wide variety of research that indicates that Ocean Sound College further investing in IT systems for housing and residence can benefit the institution and the town at large. The College's current housing system, three binders, does not provide the institution with the ability to tabulate and analyze data. The information the College could infer from a digital system has the potential to be highly profitable to the College (Council on Social Work Education, 2014). Regularly performing data analysis could help the College understand important metrics such as which landlords consistently provide good quality listings, how students thrive in certain areas of the college town, and more. Another reason for an accessible, digital housing system is the institution's potential attraction of more potential incoming students to the College. All illustrated by McEwan and Teixeira, post-secondary students often benefit the town they live in for their studies, as students often take part in the local workforce, buy local goods, and contribute to the success of the local economy (BCStudies, 2012). Students describe the need for better information systems to help them make more informed decisions about housing and residence in the town or city they will reside in for their studies (The Canadian Journal of Higher Education, 2016). Universities and colleges that do not display or evaluate housing listings online makes it more difficult for international students to decide what housing option to pursue when they arrive to Canada (The Canadian Journal of Higher Education, 2016). As international students make up a significant portion of the Canadian post-secondary student body, and often pay higher than domestic wages, Canadian institutions have another economic incentive to have a digital housing system that foreign students can use (The Canadian Journal of Higher Education, 2016). As some post-secondary institutions not only have a digital housing system but actively orient students about their housing and residence needs, Ocean Sound College needs to exert more effort in this area order to stay competitive (The Canadian Journal of Higher Education, 2016).

# **3.0 Finance**

Ocean Sound College can employ traditional methods of funding for its investment in the new housing system, or look to other academic institutions and their methods of funding housing related projects. There are many examples of institutions across North America that have derived and executed innovative solutions to fund housing and residence projects. For example, Ohio State University recently released $350 million of bonds to the financial markets to fund their University's rebuilding of campus residences and housing physical and information systems (National Mortgage News, 2013). Ohio State University is the first public institution to issue 100-year bonds to fund such a project and the University has described its efforts as investing in the student life experience for the next decade (National Mortgage News, 2013). If Ocean Sound College is struggling to obtain sufficient financial resources for the project, the college can consider changing its housing policy to be more profitable. For example, the University of British Columbia Okanagan campus's housing policy dictates that all first-year students are guaranteed residence and upper year students can enter a lottery if they wish to live on campus after first year (BCStudies, 2012). A policy guaranteeing their own room on campus room might encourage more first year students to live in College housing. Ohio State University has a noteworthy housing policy where it is mandatory for all students to live in on campus residence. Though such a policy would likely be socially controversial, it could be an increased source of revenue for Ocean Sound College in the future.

# **4.0 Technical Specifications**

## **4.1 Existing Systems**

The proposed system will be operating under the assumption that the users present are students in need of a home in an urban environment, nearby to their school. Densely populated metropolitan areas are a common occurrence in cities across the world. By examining similar systems being used by hotel booking companies in China and affordable housing solutions in Los Angeles, it is evident that an object-oriented approach has been used to fill the need for an efficient booking service (Law, 2005). In the case of the Los Angeles system, the most “at-risk” citizens are placed at the front of any waitlists that may appear before them (Eubanks, 2018, p. 230). By extending this to student-based databases, the system can prioritize listings based on the income of the student, the relative location of the student to the school, or any other socioeconomic information they may wish to produce. This will filter the results to a more personalized degree based on the student’s needs.

**4.2 Database Systems**

A database will need to be created to store a variety of information. The binders previously acted as a database of sorts, just in paper format. In converting the information there into a digital format, the binders must be made more concise in their data. Redundant listings will be removed during this process. Afterwards, individual tables will be created digitally for students who wish to use the service, listers providing properties for the college to display, and a table for the listings themselves, which will be displayed later in the web application. Since Linux can interface with both databases and web applications, its use should be considered, even when compared to similar Microsoft systems. Linux systems have also been proven to improve enterprise applications within similar fields (Convergent Computing Inc., 2017). Linux has allowed companies to expand their Microsoft server technologies, making it a preferable technology to use. Linux can also provide with the ability to easily monitor connections coming into the server hosting the web application, as well as other tools such as the monitoring of user applications and how much memory they use. The implementation of database and server security can be streamlined with Linux-compatible software to provide further control over the application. Users should be able to interact with the new system within an online web application. As, database objects can be used with HTML, a system that display web pages, these objects can be viewed by every device with access to a web browser. These objects can also be interpreted by multiple Java interfaces, such as JDBC, to connect to a database and manipulate or view its contents. By combining both of these technologies, students can access personalized listings from the comfort of a easy-to-use and secure web page.

## **4.3 Appfolio as an Inspiration**

The synthesis of these technologies has allowed applications such as Appfolio to take shape. Appfolio is a web-based property management software used to create and remove information pertaining to listings for properties that are up for rent as well as managing tenet information, such as their monthly rental costs (appfolio, 2014). As a web-based service, the application provides mobile accessibility, cloud-based security, and most importantly, an efficient and easy means of managing properties. However, if one were to copy this system, it would not have many features necessary to students specifically. Appfolio does not provide a front-end user interface to interact with for those looking to rent properties. It is simply a tool for the managers to use alongside a system such as Kijiji to list their properties.

**4.4 JDBC and Web Based Applications**

The sheer ubiquity of online learning tools make a digital solution much easier to maintain. New employees that are familiar with basic web-design and database interfacing should have little trouble adapting to this system, as the web-based system proposed will use a selection of scalable and versatile technologies. A SQL-based database and a JDBC-based database interface should be considered, if recommending this system. Learning materials for these technologies are widespread, as they are used in both educational and enterprise environments. The clerical staff will only have to contend with learning the property management side of the system, provided by a management system close to Appfolio in design. A web-based solution should be sought out, using a database to replace the earlier binder system. This SQL database can then be interfaced with Java objects. These objects, should then be passed to a final webpage that allows the user to navigate through all the listings. With these technologies in place, a small, in-house team of technicians can maintain the server as needed, while still being able to provide students with a simplified user experience in searching for their new home.

## **4.5 System Security**

By creating a specialized system that can provide both listing and property management solutions, the college can safely vet the listers. On public domains like Kijiji, almost anyone can create a listing. It is then up to the student to ensure the safety and stability of their potential new home. Centralizing the system will bypass these worries. Furthermore, alerts can be sent directly to both the lister and the college, making it possible to automate the process of removing a listing altogether. This alone is a massive advantage over the binder system. Old records can be removed immediately as needed, and added as soon as they have been verified. Listing on the University of Toronto’s student housing website requires the person listing to purchase a “subscription.” (University of Toronto) This subscription helps offset the costs of hosting and also provides a layer of security. Only listers willing to pay can be hosted, forcing them to provide information such as their name and address. This data is held should a property lister need to be held accountable for any wrongdoing.

Landlords need to be able to access the application in a similar matter to the students. Instead of responding to listings, however, they have to have the ability to create them. Listers should not be able to create a listing that is instantly viewable on the application. The implementation of this service may actually compromise security as it may need to allow access to a wider variety of users, unless the college can first vet those listing. Listers should only have access to their side of the application after entering their own portal. Even if using the correct login information, a hacker aware of phishing techniques may be able to access their page by masquerading as the correct user (Fruhlinger, 2018). The listers should not be able to directly interface with the database. Using coding programs such as JDBC, the user can be prevented from accessing data from an unauthorized connection. Those that pass the security checks will be brought to their personal listings page. From here, they can be able to create a listing that can be submitted for review. After which, the system will then display this listing on the student’s side of the application.

## **4.6 User Interface**

The application’s visual design can also provide with many opportunities to improve multiple services for students while improving the selling and listing experience for landlords. The student should be able to access the web page from any device. As is standard for HTML projects, a stylesheet is almost always included, allowing web designers to set the dimensions and look of a website for any screen size. A truly mobile platform would allow the user to access the page at any time, not just when they have access to a computer or a larger screen size. Stylesheets allow web designers to modify a page to fit any screen size, without compromising the performance or features of the site. The style of the page will also be set to a modern standard to maintain a professional atmosphere and a clear layout for the user. If need be, certain means of applying color to draw the user’s eyes towards specific points of interest on the page can be applied. This will further aid students into locating their own personalized listing. A web-based interface can even separate listings through filters, such as the monthly costs, location of the listing, or even the amenities provided by the listers. This can also be extended with the use of user accounts, which would provide students with a means of saving their preferred listings for later.

# **5.0 Systems Analysis and Development**

## **5.1 System Features and Priorities**

Ocean Sound College's new housing system will highlight features, processes, and technologies that will increase the likelihood of its success. Many students face significant challenges when they seek housing for college and university, and the proposed system for Ocean Sound College is designed to address those concerns (BCStudies, 2012).

### **5.1.1 Affordability Index**

As depicted in the Canadian Journal of Higher Education, affordability of housing and residence is the most prominent concern of students (The Canadian Journal of Higher Education, 2016). The concern is palpable, as students often spend more than fifty percent of their income, comprised of mostly student loans and bank loans, on housing (BCStudies, 2012). International students in particular struggle with finding affordable housing in Canada as they are less familiar with the value of Canadian currency and social norms in the country (The Canadian Journal of Higher Education, 2016). Ocean Sound College's new housing system will highlight the price of each listing and allow a user to index the range of listings based on a desired price range.

**5.1.2 Landlord Ratings**

A plethora of research suggests that landlords play a huge role in the success of student housing (The Canadian Journal of Higher Education, 2016). Students often experience difficulty communicating with landlords, bear the impacts of landlord’s lack of maintenance on the property, and face discrimination from landlords (BCStudies, 2012). Because of this common reoccurrence, the Ocean Sound College housing system will rate and review landlords. If a student finds a property through the system, the student will have the ability to provide feedback about the landlord. A landlord's rating will be compiled by the system and the rating being public will incentivize landlords to provide better quality housing to students.

### **5.1.3 Accessibility**

A key priority of Ocean Sound College's new housing system will be accessibility. Out of province and international students are less likely to have an established social network in their student town and are subsequently more likely to struggle (BCStudies, 2012). A student having a less established social network often correlates to having fewer friends and family to support them if their housing does not work out, finding good quality housing through their institution's housing and residence system is of the utmost importance (BCStudies, 2012).

## **6.2 System Processes**

### **6.2.1 Working with Landlords**

Ocean Sound College's new housing system will encompass a wide variety of internal processes and procedures. Research indicates that the list of actors involved in college housing is vast and can stakeholders such as nongovernment organizations, university administrators, faculty administrators, student organizations, and more (The Canadian Journal of Higher Education, 2016). In an effort to ensure that all of these individuals have their voices heard, there will be a monthly meeting for the first year of the system deployment involving the Ocean Sound College Team and the primary stakeholders. These meetings are to ensure that every party using the system is getting some value out of it and if there are any system modifications that any part wants to make, they can have their voices heard in that year.

### **6.2.2 Partnerships with Governments and Local Community Groups**

Other universities and colleges have partnered with their government to fund their projects because it was apparent that the new systems would be universally beneficial (Council on Social Work Education, 2014). It is recommend the colleges does a review of some vendors, their performance records, features and function of the software, and evaluate short and long term costs (Council on Social Work Education, 2014). Definitely a lot of value in meeting with community leaders, groups, and partners to engage local knowledge and utilize it (Council on Social Work Education, 2014). In the specific case of Ocean Sound College, if the primary stakeholder group is landlords perhaps there is some local community of landlords that can be interviewed and incorporated.

# **7.0 Recommendations**

## **7.1 Pre-Development Recommendations**

* Ocean Sound College considers partnering with their local government to fund the project and utilize the new system's data in a socially responsible way.
* Critically reflect upon the business case for investing and consider non-traditional methods of funding the project if required
* Ocean Sound College system analysts regularly conduct meetings with stakeholders throughout the development of the system to ensure a wide variety of perspectives are heard and incorporated.

# **7.2 System Requirements Recommendations**

* Connect a SQL-based database and a JDBC-based database interface to the website, thus replacing the existing paper system.
* The new system requires a secure database. Consider Microsoft SQL Server with Linux
* Invest in a dynamic website that uses HTML code and modern design principles.
* The new system involves key features that will provide great value to students such as:
  + The ability to rank a landlord
  + The ability to search through listings by affordability, location, etc.

## **7.3 Post Launch Recommendations**

* Prioritize security and data integrity when working with landlords and allowing them to post new listings.
* Ensure the new system is accessible to all students, domestic or abroad, who wish to use it.

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