MANAGEMENT INFORMATION SYSTEMS AND THE BENEFITS FOR NON-PROFIT HOUSING AGENCIES

A Senior Scholars Thesis

by

ROSS JAMES MCCLENDON

Submitted to the Office of the Undergraduate Research
Texas A&M University
in partial fulfillment of the requirements for the designation as

UNDERGRADUATE RESEARCH SCHOLAR

April 2011

Major: Environmental Design

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Approved by:

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Director for Honors and Undergraduate Research:	Sumana Datta

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ABSTRACT

Management Information Systems and the Benefits for Non-Profit Housing Agencies. (April 2011)

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Communication between the Texas Department of Housing and Community Affairs and the non-profit housing organizations who receive funding can be improved by using custom-written software. Lack of communication can mean either the information is late, or that the information that is received is incorrect. Meetings with the Texas Department of Housing and Community Affairs enabled formulation of what is required of the non-profit organizations. A program using Microsoft Excel and its macro programming language using Visual Basic has been developed to help the non-profit organizations fill out the required forms more efficiently and effectively. The specific non-profit organizations aided by this research are the Self Help Centers in the colonias. Colonia is Spanish for neighborhood or community located on the Texas-Mexico border and the majority of the people who live in this community are families of low and very low income. These communities lack safe, sanitary and sound housing.

The solution of this problem depends upon review of literature in Management Information Systems, software usability, and affordable housing. Based on the combination of literature review, interviews with officials from the Texas Department of Housing and Community Affairs, and the creation of a user friendly interface, the software will be able to improve the quality of information received from the non-profits and assist them in receiving their funding and it will reduce the cost to the state to monitor the program.

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CHAPTER I

INTRODUCTION

Communication between a state agency and local non-government organizations (NGOs) often presents challenges and difficulties that can be overcome with improved business practices and appropriate software. The Texas Department of Housing and Community Affairs is charged by the state to distribute funds to NGOs and assure that the funds are spent properly to serve the intended constituents. However, sometimes the required reports are filed incorrectly resulting in delays in distributing funds and implementing projects. Programs in the colonias in particular face challenges due to lack of experience and educational level of many participants. This research explored the development of software that could help streamline the process of filing reports to the TDCHA.

“A "Colonia," Spanish for neighborhood or community, is a geographic area located within 150 miles of the Texas-Mexico border that has a majority population composed of individuals and families of low and very low income. These families lack safe, sanitary and sound housing and are without basic services such as potable water, adequate sewage systems, drainage, utilities, and paved roads.” (Texas Department of

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This thesis follows the style and format of the Design Studies Journal.

Housing and Community Affairs, 2010b) To help address this problem in 1995, the 74th legislature passed Senate Bill 1509 to require the Texas Department of Housing and Community Affairs (TDHCA) to establish colonia self help centers (SHC). "Operation of the colonia SHC's is carried out through a local nonprofit organization, local community action agency, or local housing authority that has demonstrated the ability to carry out the functions of a SHC." (Texas Department of Housing and Community Affairs, 2010a) The non-profit organizations help in many different ways for the colonia that they are serving. The different budget items that the Texas Department of Housing and Community Affairs funds are: Public Services, Residential Rehabilitation, Administration, Reconstruction, New Construction, and Homeownership Assistance. Amongst the different budget items are potential activities that a county can implement such as: Construction Skills Classes, Homeownership Classes, Technology Classes, Technology Access, Solid Waste Removal, Tool Lending Library, Housing Rehabilitation, Self-Help Small Repair, Utility Connections, Closing Costs, Down Payment Assistance, and Principle Reduction. (Gudeman, 2011)

Literature review

To effectively conduct and obtain conclusions I had to back up my research with an extensive literary review. The three main topics that I investigated in the literature review were Management Information Systems, Software Usability, and the legal, social, and economic aspects of affordable housing. The review of literature on Management Information Systems investigated the benefits and the impacts this field has on modern businesses both internationally and nationally. For the theme of Software Usability, I researched the effect of program design on client satisfaction. This helped aid me in determining what factors influence a positive user interface; exploring the factors of color or layouts and the effect they have on the user. This research also helped me to discover the main scholars on the subject. The third theme of the literature review covered different aspects of government funded housing. This looked into the legal aspects of the organizations and investigated rules and how they comply with the government codes. It also examined the economic need and impact of affordable housing, and the social consequences. Then I could determine if there is a correlation between the rules and what the reporting requirements were for the non-profit housing organizations. The knowledge obtained from these three aspects of my literature review helped me understand the necessary information which aided me in the rest of my research.

Management information systems

I approached the topic of Management Information Systems and I began to investigate the benefits and the impacts the field has on modern businesses both internationally and nationally. According to the *Comptroller's Handbook,* the definition of Management Information Systems is a "system or process that provides the information necessary to manage an organization effectively" (Comptroller of the Currency Administor of National Banks, 1995). Management Information Systems help to gather sufficient data that can then be an influencing factor in making business decisions. According to the Bureau of Labor Statistics, a Management Information Systems specialist should be able to "plan, coordinate, and direct research on the computer-related activities of firms. In consultation with other managers, they help determine the goals of an organization and then implement technology to meet those goals. They oversee all technical aspect of an organization, such as software development, network security, and Internet operations" (United States Department of Labor, 2009). The *Comptroller's Handbook* states that a Management Information Systems specialist should be qualified to achieve the following:

- Enhance communication among employees.
- Deliver complex material throughout the institution.
- To provide an objective system for recording and aggregating information.
- Reduce expenses related to labor-intensive manual activities.
- Support the organization's strategic goals and direction. (Comptroller of the Currency Administor of National Banks, 1995)

A person in the field of Management Information Systems is also a critical component of an institution's overall risk management strategy. The Management Information Systems worker should be able to "recognize, monitor, measure, limit, and manage risks" (Comptroller of the Currency Administor of National Banks, 1995). The work produced by a Management Information Systems specialist contributes to the well-being and productivity of our society by making our job, whatever it may be, easier.

Software usability

The next topic that I covered in my literature review is the theme of Software Usability. I researched the effects of program design on client's satisfaction and the benefits of having a well designed user interface. This helped aid me in determining what factors influence a positive user interface; exploring the factors of color or layouts and the effect they have on the operator.

When I first started researching what Software Usability is and why it is important, I found a prominent author on the subject to be Jakob Neilson. His theories continued to be the back bone in the majority of books that I read. To understand Software Usability, I defined its components, starting with the most straightforward – information, which is "all the textual elements that software users see and use including, but not limited to, system messages and printed manuals" (Henry, 1998). The simple definition of software usability can be defined as "the ease with which users can use software" (Henry, 1998). You could ask why is software important. Or you could ask why do people use software. People use software to "make life's tasks easier and quicker for themselves and for others" (Henry, 1998). The goal of software is to enable users to execute tasks. As Pradeep Henry stated: "our goal then is to make it easy, quick, and pleasant for them to do so" (Henry, 1998). There is a list of the four top-level good design goals for general software design work. These goals can be applied to whatever you are designing. "If you adhere to these four goals, whatever you're designing has a better chance of being accepted by others: The design must be ethical. The design must be purposeful. The design must be pragmatic. The design must be elegant" (Butow, 2007). When using ethical design "the user interface design should do no harm-that is, it shouldn't make users' lives harder than it already is. You should develop your user interface so that it actually helps improve your users' lives. For example, an interface should not include unnecessary information that distracts the user and makes him less efficient in completing tasks" (Butow, 2007). When the design must be purposeful "the user interface should help users achieve their goals in using the software" (Butow, 2007). To be pragmatic you must create "user interface design as early as possible to meet the requirements of the stakeholders. It takes time to overcome the gap between users and designers" (Butow, 2007). To make the interface elegant "the user interface design must be as efficient as possible. In other words, if a function in your interface is accomplished with two clicks, try to get the function down to one click. Elegance also means that all parts of your interface must feel like they work together as part of a whole, not disparate parts cobbled together, because incoherence can breed confusion and frustration among your users" (Butow, 2007). "Some people might argue what is the point of having good interface design or why should we care about good interface design. First off it helps you save money because you do not have to spend time trying to fix problems caused by poor design. Also it will help keep your existing users happy and it will help to bring in new users" (Butow, 2007).

Sometimes when programmers design software, it is "not designed around tasks that users perform. Therefore, there is a wide gap between users and software. Users find themselves unable to comfortably or effectively use the software" (Henry, 1998). If the program is too hard to understand the user might "give up the hard-to-use product. And this is exactly what software houses today are worried about. People will switch to a more usable brand" (Henry, 1998). A user interface that is not designed around tasks that the user performs can create a wide user-software gap which consumers would then describe as unusable software (Henry, 1998). The three principles that promote usability are "a software's quality of being easy, quick, and pleasant" (Henry, 1998). Henry then takes these three attributes and describes each in detail. The first is easy to use software. "People want easy-to-use software. And that is nothing new- it is in keeping with the continuing trend toward making life easier, not harder" (Henry, 1998). The second attribute is efficiency. "Easy is often faster or more productive. But not always. People experienced with the software will need faster-not necessarily easier-ways of performing tasks. Response time and computing environment can impact user productivity" (Henry, 1998). The last quality for promoting software usability is its pleasantness. "This is a subjective, user-preference attribute. Things like good aesthetics and friendly tone can make it pleasant to use software" (Henry, 1998). These three attributes when put together will help to make a user interface that is not only efficient but enjoyable to use. Henry also talks about the key concepts common in a user centered design process, these concepts:

- Focus early on users and tasks. Understand users' cognitive, behavioral, and attitudinal characteristics, the tasks users perform, how, and in what kind of environment.

- First design the user interface. Separate user interface design from internal design. Reverse the traditional process by first designing the user interface.
- Involve users. Have users participate in design and design reviews.
- Insist on interactive prototyping and evaluation. Evolve user interface design via user testing and iteration. (Henry, 1998)

To have a user friendly interface you have to make sure you are focusing on the user and involving them. Over the years researchers and usability practitioners have come up with sets of principles of software usability. The list of principles developed by Jakob Nielsen and Rolf Molich are specified as: “simple and natural dialog, speak[ing] the user’s language, minimize[ing] user memory load, consistency, feedback, clearly marked exits, shortcuts, good error messages, [and] prevent[ing] errors” (Henry, 1998). Nielsen also said that in many studies “consistency reduced user training time to between 25% and 50% of that needed for inconsistent user interfaces” (Henry, 1998). Even-so, there are five key principles that embody user centered interface design and distinguish it from other approaches. These five principles are to “keep software usability the goal-always, design all the information components using technical writing skills, integrate all the information elements, perform 2-level evaluation, [and] integrate UCID into user-centered design process” (Henry, 1998). User centered interface design has advantages for both the users and the practitioners. These advantages for users can be described as following:

- Helps maximize the ease of use of, productivity of, and overall satisfaction with the software.

- Avoids unnecessary repetition of information, elimination of critical information, delivery of useless information, and inconsistencies among the software usability components.
- Wins the preference of users because they become involved in, and can contribute to, the design of information elements. (Henry, 1998)

Advantages for practitioners include:

- Puts you on the right track toward maximizing software usability.
- Improves company's bottom-line. Information meeting users' needs and expectations means improved software usability and the resulting positive impact on the company's revenues.
- Gives possible competitive advantage to organizations that take it up first.
- Reduces costs by resolving design flaws at an early stage and by avoiding costly corrections toward the end. Here, a design flaw can be a wrong set of information elements or an information element that is baldy organized.
- Plays an important role in establishing the identity of technical writers as designers of product usability.
- Improves project communication. UCID requires that you record details such as the design rationale. These details help writers who join the team at a later stage. (Henry, 1998)

Prototyping

To create my own program with a successful user-interface, I researched implementing the method of prototyping. There are multiple different testing methods that can be used to get information from the user. Some examples are “usability inspection methods, such as heuristics evaluation and walk-throughs, and user testing methods such as laboratory and field tests” (Henry, 1998). One effective way to design your user interface is to engage in “paper prototyping and storyboarding, which allow you to create mockups of the user interface designs that you and your team are discussing” (Butow, 2007). “The biggest advantage of paper prototyping is that you will have a better idea of how your users use the product” (Butow, 2007). Paper prototyping also resolves the problem of a bad layout and encourages the users to be creative when thinking of ways to make the user interface better (Butow, 2007). This method of data collection has many different advantages, for instance it helps to find:

- Unclear concepts and terminology
- Problems with navigation, work flow, or task flow
- Content issues that can lead to refinement, which leads to a better design that sends the right message.
- The way the user expects to find and use product documentation
- Functionality issues
- The layout of objects on the screen on the hardware product. Objects can include text, windows, and buttons.

- The effectiveness of the product. If the product isn't easy to use, it won't be effective. (Butow, 2007)

Website design

Within my literature review I also researched what qualities create a good website. "Web design has had a significant effect on the design of user interfaces, in large part because many computer users access the web" (Butow, 2007). Eric Butow states that "a graphical user interface, which is more popularly known by its acronym GUI, is a system for interacting with computers by manipulating graphics elements and text" (Butow, 2007). Just like a user interface for a program, a "web interface must be consistent across all pages of the site, because that consistency gives your visitors the impression that the site is part of a unified whole" (Butow, 2007). When designing for a website you should design "for the least common denominator when it comes to text and graphics. That denominator is the web-safe set of several common fonts and a set of 256 colors that all browsers can display. Also, be careful to avoid colors that might have cultural implications, or colors that might cause a problem for the colorblind users" (Butow, 2007). Throughout my research I have been looking at a book called *The Web Designer's Idea Book* by Patrick McNeil (McNeil, 2008). Throughout this book there are examples of websites and tips of how to make the program visually appealing. It lists color schemes that were helpful in the design and creation of my program.

Microsoft macros

After I saw the change of direction of my project I had to learn how to program macros in Microsoft Excel. This was a skill that I did not have so I had to turn to literature to help me out and to explain to me what needed to be done. One thing that I researched was the creation of dynamic drop down menus. What this means is that there is a worksheet that only Mr. Gudeman, my contact at the TDHCA, has a password for and he can add to or change any of the drop down menus in my program just by adding an item to a column in the excel worksheet. The code that allows this to happen is displayed in Figure 1. The reason I was able to complete this code was thanks to the resources others have posted online. (Contextures, 2010)

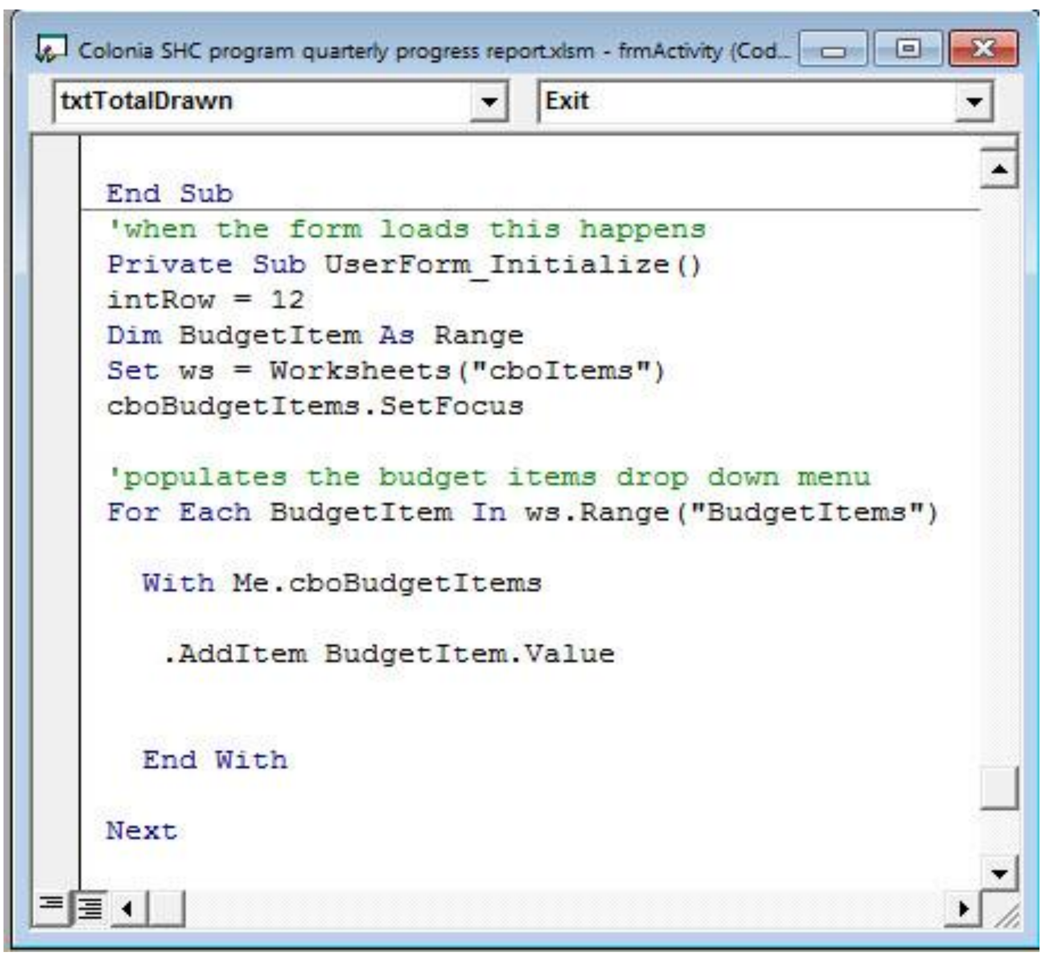

Figure 1. Example of Macro Microsoft Excel Visual Basic Code

Affordable housing

The final topic that I investigated in my literature review is the legal, social, and economic aspects of affordable housing. This review looked into the legal aspects of the organizations and investigates their rules and how they comply with the government regulations. It also examined the economic need and impact of affordable housing, and the social consequences. This research helped me understand the great need for affordable housing in America today.

The need for affordable housing

"Many significant federal programs were created from the Federal Housing Act of 1934 through the Affordable Housing Act of 1990 that stimulated supply and subsidized demand for both homeownership and rental housing" (Hecht, 2006). This goes to show that there are many government-funded programs that deal with supply and subsidized demand for both the homeownership sector and the rental housing department. What is the government's interest in the housing division? "To begin with, every market requires rules and norms in order to help individuals arrive at voluntary agreements that increase total welfare" (Kennedy, 2008). The government had to step in to the affordable housing sector and help stabilize it by creating rules and norms, and they have accomplished this. The programs created by the Affordable Housing Act of 1990 "helped to provide decent, safe, and affordable homes to millions of working American families" (Hecht, 2006). From this we can determine that the programs generated by the government have been very effective at getting Americans into safe and affordable homes. "At its height, the industry was managing more than 5.5 million units of federally supported, affordable rental housing" (Hecht, 2006). By 2005, the success of the government implementations helped "more than 33 million people [utilize] federally insured mortgage programs to become homeowners" (Hecht, 2006). Thanks to government funded housing and the economy, "the homeownership rate is at an all-time high of almost 70 percent" (Hecht, 2006). One way the economy has helped is by the private sector:

> Creat[ing] loan programs that now make it possible for very-low-income people, to buy a home with no money down and to prove creditworthiness in many unconventional ways such as showing 12 months of cell phone bill payments. In fact, these innovations have helped whole segments of the population who historically have been shut out of homeownership to do so in record numbers. (Hecht, 2006)

Even though the economy has been helping the condition of affordable housing, "the last major piece of housing legislation was enacted more than 15 years ago. No new major initiatives are expected in the coming years[,] despite the fact that almost 100 million Americans are in need of affordable housing" (Hecht, 2006). As "the supply of affordable rental housing shrinks, the need continues to rise" (Hecht, 2006). The government needs to continue with production of affordable housing because the demand for it will continue to grow. "As recently as 2001, 95 million Americans had excess housing costs burdens (paid more than 30 percent of their income for housing) or lived in crowded or inadequate conditions" (Hecht, 2006). With more affordable housing hopefully these numbers can begin to decrease. "As more areas of the United States became developed, the cost of housing rapidly became a significant portion of a person's income. Housing is the single largest expenditure for most individuals" (Kennedy, 2008). Sadly "the average household spends approximately one-fourth of its income on housing. The portion is one-half for many poor families" (Kennedy, 2008). One study stated "that poor households devoted 64 percent of their income to rent" (Kennedy, 2008). When you spend 64 percent of your income on your rent you most likely barely have enough money to pay for the necessities of living.

Managing all the different financial transactions can be extremely hard on the national government. The states have begun to take over in "financing affordable housing [and this] continues to grow especially as federal programs and funds become more scarce" (Hecht, 2006). By giving the state government more control of the affordable housing sector it enables them to focus more directly on the needs of communities and individual cities rather than the national government just making nationwide standards. It allows for a better process of specialization amongst the affordable housing sector. "This growth of state action in affordable housing is in contrast to the decline in federal support over the past two decades. Federal support has shrunk in every category" (Hecht, 2006). This is why if the state governments get more information back from the non-profit housing organizations, they will be able to make the building process more efficient, allowing them to create more affordable housing units.

Self help centers

"The purpose of a self-help center is to assist individuals and families of low income and very low income to finance, refinance, construct, improve, or maintain a safe, suitable home in the colonias' designated service area or in another area the department has determined is suitable." (74th Texas Legislature, 1995) The self help centers are allowed to request government funds from the TDHCA but they are required to produce proper documentation each quarter. The Texas Administrative Code states that each time the self help centers attempt to do something they must request to receive financial backing. "Request for Payments. The Contractor shall submit a properly completed request for reimbursement, as specified by the Department, at a minimum on a quarterly basis; however the Department reserves the right to request more frequent reimbursement requests as it deems appropriate. The Department shall determine the reasonableness of each amount requested and shall not make disbursement of any such payment request until the Department has reviewed and approved such request. Payments under the Contract are contingent upon the Contractor's full and satisfactory performance of its obligations under the Contract." (Texas Administrative Code, 2009) The TDHCA has to hold the non-profit organizations accountable with the funds that they are given. That is why "The Contractor shall submit to the Department reports on the operation and performance of the Contract on forms as prescribed by the Department. Quarterly Reports shall be due no later than the twentieth (20th) calendar day of the month after the end of each calendar quarter. The Contractor shall maintain and submit to the

Department up-to-date accomplishments in quarterly reports identifying quantity and cumulative data including the expended funds, activities completed and total number of Beneficiaries." (Texas Administrative Code, 2009) With the quarterly reports the Texas Department of Housing and Community Affairs is able to monitor if the contractor is doing his or her job correctly and not wasting any of the departments funds. The reason the TDHCA keeps all of this information on file is because "If the Contractor fails to meet a Contract requirement the awarded funds related to the lack of performance may be entirely or partially de-obligated at the Department's sole discretion." (Texas Administrative Code, 2009)

Point of departure

As a result of my literature review, I discovered more about what the job of Management Information Systems entails, and how it helps businesses. The job of an Information Systems Manager is to make the company run smoothly, and attempt to make it run more efficiently and effectively.

The user interface design section shows that if something is not necessary then it should not be included in the design. Keeping simple and natural dialog, the correct language for the user, minimizing the user memory load, consistency, feedback, clearly marked exits, shortcuts, good error messages, and preventing errors are all concepts of user interface design that I used when I designed my program. There has always been and always will be a need for affordable housing.

As stated in the literature review the TDHCA has to have some way to hold the non-profit organization that they manage accountable when they are given federal funding. If they did not ask to see progress reports they would have no way of knowing that the non-profit organizations were doing what they proposed that they were going to accomplish. This way the TDHCA also has records to prove that the non-profit accomplished what they set out to do. Currently, the Texas Department of Housing and Community Affairs have a form that they require the non-profit organizations to fill out and submit back to them.

CHAPTER II
METHODS

Various methods were used during this study. A literary review of several topics was performed to help understand the issue and the problem that needed to be solved. The three topics that were researched in the review were: management information systems in general, software usability and the legal, social, and economic aspects of affordable housing. This information was used to help guide me in the completion of my experiment. From researching management information systems, I was able to understand the benefits and the impact that this field has had on modern business both internationally and nationally. Management information systems helps gather sufficient data that can help influence business decisions. The more information that the Chief Executive Officer of a company has, the easier it is to make the decision. This helped me to understand the importance of having current and reliable data. The second literary topic investigated was software usability. From the study of software I was able to learn the effects of program design on client satisfaction and the benefits of having a well designed user interface. This research helped me decide and design the experimentation portion of my research. It also provided guidance on making sure that the user's interests are kept in mind, which proved useful in the pursuit of accurate results. The third major topic for literary review included the legal, social, and economic aspects of affordable housing. This topic helped to better understand the laws that created this program at the

Texas Department of Housing and Community Affairs, the requirements for non-profit organizations, to better understand colonias, and the need for affordable housing. This assisted in understanding the benefits of non-profit housing agencies and the impact that they have on affordable housing. A final benefit that was learned through the literature review was how to code macros in Excel.

My research required approval from the Institutional Review Board (IRB) since the project required me to conduct interviews with individuals from the TDHCA. Once IRB approval was obtained the process of getting in contact with a member of the TDHCA began. This started with talking to Oscar J. Munoz who is the Deputy Director for the Center for Housing and Urban Development Colonias Program at Texas A&M University. He was able to get me in contact with Will Gudeman who is the Program Coordinator at the Office of Colonia Initiatives at the Texas Department of Housing and Community Affairs. I was able to interview Mr. Gudeman and ask him what information the non-profit organizations are required to submit to the TDHCA and the current method of collecting that information.

Once the direction of the program was decided a prototype was created. The prototype was based off of the form that the TDHCA currently has the non-profit organizations fill out. After his approval the rest of the program would be completed. A final test would be conducted by having some students, with no prior knowledge of the program or the purpose of the program. This was a great way for me to test to see if my program would help simplify the process of entering the data so that anyone can do it without making a mistake.

CHAPTER III
COLLECTING DATA

To begin the research, an application needed to be designed that would be capable of asking the user (non-profit housing organizations) to enter in the information that the Texas Department of Housing and Community Affairs (TDHCA) requires. Once approval was obtained from the IRB I began the process of contacting someone within the TDHCA. I completely underestimated the difficulties and complexities in getting connected to the correct contact at TDHCA. I asked my contact from Texas A&M, Oscar Munoz, if he could help coordinate a meeting with his contacts at the TDHCA. Mr. Munoz is the Deputy Director for the Colonias program in the Center for Housing and Urban Development at Texas A&M University. I initially had difficulty in getting in touch with Mr. Munoz because of his traveling schedule. Once we were able to visit he worked very diligently to help connect me with someone from the Texas Department of Housing and Community Affairs. Without his help I most likely would not have been able to speak with any associate of this department. The process of getting in contact with a member of the TDHCA took significantly more time than I had expected. The primary reason for the delay was because the department wanted to make sure that they could release the information for my project. They checked with their human resource department to make sure that they were allowed to talk with me. There seemed to be more steps required at the state agency level for me to be able to talk to or work with them than I was expecting. I met with Mr. Munoz as often as possible to see if he had made any progress in allowing me to be able to talk with someone from the TDHCA, but I did not want to pressure him too much because I was asking him to do me a favor in setting me up with this department. He in turn, did not want to put too much pressure on the housing department because he wanted to make sure they got everything approved. This added to the time it took for me to be able to speak with someone. The problem with depending on other people is that they are not necessarily inclined to help you in a timely fashion because it might not be as important to them. This is a lesson that I have learned from this project and will remember as I graduate.

Approval was granted to speak with a member of the TDHCA at the beginning of March. This was a setback that I was not prepared for, but I am thankful that I was able to meet with Will Gudeman, Program Coordinator of the Office of Colonia Initiatives. Mr. Gudeman was able to explain to me what their office needed to know from the non-profit agencies that they collaborate with. He works for the Office of Colonia Initiatives and so the information he provided allowed me to create a program specifically for his office.

When I conducted my interview with Mr. Gudeman I explained to him what I was attempting to accomplish and asked him questions that would help me to accomplish my goals. I asked him to describe the current process of how the TDHCA collects data from the non-profit organizations that they manage. As discovered during the literary review the law (Texas Administrative Code, 2009) requires that the non-profits report quarterly to TDHCA to be eligible for reimbursement and that TDHCA monitor the program. He said that the non-profits fill out the form in Microsoft Excel, get it approved and signed by a local representative, then scan in the approved copy, and email him both the signed copy and the excel spreadsheet. The form they currently use is displayed in Figure 3. This must be reported quarterly. This process is how the non-profits keep TDHCA informed of their progress and how they request draws (payment). See Figure 2 below for an understanding of the process.

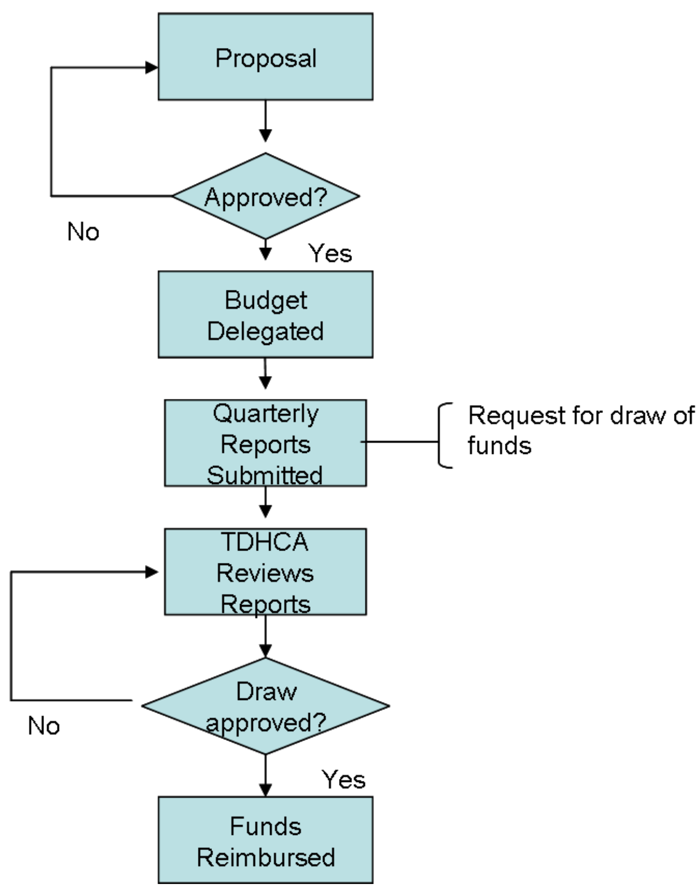

Figure 2. Flow Chart of Non-profit Reporting

COLONIA SHC PROGRAM QUARTERLY PROGRESS REPORT
MINORITY ENTERPRISE REPORT Part One

Contract No.: Locality Name:

Quarterly Reporting Period: ☐ Jan-Mar 20__ ☐ Apr-Jun 20__ ☐ Jul-Sep 20__ ☐ Oct-Dec 20__

1	2			3	4 ACCOMPLISHMENTS								
	TxCDBG Funds			Other Funds	Proposed			Activity this Quarter			Actual / To Date		
Line Item #, Activity & Subactivity (if applicable)	a. Current Budget	b. Total Drawn	c. Balance Remaining	Expenditures To Date	d. Deliverables	e. Total Beneficiaries	f. Total L/M Beneficiaries	g. Deliverables	h. Total Beneficiaries	i. Total L/M Beneficiaries	j. Deliverables	k. Total Beneficiaries	l. Total L/M Beneficiaries
Total:	$ -	$ -	$ -	$ -									

MINORITY BUSINESS STATUS										
Contractor/Subcontractor Name	Contract Amount			Column Codes:						
List all contracts awarded this quarter only	CDBG Dollars	Other Funds	Total Dollars	*See instructions for codes*						
				A	B	C	D	E	F	G

Certification by county representative:

____

Figure 3. Excel From Currently Used

I asked him if the information entered is entered manually or is it automated or mixed. He said that all the information is entered manually which is what causes the majority of the errors. The spreadsheet currently provided to the non-profit organizations has the form on one worksheet and the instructions on how to fill out the form on a different worksheet. This can be confusing because you have to switch worksheets to see what needs to be entered and then switch back to the form and try to remember where and what information you have to enter. It also allows free flow entering of any kind of data into the fields with no requirements for the type of data or if it must be entered.

During the initial interview with Mr. Gudeman he explained that this new solution could not cost the non-profits any additional money or add an additional burden in entering the information. The program has to convert the users input into the Excel form correctly and must use tools that they are accustomed to using. He did not want to change his process that he was using to combine all of the reporting non-profit organizations into a summary spreadsheet.

Other questions asked related data entry requirements like:

- On the form which fields are mandatory?
- Are there any field length restrictions?
- What are the default normal answers/formats for each field?
- Are there any cells you want to have pre-filled based off of the information the user enters?

It was discovered that all the fields were mandatory and there were very few field length restrictions. He also provided a list of answers that I could use to populate a dropdown menu where necessary, and he said everywhere there can be a pre-filled cell there should be. During the interview a common problem with user training surfaced. Mr. Gudeman explained that sometimes once the person filing out the forms for the non-profits is trained they will leave and go to a bigger non-profit. This creates a tough situation for the non-profits that Mr. Gudeman manages. They constantly have to spend time and money to train the new employees on how to fill out the form correctly. This program will decrease both the amount of time and money required to train users on how to enter in the information accurately and efficiently. These forms are submitted on a quarterly basis so making sure they are accurate every single time is important since funding is tied directly to providing timely and accurate information.

CHAPTER IV
SOFTWARE

Mr. Gudeman gave me the form that his department requires the non-profit organizations to report back to them. This form is called the "Colonia SHC Program Quarterly Progress Report". This report consists of two different parts. The first part has information fields pertaining to the Contract number, locality name, and which quarter of the year it is. Then for each activity it has the: current budget, total drawn, balance remaining, and expenditures to date. Also for each activity there is more specific budget information like the amounts that were proposed, activity for the current quarter, and actual to date value of the deliverables, total beneficiaries, and the total Low to Moderate Income (L/M) beneficiaries. The second part of the form contains Minority Business Status information. This form also contained multiple fields of required information. Each field has a corresponding question on the next page of the Excel document.

The final application created includes an attractive form that has all the information fields that are required on it. This will help the non-profit housing organizations to be able to input the correct data more efficiently, because there is less room for user error. For instance, everywhere there is a set list of responses a drop down menu list was created that aids the user to make standardized entries rather than inputting their own answer. (Figure 4) All of the fields that can self populate (meaning that after the user enters in one answer it generates the next answer) do so. For example, once the beginning balance and the total drawn have been entered, the program automatically adjusts the balance remaining field. This process is displayed in Figure 4. Since there are multiple activities that the non-profit housing organizations can do within a quarter of a year there needed to be a way for them to enter in more than one activity. This is accomplished by filling out all the information that the form is asking for per activity. Once one activity has all the data filled in they select Add to List. There is a list box that displays all the activities that have been accomplished within this quarter.

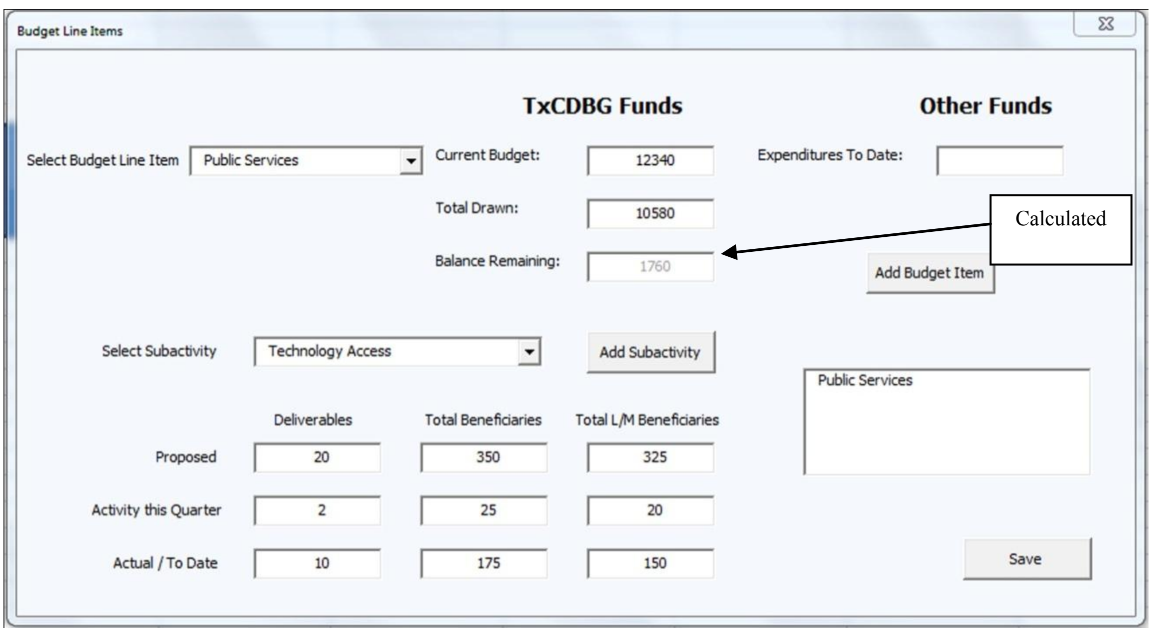

Figure 4. Adding a Budget Line Item

The user can add a sub activity to a normal activity by selecting the activity they want to add the sub-activity to the program will check to see what the last budget item created was to see if there are sub-activity items for that budget item. If the budget line item has sub-activities then the select sub-activity drop down menu will be populated with the correct choices and be enabled for the user to click on. Then they will click Add Sub-activity to add this to form.

The next step is filling out the Minority Business Status form. This form consists of the contractors name and many other fields that have predetermined answers that can be selected from the list. The Minority Report form can be seen in Figure 5. Dropdown menus were used to save the user's time by allowing them to select an answer from a list instead of requiring the user to type in each field.

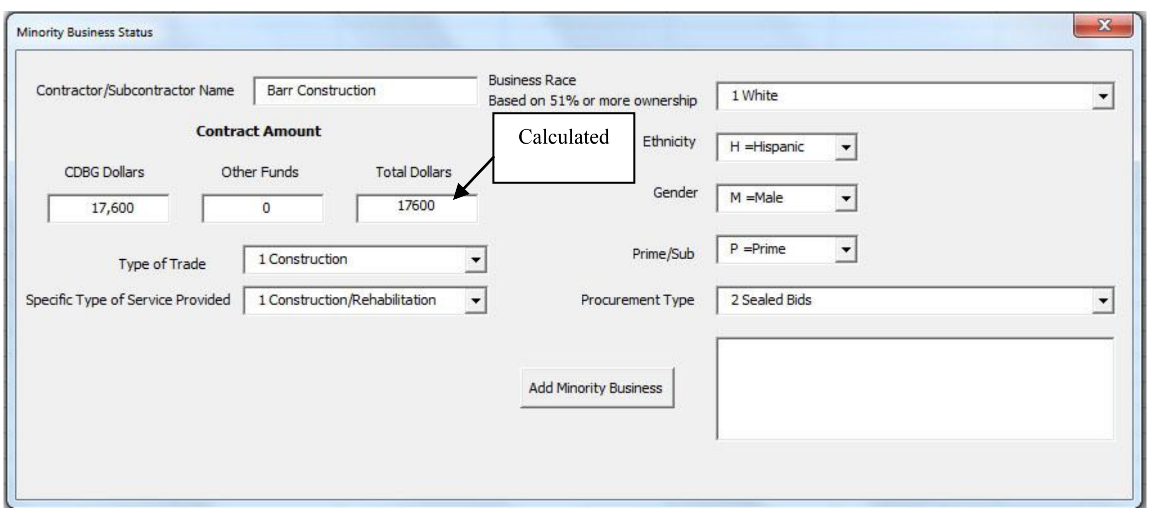

Figure 5. Minority Report Program

This also helps improve the accuracy of the information. Since multiple contactors can be used, the non-profit users must be able to enter in more than one contractor's information. Again there is an Add Minority Business. Every time the Add Minority Business button is pushed it writes the current information into the Excel spreadsheet. This Excel document will look just like the form that the Texas Department of Housing and Community Affairs already uses, but all the information should be correct. The non-profit housing organization will then have to print it out and take it to be signed by a county representative. After it is signed the non-profit housing organization will have to fax a copy of the signed form and then email the Excel file to TDHCA .

Data entry into the form was tested to verify that the form made it easier to enter in the non-profit housing organization's data. I asked some fellow classmates to enter in the data. They had no prior knowledge of the program or the forms, but they were able to enter in the correct information into the correct fields when given the same information that a normal non-profit agency would have.

CHAPTER V

CONCLUSIONS

When I first began my research I was attempting to solve a perceived disconnect between non-profit housing agencies and the Texas Department of Housing and Community Affairs. Before I talked with Mr.Gudeman I imagined that the lack of communication was because the non-profit agencies were not sending the information to the TDHCA quick enough. However, after interviewing Mr. Gudeman I learned that the reason that there was a miscommunication was mainly because the non-profit housing organizations would report inaccurate data. This would occur because the people entering in the information to be sent to the TDHCA would not fill out the form correctly. He said that if the form was late it was not that big of a deal to him or his department because the non-profit organization would not get any more of the States' money until they submitted the form. However from the non-profits perspective this is a huge deal. The State's money is where the majority of the funds come from that they use to provide services to the colonias. Without government funding many of the services that the non-profits provide will not be funded. For the non-profits reporting the data late or inaccurately was a huge problem. This changed what I planned on doing. There was no longer a need to create a website that could have the non-profit housing organizations log in and submit the data instantly. The big problem that I needed to solve was how to help the non-profits submit the correct information.

Also, initially, I planned to do a web-based database application, but after visiting with Mr. Gudeman, he informed me that TDHCA did not have the funds to host a new database application. He expressed the desire to provide a solution that was familiar to the non-profits. So, my proposal to fix this problem was to create a program that prompts the user to enter in the correct information using a tool that they were familiar with and that they already owned. I created this program in Microsoft Excel because I know that the non-profit organizations have access and are familiar to Excel because that is what they currently use to submit the forms. This program, when run, asks the user for all the information that is required on the forms the TDHCA requires the non-profits to report and it gives the user choices of what they can enter in. For example, the application will only allow numeric entries if the cell is asking for a numeric entry and it will make sure that all the cells have the required information before writing it to the Excel worksheet. The program also uses drop down menus when there are certain answers that the user can choose from and they cannot enter in their own answer. Both the drop down menus and the validation of what the user enters helps to eliminate user error and will help lead to less incorrect entries. This program helps the non-profit housing organizations organize and set up the form that the TDHCA requires them to report every quarter.

During this research I had some difficulties in getting in contact with the correct person. I discovered that I cannot wait for other people to get back into contact with me after I have tried to contact them. The process of being able to communicate with a member of the TDHCA took much more time than what was anticipated. One must be persistent, but polite in their approach. I also learned that if you are able to demonstrate how your proposed solution will benefit the person or organization they will be much more responsive. One of the things that would be nice to change about this project would be getting into contact with someone from the TDHCA sooner. If I had applied for my IRB approval back when I first came up with the idea for the research it would have been possible to talk with someone from the TDHCA in December or January. This project has taught me to plan ahead for problems. In the end, I was able to communicate with the TDHCA and I feel that my project will help them obtain more reliable and timely information from the non-profit housing organizations. This improvement will help the non-profits to provide correct information which will help them to receive future funds.

Another thing that I learned during the course of this research is that when making a program of any kind you must make sure that you make it as easy for the user as possible. When designing any program, whether you know the audience you are designing for or not, you must design it so someone with no knowledge of your program can look at it and figure out what needs to be done. This will help the user be able to understand what to do and not get lost searching for how to make the program work. The literature review helped me to learn more than I could have imagined about user centered interface design. Now I know that any time I design something I need to keep the user in mind from the beginning and for the best results I need to include the user in the actual design.

This program will help both the Texas Department of Housing and Community Affairs and the non-profit housing organizations that work with the colonias. The way it will help the non-profit organizations is by helping them fill out the forms that the TDHCA requires them to report more efficiently and effectively. My program will present the questions in a user friendly manner and allow the non-profits to enter in the data with less confusion. Also the program presents the user with answer choices, rather than a free entry field, in all the fields where there are answers the user has to choose from. This will help take away some of the user error and it will help make the forms easier to fill out.

The TDHCA will benefit from this application as well because this program helps to ensure that all the information they receive is as accurate as possible. This will cut down on the amount of time needed to check over the received forms and it will decrease the time spent calling the non-profit housing organizations asking them why they entered the information incorrectly.

In conclusion, I identified an issue that was costing the State of Texas time and money, but it was also causing delays in non-profits receiving funds to continue providing services to help the people living in the colonias. The research that I conducted helped me to be able to understand the importance of the problem and it helped me to develop the skill sets I needed to create a program that would solve this problem.

Future work

This project sets up a great foundation for other projects to branch off of. Creating an automated form is just the beginning of possibilities that can be done to help many different organizations. This program that I created can even continue to be improved. For instance there could be a website that route the documents to the correct official so they could digitally sign the file. This would eliminate the need for the document to be printed at all. Then you could write a different program that took all the data received, compiled it, and generated graphs and a table that shows all the received data. These graphs could help the TDHCA create trend lines so they can better predict what is going to happen in the future.

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