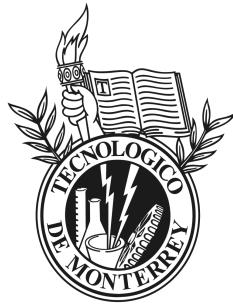


Evolving long web forms into single tasks forms and its effect on completion, a field research



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This thesis is dedicated to my parents and sister for their infinite love
and always supporting my vision.
Also to every person that contributed to this accomplishment,
directly or indirectly.

I'll be forever grateful.

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Chapter 1

Introduction

Web forms are one of the angular pieces of web systems that require input from the user. From filling a simple log-in to filling a insurance policy, interacting with forms has become very common for web users. But sometimes these forms pose friction between users and the web system, as Wroblewski[12] explains: "nobody likes having to fill out a form; its just that bit of red tape that must be dealt with before we get what we want". Since one of our aims when designing or implementing a web system should be to give our final user a great experience, we need to work on making these interactions more bearable and even enjoyable.

In the search of bettering the user experience with forms, exploration in the field of web forms and HCI has been conducted in recent years; from evaluation of empirical guidelines via eye tracking[24] and label placement in input fields[14] to evaluating the impact on users by modifying the number of items per screen[26, 29]. As we can see, there are many factors that impact how the users experience forms, but in this research we focus mainly in the impact of navigation in user experience by asking (via user testing) a simple question: does breaking apart monolithic forms into single task forms affect the time and stress perception on users completion?

1.1 Thesis structure

In the following section we explain how this research work is structured, as what to expect from each chapter.

In the **Background and state of art**, we present an exploratory research and analysis of what has been done regarding web forms and HCI. In here we also set the base ground with some definitions that will help the reader to comprehend the rest of this research work, such as what is HCI, what is User experience and so on. The

purpose of this chapter is to explore what has been done in these research fields and how this research presents a new contribution to the mentioned fields.

In the **Problem statement** we continue with an explanation of what this research attempts to answer. Here we present the main motivation of this research, the hypothesis: " By breaking apart monolithic forms into single task forms, completion time and stress perception on users is reduced" and the scope of research which is limited to Bachelor students of ITESM Queretaro as well as measuring only stress perceptions given the time limitations.

In the **Methodology** we present a scrutiny of how this research work was made. Here we describe what was done to test our hypothesis and why those decisions were made, in order to provide the reader a clear picture of the logical process involved in this research. This goes from explaining why A/B testing was the suitable methodology, how the experiments were conceptualized and taken into reality, the logical process to build the survey as well as discussing the implementation of a javascript library that helped us to develop such experiments.

In the **Results and Interpretation** we discuss the results of the experiments that were performed to test our hypothesis first as hard data to then move on into the analysis that led us into our final conclusions. Graphs and tables are presented here to help the reader comprehend in more extensive manner what this research produced.

Finally in the **Conclusion** we present the wrap up for this research work. Here we provide the reader a take away message of all the research, by answering if our hypothesis was proven or disproved and at the same time we propose future work for this research in order to extend the body of knowledge between long forms and single task forms.

Chapter 2

Background and State of Art

”Success of a technology simply results from the easiness with which the user can interact with it”[1]

In this chapter we explore the field of HCI (Human Computer Interaction) and its relationship to software engineering. We also discuss some general research efforts that have been done around web forms. To conclude, we analyze specialized research on web forms that has a direct relationship to this work.

2.1 Human Computer Interaction

In order to understand what HCI is and what it’s all about, we should first explore where it came from. Human Computer Interaction emerged in the early 1980s, first conceived as a speciality area in computer science that embraced cognitive science and human factors engineering.[5]

Why then and not before? In the late 1970’s only specialized information technology professionals interacted with computers, but this changed abruptly with the emergence of personal computing . From that point on, everyone in the world became a potential computer user, and they weren’t having a good time in terms of usability. HCI answered this challenge with one goal in mind: to produce software that was easy to learn and easy to use.

We have come a long way. Now when we talk about HCI and usability we think about fun, feedback, efficiency, satisfaction, and psychological and sociological factors. As Carroll[5] points out, we can see HCI as a community of communities. One of them is the UX (User Experience) community, which is important to this research since all the efforts that are presented here and the ones that will derive from this research are bounded to usability.

2.1.1 On User Experience (UX)

User experience (abbreviated as UX) is how a person feels when interfacing with a system. The system could be a website, a web application or desktop software and, in modern contexts, is generally denoted by some form of human-computer interaction (HCI)[13]. Don Norman, who coined the term, defines usability as a quality attribute of the UI, covering whether the system is easy to learn, efficient to use, pleasant, and so forth[21].

The HCI field UX is nurtured by many fields, as seen on Figure 2.1



Figure 2.1: Usability related fields

Why is UX important? As stated by Alex Roney [1], success of a technology simply results from the easiness with which the user can interact with it. If the interface is poor or hard to use, the user will simply ignore the product or technology. Hence, having usability when designing a software product is a major key to success. This is one of the reasons why UX has gained so much notability over the past years in the software field.

2.1.2 On Software products

When we talk about software we talk about Software Engineering (SE), and the link between HCI and SE is pretty tight, as Kazman explains[16], "it has been reported that almost half of software in systems being developed today and thirty-seven to fifty percent of efforts throughout the software life cycle are related to the system's user interface; for these and other reasons, problems and methods from the field of

human-computer interaction (HCI) affect the overall process of software engineering (SE) tremendously, and vice versa”.

Web applications are an example of software products which have become increasingly popular. With about 1.5 billion users on the web[13], it is not surprise that web applications are becoming part the daily routine of a computer user. That is one of the reasons why research in usability and web applications increased in the early 2000’s and has continued ever since[25, 27, 3, 4, 26, 24, 19]. A few examples can be seen in figure 2.2

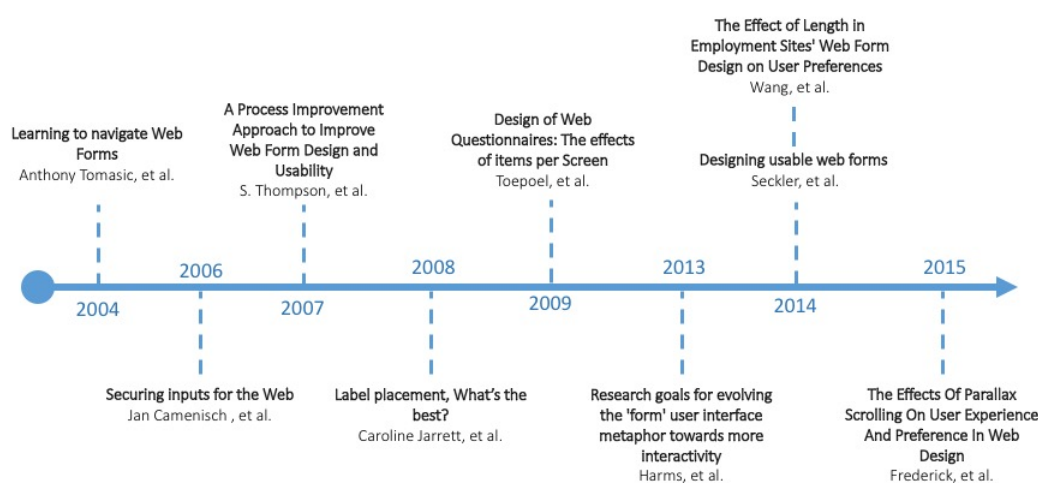


Figure 2.2: HCI research on web timeline

2.2 HCI research in Web Forms

Distinct factors gave researchers the necessary motivation to start exploring the field of web forms. One such factor is that web forms are an angular piece for web systems, since they are the main way users input data. From filling a simple login, which can consist of two fields, to long forms that contain many fields (see figure 2.3) interaction becomes more complex as more fields are involved. These were not particularly user friendly, as Wroblewski[12] explains: ”nobody likes having to fill out a form; its just that bit of red tape that must be dealt with before we get what we want. Before we are approved,there is an application form. Before we get to use a Web service, there is

a registration form. Before our purchase is complete, there is a payment form. Form completion is a cost we must pay before we benefit”.

Domain and Form	Number of Fields
Business Adm.: Editing a person in JFire	35
Social Networking: Profile page in Xing	66
E-Health: OpenClinica Docetaxel sample study	143
E-Government: US 1040 tax return form	246
Software Eng.: Eclipse preferences dialog	> 300

Figure 2.3: Data obtained by Harms, regarding number of form fields in distinct environments[11]

Those factors gave birth to much research regarding web forms and usability. In this section we will discuss and look at a few of them.

2.2.1 Brief introduction of what has been done

In 2008 Caroline Jarrett et al.[14] published a paper titled *”Label Placement in Forms What’s Best ?”*. This research discussed the visual aspect of forms but focused on a single element: labels. She made it clear that labels are more than just text; they are the way forms ”ask” the user for an answer. She proposed that terms like ”your address” should be used over ”address” for a better understanding from the user. She concludes the paper by acknowledging one of the key rules in usability: there is no universal solution and label placement is not the exception. Rather than a rule, one should consider the users that will interact with the system, and the tasks that will be completed in order to define what’s best for our system.

In 2009 Caroline Jarrett [15] continued her efforts for making the forms more user-friendly by publishing a book named *”Forms that work”*. This book can be seen as a continuation of her previous work [14], like the paper we just mentioned.

Moving on in the time-line, in 2013 a major effort from Harms[10] was published under the name of *”Research goals for evolving the ’form’ user interface metaphor towards more interactivity”*. Here, Harms wanted to change the way users interacted with forms because, as he states, ”Forms have been static, document-like user interfaces (UIs) for centuries.” He proposed a few insights on forms, such as including auto complete fields, and improving navigation by the inclusion of Focus-and-content navigation. But the main contribution of this work, as he exposes it, was to provide a deeper understanding of forms, systematically highlight relevant research topics, and hopefully foster a scientific discussion in form design. In the following year, he[11] published another work titled *”Design Space for Focus+Context Navigation in Web*

Forms” where he went deeper in one of the topics of his past work, Focus-and-content navigation.

In 2014 another major work regarding forms and usability was published during the ACM CHI Conference on Human Factors in Computing Systems of that year. Seckler[24] published *”Designing Usable Web Forms Empirical Evaluation of Web Form Improvement Guidelines”*. In this work she tracked eye movement to test the effectiveness of 20 guidelines. This research is of special importance since it combined quantitative data, the eye tracking, with qualitative data, a subjective questionnaire that was applied to the subjects. In the results of the research she found that by implementing these guidelines, users were able to complete the forms faster, reduce the failed submission trials, reduce the eye movement, and increase the user satisfaction.

In 2015, a paper by Nomura[19] introduced an analytical method for web form usability; they complemented Seckler’s using an electroencephalogram. All of this effort ended with the suggestion of a web form that, based on their research, users can complete more easily. They make an emphatic remark that these research was made over Japanese forms and with Japanese speaking test subjects.

We can see that there is a lot that has been done in the field of forms regarding usability, but there’s also plenty of new work that can be done, like replicating the Nomura[19] research with Latin American subjects or complementing the Seckler[24] research with any new guidelines. In the past few years we have seen visual design trends rise and die,[7, 9] and these visual design trends impact the way a form look, thus impacting the way users perceive them. There is still more research to be done in this area.

2.3 Research regarding Form Navigation

This research focuses in navigation, one of the interaction factors on forms. In this section we will give a little introduction for each of the three researches and then analyze and compare them. The involved researches are:

1. Design of Web Questionnaires: The Effects of the Number of Items per Screen[26]
2. The Effect of Length in Employment Sites’ Web Form Design on User Preferences [29]
3. The Effects Of Parallax Scrolling On User Experience And Preference In Web Design[8]

2.3.1 Brief introduction of what has been done

The first research work was published in 2009 by Toepoel et al.[26] "*Design of Web Questionnaires: The Effects of the Number of Items per Screen*". This research presented the result from presenting one versus multiple items per screen in a Web survey. In order to find out how that manipulation affected users interaction. Four formats were tested:

- 1 item per screen
- 4 items per screen
- 10 items per screen
- all (40) items in screen

The results from this work are the following:

- The use of screen-by-screen format can be a lack of context. This result is specially relevant for the construction of a proposed solution, where the user will always have context of what is going on, such as how many questions are left, in which question he is at the moment.
- Scrolling questionnaires can lead to shorter completion times. This is relevant to have in mind when presenting a solution in this work, and also to keep in my when presenting conclusions for this work.
- A linear relationship between the number of items per screen and item non-response, the more items per screen caused users to forget a field or don't even see that they were missing one answer. This is a relevant insight for the field of forms since as Nielsen[22] mentions, preventing errors is one of the basic usability heuristics when thinking on user experience.
- A linear relationship between the number of items appearing on a single screen and the duration of the interview is found. This is specially important for this work, since we are seeking to search impact between time completion and breaking apart forms.
- The more items appear on a single screen, the more difficulty people experienced in answering the questionnaire.

In 2014 Wang[29] published "*The Effect of Length in Employment Sites Web Form Design on User Preferences*". This research, like Toepoel's, explored the variations on formant and length on web forms. The form that was tested in this research consisted of 9 steps and the presented variations were the following:

- All items in screen.
- Form divided in 3 chunks, each one containing 3 items per screen.
- 1 item per screen.

The results from this work are the following:

- Participants preferred the paginated form with a clear sense of steps. However, they did not like the form to be split into too many pages. It is important to have this in mind, when proposing a solution in this work. Also this insight backed what Toepoel[26] found in regards of users wanting more context available when answering a form.
- Users wanted an indication of progress and automatic saving of filled-in information if the form is separated in many pages. As the past result it shows that its important to show the user how much they have advanced in the form completion.

In 2015 Frederick[8] published "*The Effects of Parallax Scrolling on User Experience in Web Design*", where he explored one specific variation in form navigation. Rather than separating the form in different formats, he implanted Parallax scrolling, which is defined as an effect that allows multiple backgrounds in a web page to move simultaneously at different speeds, thereby creating the illusion of depth.[8]. In order to test this concept, he presented the following variations:

- A site that included Parallax.
- A site without Parallax.

The results for this research are the following:

- The Parallax website was perceived to be more fun than the no-Parallax website. This insight show how integrating interactions such as animations can positively impact User experience, and should be kept in mind when trying to build tools for users.

- Parallax could positively affect UX when used in a hedonic and fun context. This insight reinforces the insight about how the inclusion of parallax can make a good impact in your users experience.

2.3.2 Analysis

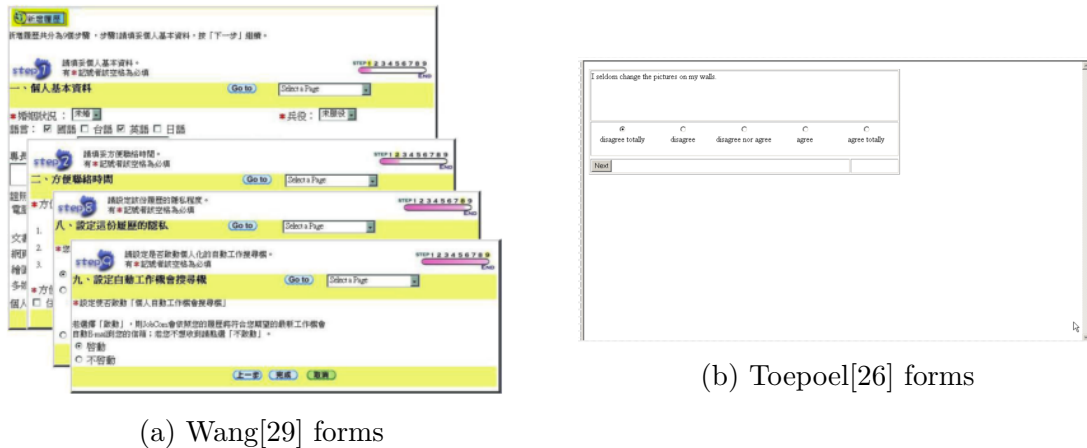
In this section we analyze the previously introduced researches based on different factors such as sample size, factors measured, introduced variations to forms, etc.

As can be seen in figure 2.4, the size of the sample varied a lot, going from less than a hundred to the thousands. This has to do with different factors; the tests on the Toepoel research[26] were remote and used an existing user base while the other two were implemented in a similar setting ,a school environment, which limited the size of the sample. Also, only the Frederick[8] research specifies in detail how the tests were done and assessed the limitations of the used method, intercept method, which consisted of inviting test subjects to participate in the test while they were walking on the campus. Each of these researches offered a different perspective regarding how navigation impacts forms. It is very interesting to see how Wang[29] and Toepoel[26] complement each other; Wang includes suggestions that can be implemented when separating forms, which will be considered for this research. Also it is interesting that Wang measured time of completion in order to see if the linear relationship found by Toepoel was replicated.

	Design of Web Questionnaires: A Test for Number of Items per Screen	The Effect of Length in Employment Sites' Web Form Design on User Preferences	The Effects of Parallax Scrolling on User Experience in Web Design
Sample size	2565	48	86
Sample characteristics	Varied, from young adults to elderly people.	Students. Undergraduate and graduate.	University students and staff.
Way of testing	Subjects were separated in groups and each one filled out one variation of the form	Each subject filled the form in the three existing variations.	Subjects were separated in groups and each one filled out one variation of the site
Introduced variation	Number of items per screen	Number of items per screen	Parallax scroll
Measured variables	Duration, Easiness, Layout	User ratings of the Web form design features as well as their satisfaction with the overall user experiences (Not specified variables)	Fun, Usability, Visual appeal, Satisfaction, Enjoyment
Results	Found a linear relationship between items per screen and item non-response and a linear relationship between the number of items appearing on a single screen and the duration of the interview is found.	Participants preferred the paginated form with a clear sense of steps. However, they did not like the form to be split into too many pages	The Parallax website was perceived to be more fun than the no-Parallax website. No significant change in the other measured variables.

Figure 2.4: Comparison of mentioned research

An area of opportunity is to complement or re-evaluate the discoveries made by Toepel[26] and include the recommendations that resulted from Wang’s[29] research into this work. Another area of opportunity is including the visual factor of the forms, since these two researches didn’t give a major role to it and kept a really basic visual design to their forms see figure 2.5.



(a) Wang[29] forms

(b) Toepel[26] forms

Figure 2.5: Visual aspect of forms used in research

2.3.3 Conclusion

In conclusion, there has been recent efforts in making the experience of users better, when dealing with forms. But there is also great room for improvement or test other ideas that the mentioned authors may have not explored by their own. One example of it is to follow up the insights of these research, like integrating a progress bar in forms to re test impact in breaking apart forms. So one great area of opportunity here is to add these interactions to forms, such as keyboard navigation, more interactivity, sense of context to test the impact of single task forms when presented to users and how these alterations may impact insights already made. One example of these insights is how Toepel[26] found that less items per screen can lead to a longer time of completion, and adding these alterations may or may not alter this insight.

Chapter 3

Problem statement

In the previous chapter we analyzed what has been done on web forms usability and we took a deeper dive into those studies that focused on navigation or how to manipulate the number of questions per page. In this chapter we will discuss what motivated this research, connect it to the proposed hypothesis, and acknowledge the scope and objectives of the research.

3.1 Motivation

This investigation was born from the idea that long forms are tedious to fill out and could take a lot of effort from the users. This was confirmed by the authors cited in the background chapter [12, 1, 4, 29]. Another source that inspired this work was the emergence of platforms as Qualtrics, Survmetrics and Typeforms, all of which introduce some kind of variation to the regular web forms. However, there are no studies that validate that the use of these platforms impacts in a positive way how users interact with web systems.

This problem is important because it affects the users of web systems; as expressed by Camenish et al [4], HTML web forms are the primary medium for user input on the web. Thus, when a user is confronted with the task of filling a web form, it shouldn't be a tedious task. From a business perspective, these interactions affect the potential success of a web platform, which will reflect as profit [4, 1].

Research on this include works that introduce variants to forms, as exposed on the background. But these works lack attention to visual design and interaction improvements, as seen in section 1.3.2 . The platforms used to test their hypotheses literally broke apart forms, without offering something else to the users. This research aims to break apart monolithic forms into single task forms. At the same time, it

replicates the attention to detail on visual design and interaction that platforms like Typeform and Survmetrics present.

3.2 Hypothesis

Our hypothesis is that: By breaking apart monolithic forms into single task forms, completion time and stress perception on users is reduced. As mentioned in the motivation, by proving or disproving this hypothesis, we could have an impact on how forms will now be presented to users in terms of the number of items per screen. We will also attempt to determine if the visual design and interaction tweaks on forms really impact how a user completes a form as measured by stress perception.

3.3 Research goals

Having presented the problem and its justification, we now present the goals of this research work:

- To test out how breaking apart long forms into one item per screen impacts time completion and stress perception in users.
- To analyze the results of testing the platform in order to obtain insights on how these alterations on forms ultimately impact user experience.

3.4 Scope of the project

This work will focus only in testing one type of web form: Web surveys, which commonly imply long forms. The research team of Survey Monkey[30] found that the median survey length is of 10 questions, which translates to 10 form fields. Also, these type of forms are the easiest to test since there is no need for previous engagement, unlike other types of forms, like hotel reservations. The measurement of stress will be restricted only to the users' own perception, via a simple survey. No controlled environment will be used, nor other means of stress measurements such as electroencephalogram (EEG). The testing of the platform will be carried out with college students only. They are all assumed to have the same exposure to web system technologies. More specifically, bachelor students of the ITESM campus Queretaro will be the target of the research. No controlled environment will be employed in the testing of the platform, given the limited time and resources at hand.

Chapter 4

Methodology and Solution

In this chapter we will discuss what has been done to solve the proposed problem and why those decision where made. The objective is to provide the reader with a clear a picture of the logical process involved in this research. This will be accomplished by explaining the way the surveys were designed and the methodology used for making the usability test, all of this with the purpose of proving or disproving our hypothesis, since there is no formal study that validates that shorter forms are faster to complete and reduce stress perceptions on users.

4.1 Envisioning the solution

This research's solution to tackle the problem consisted in designing a survey that could be considered a long form, in which we could measure completion time and factors related to stress perception, in the two proposed schemes: single task and long form. In the following sections we describe these elements in depth.

4.2 Selected methodology

In order to answer our hypothesis, user testing had to be done. We evaluated a time completion metric and the perception of the user's own stress level. A/B testing was selected for this purpose. Chopra[6] defines this methodology as *"you have two versions of an element (A and B) and a metric that defines success. To determine which version is better, you subject both versions to experimentation simultaneously. In the end, you measure which version was more successful and select that version for real-world use."* . This methodology is the most adequate for this research since we are going to test two versions of the same survey: long form and single task forms.

4.3 Elements of the experiment

In this section we will take a look at how the different pieces that conformed the experiment came to be, as well as the logic behind the decisions taken regarding each of these pieces.

4.3.1 Survey

The first step was to design the survey that users would answer in long and short form. This survey consisted of 16 different questions. The number of items present was selected based on the research by Survey Monkey[30] that showed that the median length of a survey is 10 questions. In order to make the survey long enough, 6 more questions were added to the questionnaire, making our survey 60 percent longer than the median.

4.3.2 Defining the presentation of surveys

Once the survey questions were designed, the next step was to build the two presentations. Both surveys followed design guidelines presented by the Foundation CSS framework. The long form (see figure 4.1) would present all the fields in a single page, meaning the user will need to scroll in order to navigate through. The second one is the single task form (see figure 4.2), where questions would be prompted to the user one at a time, along with other added interactions such as keyboard navigation, advance bar indicator and the ability to select an option with a key. These two different presentations are the A and B variations presented to the test subjects in A/B testing.

ITESM QRO

¿Que semestre te encuentras cursando?*

¿Que carrera estudias?*

¿Haz cursado toda tu carrera en este campus?*

Si No

¿Haz comido en alguna de las cafeterías dentro del campus?*

Si No

En caso de haber respondido si, a la anterior. Consideras que la comida servida fue:*

Calidad Buena Calidad regular Calidad Mala

Selecciona las características que para ti son mas importantes cuando asistes a comer a cualquier lugar:*

Precio Variedad de opciones Servicio rapido Opciones de combos Sabor

Cual de las cafeterías del campus considerarías es la mejor y por que razón? Ingresas su nombre o referencia (ej. La de arquitectura)

continues



Figure 4.1: Long form

Campus ITESM CQ 0 / 16

¿Que semestre te encuentras cursando?*

[Siguiente](#)

puedes presionar enter para continuar o las flechas ← → para navegar

Figure 4.2: Single task form

4.3.3 A tool for presenting long forms as single task

In order to achieve what the past subsection states, a Java Script library was created. Which works as a set of CSS classes, which need to be added to the existing forms in order to break them apart, as well as some HTML that need to be added to the

HTML document. How this library works is that the Java Script library parses the DOM via JQuery and binds actions to the HTML nodes that have the specified class in the library. In this library we included routines to advance the next question, assert the answers of the users and others.

This library was implemented in order to provide a open source library that does this kind of job, since other solutions are paid or add more complexity to integrate them in an existing solution. The construction of this library helped to test our hypothesis, of long forms and single task forms. When constructing this solution insights of other researchers such as Wang[29] was taken into account, for example the insight of Wang led to adding a progress bar into the single task library.

For more information about how the library can be used on your projects refer to <https://github.com/PoloSarcia/HCIForms> read-me file.

4.3.4 Perceptions measurement

The second step in forming all the elements of the experiment was to design a simple set of questions that will tell us more about how users felt while answering the survey. First we defined which perceived factors could affect stress perception. This was done via simple interviews and conversations with members of the population that this research aims, since every year they have to answer a long form regarding the quality of the lectures they received that year. The factors that came out of this interviews were: perceived length, perceived ease of answering and perceived speed of completion. The post-survey questionnaire was designed based on these factors.

4.3.5 Testing environment

The final step was to decide the size of the sample to participate in the testing in order to represent the population of bachelor students of the ITESM Campus Queretaro. According to Nielsen [18], if we are seeking to obtain quantitative data in usability metrics, we should be aiming to 20 users. That's the minimum number of test subjects that this research will present. Regarding how to select our sample, since we were looking for engagement, we sought help of academy professors for a space in their lectures where the users would answer our survey. Thus, the sample was random within the specified population and since answering the survey was a lecture activity, the users were engaged in the process.

4.4 Executing the experiment

As mentioned in the past section, students from the participating lectures were given a URL where they could access and answer the survey. To follow the process that A/B testing proposes, half of the student in one lecture were directed to the long form survey and the other half was directed to the single task form survey. From there, the sessions of each participant were recorded to obtain the completion time. Once the users completed the survey, they proceeded to answer the post-survey questionnaire. In this fashion we ended up with the required data to test our hypothesis: completion time (quantitative data) and stress perceptions (qualitative data), which is further analyzed in the results chapter.

4.5 Conclusion

In this chapter, we present all the steps and reasoning that lead to the selected methodology and how the solution was constructed. The selected methodology is A/B testing given the nature that there are two form variations to be tested. We also defined that the survey would have 16 questions and at least 20 user test per form variation will need to take place. Finally we moved in to explaining that we'll be measuring time of completion recording user sessions and regarding the stress factors users will answer a post completion questionnaire. In the next chapter we'll take a look at the results of the experiment that was explained in detail here.

Chapter 5

Results and Interpretation

In this chapter we present the results and interpretation of the experiments we performed to test our hypothesis. The objective here is to provide the reader with the data that lead to the conclusions of this research. First we present the data that resulted from the experiment. Next, we proceed to interpret and analyze those results, taking into account the research objectives; and finally, we close the chapter with some conclusions drawn from the analysis.

5.1 Results

In this section we present the results of the experiment. The results described here are divided by the two different presentations of the survey. We performed 66 tests in total, 33 for each variation. Each subsection will present the qualitative and quantitative data obtained for each of the survey presentations. The details as to how they were constructed are presented in the previous chapter, but here are some key points to keep in mind: the survey contained 16 questions, and when a user was finished with the survey they answered three short questions regarding perceived length, perceived ease of use, and perceived speed of completion.

5.1.1 Long form results

The long form variant of the survey consisted of a form where all the fields were present in the same page. We recorded each user's session so that we would be able to extract time of completion and then calculate the following metrics:

Measurement	Result (in minutes)
Median	2.68
Standard deviation	0.79
Maximum time of completion	4.26
Minimum time of completion	1.42

Table 5.1: Time of completion in long forms

Regarding the post-survey questionnaire (quantitative data), here we describe the results obtained from the users that evaluated the long form. These results are presented as graphics; each bar of the graph contains the exact number of observations:

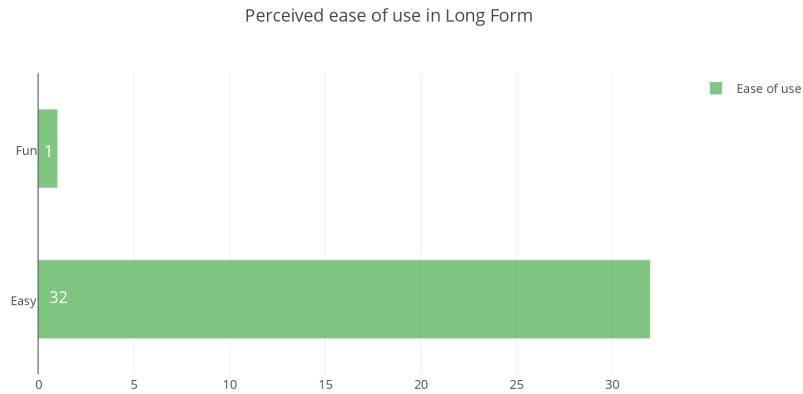


Figure 5.1

In this graph (figure 5.1), it is important to note that we obtained 0 occurrences of the "tedious" option, which is why it doesn't appear on the graph.

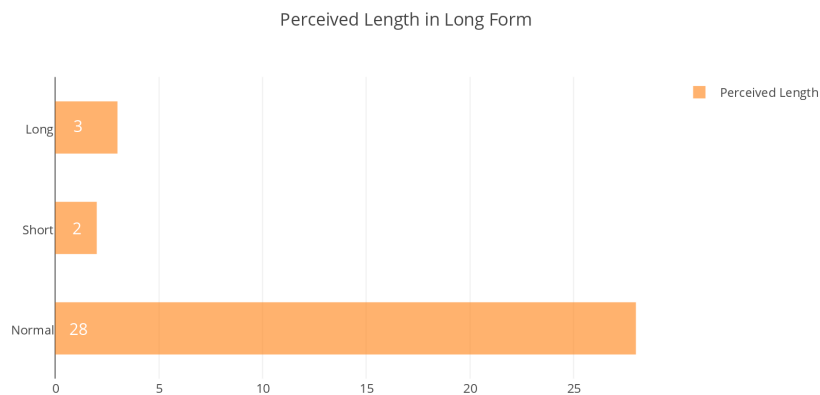


Figure 5.2

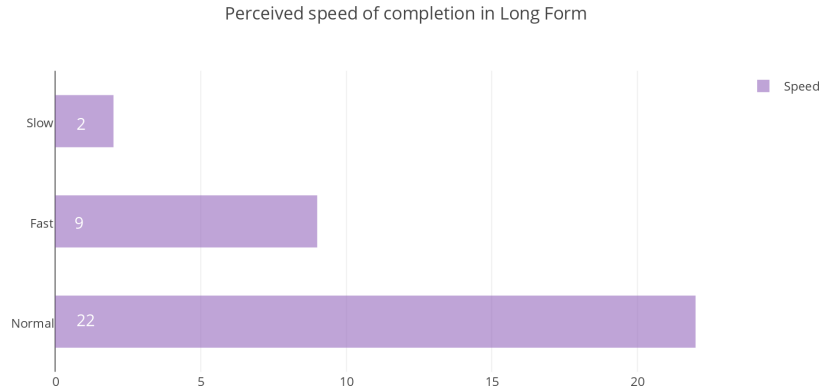


Figure 5.3

5.1.2 Single task form results

As presented in the past chapter, the single task variant of the survey presented the user with one field at a time and added interactions such as number of questions answered and a progress bar. In the same fashion as with the long form, each user session was recorded so completion time could be extracted and we were able to calculate the following measurements:

Measurement	Result (in minutes)
Median	3.04
Standard deviation	0.94
Maximum time of completion	5.11
Minimum time of completion	1.30

Table 5.2: Time of completion in short forms

Regarding the post-survey questionnaire, here we present the results obtained from the users that evaluated the single task form. These results are presented as graphics; each bar of the graph contains the exact number of observations:

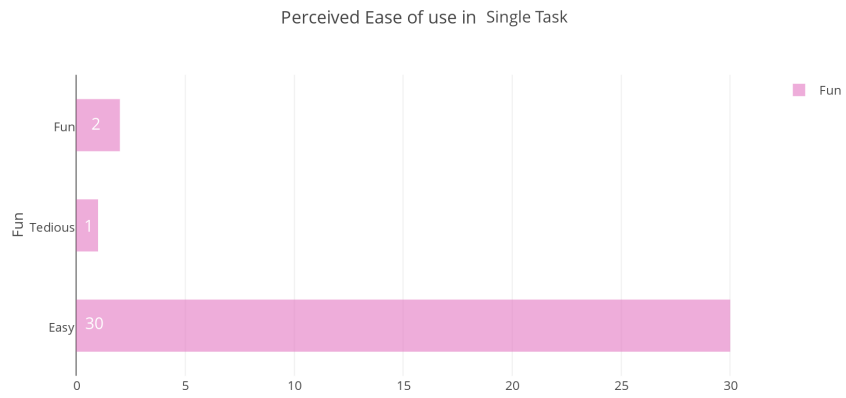


Figure 5.4

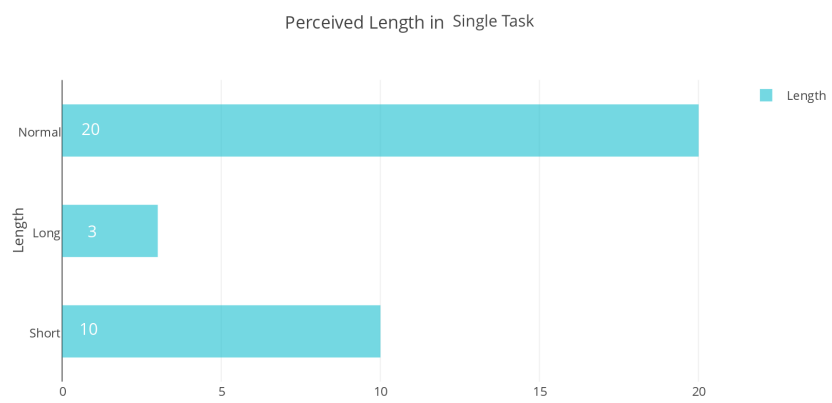


Figure 5.5

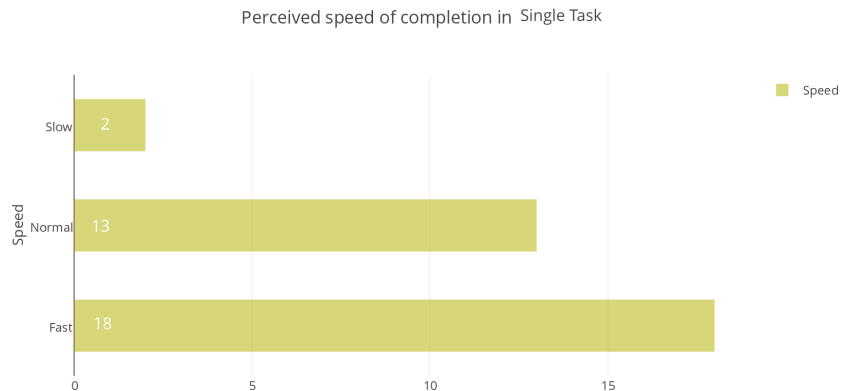


Figure 5.6

5.2 Interpretation and Analysis

In the problem statement chapter we outlined two research goals:

- To test how breaking apart long forms into one item per screen impacts time completion and stress perception in users.
- To analyze the test results in order to obtain insights on how these alterations ultimately impact user experience.

These are important to bring up so that we can interpret and analyze the results of the experiment in the context of each one.

5.2.1 Impact on time completion

We can easily see that the long form made a better job by looking at the time of completion median **2.68 minutes in long form** vs the **3.04 minutes in the single task form**. In this regard, we can conclude that the single task presents no improvement when comparing it to a traditional long form; in fact, it makes the process slower. This confirms what Toepoel [26] discovered in her research: that the less items per screen, the more time it took to the users to finish their interview.

5.2.2 Impact on stress perceptions

Three factors were considered to construct the stress perception in users: **perceived length**, **perceived ease of use** and **perceived speed of completion**. The results

of these measurements will be presented in this section, in order to compare what long form and single task forms made the users perceive.

The first evaluated factor was **perceived ease of answering**. By evaluating it, we aimed to find which of the variations was easier for the users to answer. Here we demonstrate a comparison of the results:

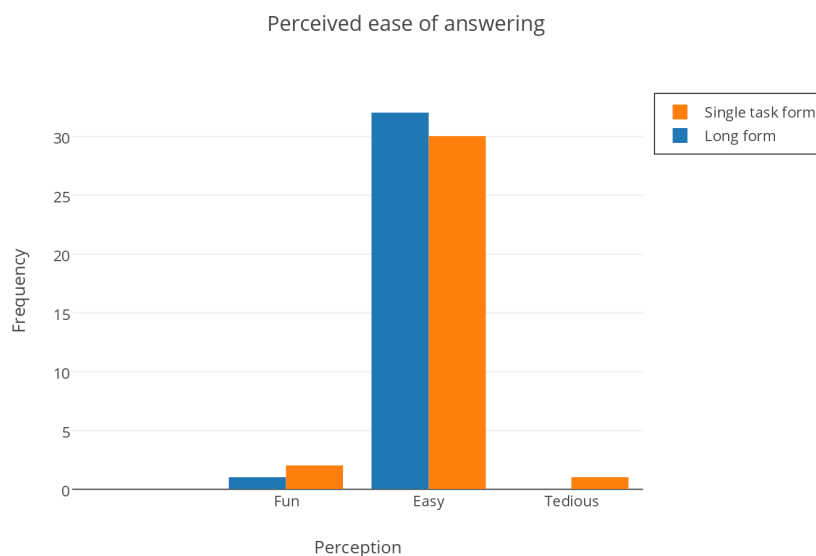


Figure 5.7

For this factor, we obtained very similar results between the two variations. It is interesting to see that we obtained one description of "tedious" on the single task form and two descriptions of "fun". But is by this very small variation that we can conclude that the variation between long form and single task form presents no notorious difference on which is easier for the users to answer. This might be related to how users are used to long forms because, as stated by Harms[10], forms haven't changed in a very long time.

The second evaluated factor was **perceived length**. By evaluating it we aimed to look if the users felt one of the variations was shorter than the other, even though the survey was exactly the same apart from the presentation. Here we demonstrate a comparison of the results:

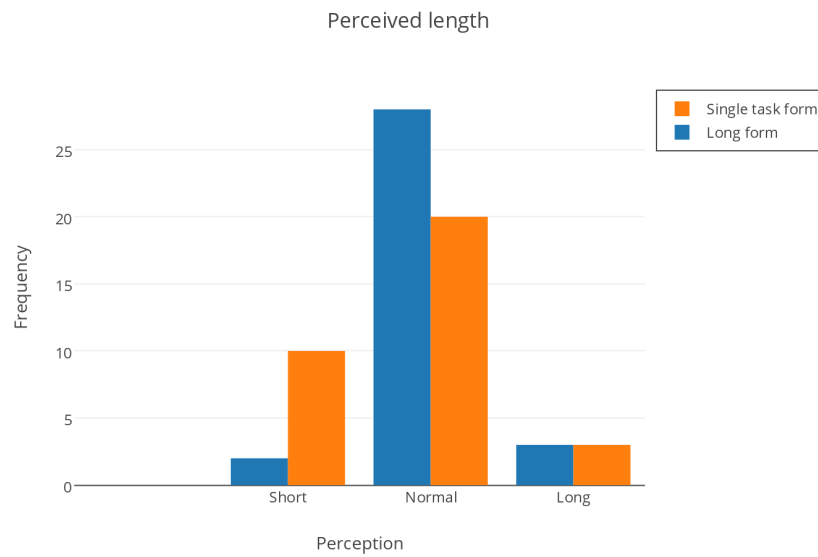


Figure 5.8

In this factor we obtained a notorious difference between the two variations. About **30.33% of the users that answered the single task form perceived it as a short survey, compared to 6.06% in the long form.** With this we can interpret that single task forms has more positive impact on how users perceive the length of the survey.

As for the third evaluated factor, we selected **perceived speed of completion.** By evaluating it we aimed to observe if whether or not the users felt any difference between the two variations, specifically in terms of speed. Here we demonstrate a comparison of the results:

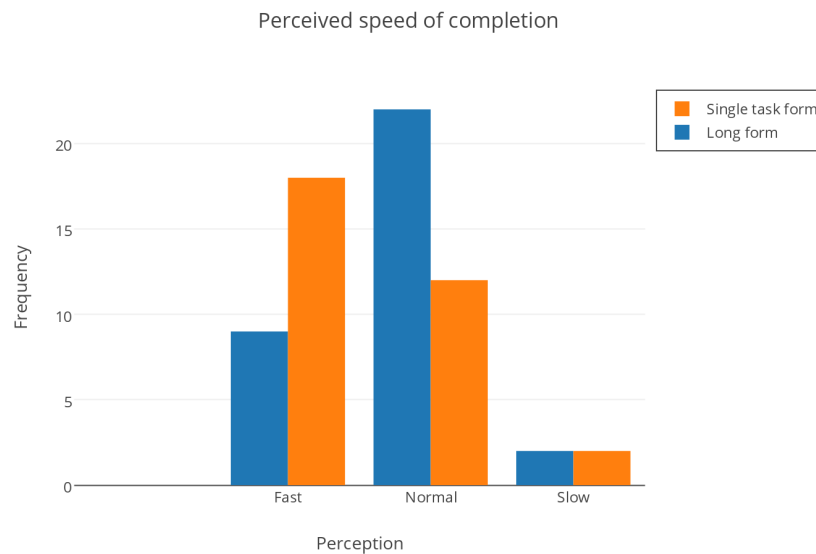


Figure 5.9

In this factor is where we obtained the most notorious difference between the two presented forms. **About 54.54% of the users felt that the speed of completion in the single task form was fast, while in the long form only 27.27% perceived it in the same way.** As for the users that perceived it as slow to complete, both variations are tied with two users each. This data can lead us to interpret that in fact single task forms impact in a positive way how users perceive completion speed.

To conclude this section, based on two of three factors which presented a positive impact, we can state that single task forms can impact surveys presentation in a positive way and could ultimately improve stress perception in the users.

5.2.3 Final insights

One of the objectives of this research was to obtain insights as to how the alterations presented on single form tasks could affect the user experience. Here it is what we obtained:

- Even though single task forms showed a larger median on time completion than the long form, more users perceived them as faster to answer. This can be the result of how usability impacts user perceptions, as some research examines [17, 2, 23, 28].

- If we take into account the evaluation of the three factors presented, single task forms offer a better user experience.
- Some of the test subjects that answered the single task form came forward at the end of the test to comment how they found this variation was more usable and enjoyable than what they have used at that point (long forms).

We can examine how the proposed alterations make the user experience perception better while sacrificing completion times, at least for the members of the population this research aimed. So here we must ask ourselves: is perceived usability/aesthetics more important than real? Don Norman's [20] answer is that it ultimately depends on what your users want: what if for my user a fast way to answer is a better user experience or in the other hand a more bearable way to answer a survey is what they are looking for.

5.3 Conclusion

In conclusion, our hypothesis was disproved since long forms are faster to answer than the single task form. But the single task form impacted in a positive manner some of the factors that could affect stress perception. So there is no clear winner between the two variations as it depends on what are you searching to provide to your users or even what are you seeking to obtain from them. If you want a fast way to answer, based on the results of this research, long form is the way to go. But if you are searching to provide your users a more bearable way to answer surveys, then single task forms might be better. So there is no golden rule for form presentations, each of these variations as stated before offer pros and cons.

Chapter 6

Conclusion

In this chapter we present the final summary of this research and some future work. The objective here is to provide the reader the take away message of this research and remark the insights obtained. First we present the research conclusions, and from there move into some future work regarding this research.

6.1 Conclusions

This research provided a comparison between long forms and single task forms, regarding how each one impacts two factors: time completion and stress perception. Experimentation took place with bachelor students of the ITESM campus Queretaro via A/B testing and limited to testing a survey in the two proposed variations.

After the experiments were performed, this researched revealed that long forms are faster to answer than the single task form, with the following medians: **2.68 minutes in long form** vs the **3.04 minutes in the single task form**. Regarding factors related to user stress, the single task form impacted in a positive way two of the factors: perceived speed of completion and perceived length. As mentioned in the results chapter, there is no clear winner between these two variations. For that reason we concluded that there is no "one-fits-all solution" of how forms should be presented to the users. It all depends of what are you seeking to provide your users, and which of those two factors is the most important to improve.

We also concluded that single task forms present a more usable experience perception in the users than the long forms, but as Don Norman[20] proposes, we'll have to weight what we care about more again. So ultimately this research puts on the table what each of the variations has to offer. It's up to interaction designers and web designers to decide which of the two is better for what they're looking to achieve.

In this last note it is always important to take in account which will bring your users or your business more pros than cons. If a fast time of completion is your main goal you might opt for long forms, but if you're pursuing a more bearable experience for your users, you might opt for the single task form.

6.2 Future work

In this research we focused on two metrics: time of completion and stress perception (measured by factors), which lead us to the conclusions stated before. However, since user interaction is not limited to only those two factors, there is plenty of work to do in this particular topic of long form vs single task form. In the following points we propose some ideas of future work that could hopefully help researchers as a starting point to extend this research:

- **Error prone:** Explore how many mistakes users make when interacting with each of the forms variation. Is there a correlation between the number of mistakes made by a user and the number of items per screen? This question poses a really interesting insight since errors can translate into user frustration and preventing errors is one of the 10 usability heuristics proposed by Nielsen[22]
- **Quality of answers:** Surveys are represented by forms, and when we are making a survey we care about the quality of the answers, specially in open-ended questions. If there was a factor to measure the quality of answers, it could result in interesting insights if any of the form variations generates more meaningful answers.
- **User interviews:** By making these sessions we could see the perceptions of a user with respect to the form variations, instantly know their first impressions when presented with each variations, and know their specific feelings and opinions towards each variation without just narrowing it to some factors in order to expand the knowledge generated here.

These are just some suggestions of what future work for this research could look like, but finally what will dictate this is the needs of the user or the client seeking to answer questions for their business.

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