Customisable game interfaces impact on game experience
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ABSTRACT

A graphical user interface (GUI) is the bridge between the software and the user. In video games the user interface must be easily understandable and apprehensive. In fact, if a user interface is poorly done it will often break the game and make the user choose another game. If a user has the ability to configure and change the look of the user interface, will it then result in improved game experience? That’s what we investigated in this thesis. To carry out the investigation we developed a fully customisable user interface to a game called “World of Warcraft”. We then compared the original “World of Warcraft” GUI with our own developed customisable GUI; this was conducted with a usability test with five participants.

The result of the investigation showed that the participants in fact noticed an improvement in game experience and were intrigued to continue playing. With the customisable GUI the users felt that they could make more important abilities more accessible by either position them in a certain way or change the size of them.
ACKNOWLEDGEMENT

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TABLE OF CONTENTS

ABSTRACT ..........................................................................................................................3
ACKNOWLEDGEMENT .........................................................................................................4
TABLE OF CONTENTS ...........................................................................................................5
INTRODUCTION .......................................................................................................................6
  Background.........................................................................................................................6
  Purpose...............................................................................................................................7
  Goals.................................................................................................................................7
  Target Audience................................................................................................................7
  Delimitations......................................................................................................................7
  Hypothesis........................................................................................................................8
  Research Questions...........................................................................................................9
  Method...............................................................................................................................9
DESIGN OF CUSTOMISABLE GUIs ....................................................................................10
  Customisation..................................................................................................................10
  The GUIs used in our usability test................................................................................10
USABILITY ............................................................................................................................14
USABILITY TESTING ..........................................................................................................15
  Introduction.......................................................................................................................15
  Purpose of the test............................................................................................................15
  Problem statements.........................................................................................................15
  User profile.......................................................................................................................16
  The test participant criteria............................................................................................16
  Conduction of the test......................................................................................................16
  Test monitor role.............................................................................................................17
  Test plan steps................................................................................................................17
RESULT OF USABILITY TESTING .....................................................................................18
  Interview and question form results..............................................................................18
ANALYSIS OF RESULT .......................................................................................................20
  Learnability......................................................................................................................20
  Efficiency........................................................................................................................21
  Errors...............................................................................................................................21
  Subjective satisfaction....................................................................................................22
CONCLUSION ......................................................................................................................23
DISCUSSION ........................................................................................................................24
FURTHER RESEARCH .......................................................................................................25
LITERATURE AND OTHER SOURCES ..............................................................................26
  Books...............................................................................................................................26
  Web sites..........................................................................................................................26
APPENDICES .......................................................................................................................27
  Appendix I Question form..............................................................................................29
  Appendix II Note taking form.........................................................................................31
  Appendix III Readme.....................................................................................................31
  Appendix IV Result of usability testing.........................................................................31
  Appendix V User configured GUI:s................................................................................34
INTRODUCTION

After playing some certain games where it was easy to customise your user interface we gained an interest for customisable GUIs in computer games. Because of that we wanted to research to what extent, if at all customisable GUIs can improve game experience compared to a static- not customisable, user interface. The better your user interface is, the more your users will like to use it, increasing their satisfaction [MOHAN99]. Our common thought is that game GUIs affect game experience more than what the regular game user/developer thinks. The user interface will often make or break a game. This thesis is set to prove or disprove our thoughts.

Background

The user interface is the coupling between the user and the program. New games usually have an advanced graphical user interface that shows all the information the player needs. The user interfaces for games are very different from the user interfaces for ordinary software programs. Games are built to be challenging, but not challenging for the wrong reasons. A game should not be challenging because of a glitch in the user interface. Player appreciates relevant difficulty, but not irrelevant hassles [UIDG].

A games user interface can be weak and hard to learn and the game can still be a hit at release. But after a while when people have tested it and reviews come out it can really kill a game’s sales. If the user interface is horrible, the game is likely horrible too. If a system is difficult to learn or to use, customers are likely to be dissatisfied eventually, even if it is a market success at first [UIDG].

A game user interface should not only display information, it should also allow the user to be in control of the game, deciding the actions the game should perform. A good user interface is a user interface where the user has no problems identifying what to press or click to do a certain action. A good game user interface also allows the user to focus on the objects or subjects that the user intends to work with. A bad user interface, on the other hand, perhaps forces the user to focus on other objects and subjects than the intended [BÖDKER91].

However, a great game user interface is one where the game allows the user to change the look and feel of the interface. Where it lets the user to fully arrange where and how the user wants to interact with the game. User interface customisations for games compared with ordinary software programs are often preferable. Games tend to have less user interface graphical elements (widgets), for example “Baldur’s Gate”, than an ordinary software program. This makes games more suitable for interface customisation than for example a huge software program.

There is no such thing as a standard for making game user interfaces. Almost all games have a unique graphical user interface, not counting old command line games. So when you first play a new game, you have to learn how to use its user interface. Because of this there is only money and time that stands in the way for the developers to implement user interface customisation in new games. Unfortunately money and time is usually a big concern for game developers. To convince software developers and purchasers we need more than fine words,
we need some metrics [MADDIX90]. This thesis will hopefully help developers to consider implement GUI customisation for their games. However, first the developer has to consider if they really need customisation in their game. Customisable GUIs don’t fit all type of games.

**Purpose**

The purpose of this thesis is to examine whether customisable GUIs affect game experience or not. We haven’t found any similar investigation into this subject, so we hope this thesis can spread some light on the subject.

**Goals**

The goal for this thesis is:

- Investigate if customisable GUIs affect game experience.
- Find out in what way customisable GUIs affect game experience.

**Target Audience**

The target audience is anyone who takes part in development of GUIs in games. Anyone who in general is interested in GUIs, GUI design and usability might also find this thesis interesting.

**Delimitations**

This thesis will only look at GUIs from games perspective, i.e. not from standard software or tools point of view.

We will only explain the visual and functional aspect of the customisable game GUIs; we won’t explain how to implement it.
Hypothesis

“Customisable GUIs results in improved game experience”

Input:

- GUI
  - Customisable
    - Movable
    - Resizable
    - Modifiable visual aspect

GUI
A Graphical User Interface in a game is an interface between the core of the game and the user. The user interface displays information to the user and also gives the user the ability to interact with the game.

Customisable
To achieve a customisable GUI most, or all, of the elements in the GUI should be resizable, moveable or have a modifiable visual aspect. This is all at runtime; the user should easily be able to customise the GUI in game.
A GUI element can be a text displaying information, a clickable button or a frame containing these elements.

  - Movable
    An element is movable by the user within the game screen.

  - Resizable
    An elements size can be altered by the user. The user can make it smaller or bigger.

  - Modifiable visual aspect
    The user can change the texturing and colour of elements.

Output:
- Game experience:
  - Number of errors
  - Swiftness doing GUI commands
  - Subjective GUI satisfaction
  - Learnability
Game experience
Game experience is a shorter term for what a user thinks about a game and how fun he or she has playing it. We focus on the part of game experience where the GUI plays a role; we split it into the following parts:

- **Number of errors**
  The number of errors the user does using the GUI.

- **Swiftness doing GUI commands**
  Swiftness doing GUI commands is the time it takes for the user to do a GUI command from the time he decides what command he wants to do until it’s done. All interaction with the GUI is done with GUI commands; a GUI command can either be a mouse click or a keyboard command.

- **Subjective GUI satisfaction**
  The users’ perception, opinions and general feelings of the GUI design.

- **Learnability**
  How easy it is for the user to use the GUI for the first time

Research Questions

- How does the game GUI customisability affect the number of errors doing in game commands?
- How does the game GUI customisability affect the users’ swiftness doing GUI commands?
- How does the game GUI customisability affect subjective satisfaction?
- How does the game GUI customisability affect the learnability?

Method

To answer the questions at issue we had to do a usability test. To be able to do our test we had to implement a highly customisable GUI for “World of Warcraft”. We then compared our customisable GUI with the game’s original GUI.

We chose to look at the game “World of Warcraft” because the game supports scripting, which allows users to develop add-ons for the game. The standard GUI in the game isn’t very customisable so it did fit our needs perfectly.

The usability test took place in a project room at Blekinge Institute of Technology in Ronneby. The participants of the test were people who had a lot of experience with games but not necessarily “World of Warcraft”.
DESIGN OF CUSTOMISABLE GUIs

Customisation

Customisation means that the user can control and modify certain things. Customisation is good because it lets the user control how he wants things to work. If the user is used to have it in a certain way he will most probably be more productive and content if he can achieve the same looks and feeling another time, in this case in another game. You can say that customisation allows the user to “teach” the application the manner in which the user wants to use it. Such applications better meet users’ needs by not forcing the user to interact “its way” [MOHAN99].

With user interface customisation we refer to that there is a way for the user to rearrange, resize or modify the visual aspect of all or most of the user interfaces’ elements (widgets). The customisation we talk about in this thesis is all at runtime. The user should not need any programming knowledge to be able to customise the GUI.

If a user interface is insufficient and difficult to use at release it would often break the game. An application that is difficult to use will not be used. It won't matter how superior your software is technically or what functionality it provides - if your users do not like it they simply will not use it. So, one can not underestimate the value of user interface design [MOHAN99].

The GUIs used in our usability test

In our usability test we compare the original GUI in “World of Warcraft” with our customisable GUI. We had to limit our customisable GUI to player frame, target frame and action bars due to time issues implementing it. Even as it is now it’s around 3000 lines of LUA and XML code.
The original GUI

The original GUI in the game we used to perform our tests (World of Warcraft) isn’t very customisable at runtime.

Figure 1 shows the original “World of Warcraft” GUI. The components that are marked with white arrows are the components we focused on making customisable in our GUI.

1. **Player frame**, the only thing you can customise with this frame in the original GUI is to make it show health/mana* text on the green/blue bar.
2. **Target frame**, this can only be customised in the same way as the player frame.
3. **Action bar**, the bar you put your spells and abilities on. You can hide show a bar and bind keys to the different slots in the bar.

*Mana is a magical power resource available to certain player classes. [WOWWIKI]*
Our customisable GUI
Our GUI consists of four things that are different from the original “World of Warcraft” GUI:

1. **Player related components:** health bar, mana bar, portrait, player name and player level. All of these are split into separate widgets.
2. **Target related components:** health bar, mana bar, portrait, target name and target level. All of these are split into separate widgets.
3. **Frame,** this is a frame that you can put any other component in. Elements inside the frame will be moved with the frame and if you want scaled with the frame. You can create as many frames as you wish.
4. **Action button,** in this button you can put spells and abilities. You can also bind a key to the action button. You can create as many action buttons as you wish. All these components can be rescaled and moved as you please.

![Fig 2. Our customisable GUI with the different GUI elements shown. 1: all the player related components, 2: all the target related components, 3: an empty frame with options menu shown, 4: an empty action button.](image-url)
Fig 3. Our customisable GUI set up in a certain way. 1: shows a frame with player information, 2: a frame with target information, 3: a frame with four action buttons in it.
USABILITY

Usability is a quality attribute that assesses how easy user interfaces are to use [NIELSEN03]. However, usability is more than just the quality of the interface or the colours on the screen; it embraces the quality of the dialogue design, the ‘cognitive match’ between the system and the user [MADDIX90].

Usability can be defined by five quality components [NIELSEN03]:

- **Learnability:** How easy it is for the user to use the design for the first time.
- **Efficiency:** How long it takes for the user to perform tasks once they are familiar with the design.
- **Memorability:** How easy it is for the user to start using the design again after a period of not using it.
- **Errors:** How many errors the users make and how severe they are, and how easily can they recover from the errors?
- **Satisfaction:** What the user thinks of the design.

Usability is a hard thing to measure, how do you measure once satisfaction?

To test usability, a method called usability testing is introduced. Usability testing refers to a process that employs participants who are representative of the target population to evaluate the degree to which a product meets specific usability criteria [RUBIN94].

In this thesis’ usability testing we focus on user satisfaction, learnability, efficiency and errors.
USABILITY TESTING

Introduction

A test plan was developed to test if customisable game user interfaces have a great impact on the game experience. In this test we used our own developed customisable user interface add-on for “World of Warcraft”. The participants first tried the original “World of Warcraft” user interface and did a set of tasks. We then installed our own customisable user interface and let the participants configure the layout. We then asked the participant to do a similar set of tasks as with the original GUI.

- Purpose of the test
- Problem statements
- User profile
- Conduction of the test
- Test plan steps
- Test plan schedule
- Test monitor role
- Evaluation measures

Purpose of the test

The purpose of this test was to gather information about what the participants thought about user interface customisation in games. The test measured the time it took to set up the user interface, number of errors, response time and general opinion about customisation in game interfaces. A test should be as simple, concisely and reliably as possible [RUBIN94]. We tried to keep this in mind when we conducted our test.

Problem statements

These are the questions that had to be answered:

- How does the game GUI customisability affect the number of errors doing in game commands?
- How does the game GUI customisability affect the participant swiftness doing GUI commands?
- How does the game GUI customisability affect subjective satisfaction?
- How does the game GUI customisability affect the learnability?
User profile

Because game user interface customisation is an advanced subject that novice players probably won’t get in touch with, we mainly focused on participants who had previous experience with playing computer and/or console games. We also looked for participants who had vast experience and those who had game experience but never played “World of Warcraft” before.

The test participant criteria

Required

- Some computer/console game experience
- Average computer GUI knowledge

We required at least one participant with at least one of these requirements

- World of Warcraft game time
- World of Warcraft add-on knowledge
- General game GUI customisation

Conduction of the test

Before any test was conducted we had to design test plan steps, a question form (Appendix I Question form), a task list and a note taking form (Appendix II Note taking form). The question form consisted of two parts, one part for the participant to fill in before the test and a second part to fill after the test. The task list consisted of a set of tasks for the participant to complete with both the original GUI and the customisable GUI. The task list contained minor changes between the tasks for the original and the customisable.

The test was conducted in a project room at Blekinge Institute of Technology. The room consisted of eleven computers; we only needed one for our test and an extra laptop for the test monitor. We chose no more than five participants according to our user profile criteria. Research indicates that testing four to five participants will expose the vast majority of usability problems [RUBIN94]. Each test took about 30 minutes to complete.

If the participant had any questions about the configuration of the customisable GUI then they were free to ask the test monitor. The test monitor encouraged the participant to think out verbally when testing. The participant’s verbal comments gave us valuable information not covered in the question form.
Test monitor role

The task of the test monitor was to sit in the room with the participant and record timings, take notes, observe errors and ask questions before and after the test.

The test monitor also briefed the participant about how to use the customisable user interface and set up the environment, because this is not part of the test. The participant also received a small readme file (Appendix II: Readme) where all the customisable user interface commands are listed and explained. The test monitor had a responsibility to be prepared to answer any questions, make sure that the participant understood the instructions and was ready for the test.

Test plan steps

For the test plan steps we came up with the following basic steps:

1. The test monitor welcomed, thanked and shortly briefed the participant about the test, explaining how to fill in the question form and also how to configure the customisable user interface. We also explained to the participant that the purpose of the test was to gather information so that the participant wouldn’t feel bad if he or she did any errors, that it was the user interfaces’ fault, not the user.

2. Then the participant was asked to fill in part one of a question form before testing any of the GUIs to gather user profile information and previous computer/console game experience.

3. The participant was then asked to do a set of tasks with the original “World of Warcraft” user interface. The test monitor was taking observation notes and measured the time it took to complete tasks. The task list was only visible to the test monitor and the test monitor would verbally tell the participant what to do in the next task. This was done in order to prevent experienced players to be prepared of what to do and in that way spoil the test results.

4. After the set of tasks in the original user interface were done we installed our customisable user interface and then let the participant configure it just the way he/she wanted. Because in some cases participants can take a very long time configuring their user interface a cap of 15 minutes configuring time was applied. After the configuring was done we gave the participant a similar set of tasks as with the original “World of Warcraft” user interface. As with the previous task the test monitor took notes and measured timings.

5. When the participant was done with the task list the participant was asked to continue to fill in part two of the question form and take part in a short interview with the test monitor.
RESULT OF USABILITY TESTING

Interview and question form results
Results from the interview and question form are listed below.
You can see all test results figures in Appendix IV.

User written comments

User comments of the original user interface
“Simple and easy but a bit small icons”
“Ok, but some things were small”
“It’s ok at lower levels, but at high end game play it is not sufficient”

User comments of the customisable user interface
“Easier to group and find icons”
“Easier to find which key binding connects to corresponding icon”
“It’s a bit messy”
“Easier to make more important and commonly used icons more visible and accessible”
“Quick to find the key bind icon if you’ve forgotten the key for that skill”
“I can make more important skills, that I use often, stand out more than those I use seldom”

<table>
<thead>
<tr>
<th>Which GUI did you think was easiest to get started with?</th>
<th>Original</th>
<th>Customisable</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXXX</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Users’ comments:
- Original GUI, fast and simple to get started with but hardly useable when you need more information visible.
- Customisable GUI, a bit harder to get started with, took some time to get use to.

<table>
<thead>
<tr>
<th>Did you think it was hard to learn how to use the customisable GUI?</th>
<th>Not at all</th>
<th>It was ok</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXXXX</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Users’ comments:
- No problems at all, just click and drag elements you want to move or resize.
- It wasn’t hard at all.
- It would be good with some more feedback from the GUI when you move or resize, other than that it was no problem.
Users’ comments:
- Original GUI, it was ok.
- Original GUI, not good enough for raiding*.
- Customisable GUI, nice to be able to put more important things where I generally look.
- Customisable GUI, I like that I can make the icons as big as I want them.

* Raids are parties of 6-40 people divided into 2-8 groups of up to 5 players. The terms raid and raiding primarily and traditionally refer to player vs environment raid-specific instances and zones. [WOWWIKI]

**Observations**
The observations are summarised and presented for the original user interface and the customisable user interface.

**During original user interface test**
- Experienced “World of Warcraft” players complained about insufficient customisation
- Regular players thought that it was ok and easy to use
- Some participants complained about small icons

**During customisable user interface test**
- Experienced “World of Warcraft” players seemed familiar with the customisable user interface
- Some of the participants complained about insufficient feedback from the GUI when moving or sizing GUI elements.
- All of the participants were satisfied with their GUI when they were done customising
ANALYSIS OF RESULT

Learnability

How easy it is for the user to use the design for the first time

All participants had vast previous experience playing games some had even tried the chosen test game before (fig 4, user profile). There was no problem for the participant to understand what the different user interface elements represented in the original GUI.

With the customisable GUI the users had some trouble at first, knowing what the different GUI elements did. At first glance some users thought it was a bit messy.

Learnability was measured by occurrence of errors, observations and how long it took to configure each user interface. After the user configured their user interface they thought that important icons were easier to locate and also to click on.

The customisable GUI took an average of 6 minutes and 15 seconds to configure, which is almost five times longer than the original GUI (fig. 8, Summary, original GUI) and (fig. 9 Summary, customisable GUI). This was not a surprise because in the original GUI, the only things you can change are the key bindings. In the customisable GUI you can change almost everything just the way you want it.

The frequency of errors while configuring was also greater with the customisable GUI. The average error rate with the customisable GUI was 2.2 errors; with the original GUI it was 0.2 errors. This is an average of 11 times more errors during the configuration of the customisable GUI (fig. 8, Summary, original GUI) and (fig. 9 Summary, customisable GUI). This was neither a surprise, when the user is given more configuration options there is a greater chance for the user to make errors.

The customisable user interface took more time to configure and the test participants made more errors.

However, all of the test participants had no problem learning how to use the customisable user interface (fig 5, User questionere). Just after some minutes of training every participant knew how and what to configure to make their user interface personal.
Efficiency

How long it takes for the user to perform tasks once they are familiar with the design.

The tests show that the customisable GUI took longer time to set up. Doing GUI commands took about the same time with both GUIs once they were configured.

For the average user in our test it took almost five times as long setting up the customisable GUI as it took to set up the original GUI. The main reason is that there are so much more to setup with the customisable GUI.
Setting up the GUI only needs to be done once, so the time it takes is small compared to how long you play a game - six minutes out of maybe hundreds of playing hours isn’t much.

The other things we measured were how long it took for the user to use the abilities once the GUI was configured.

The results of this didn’t show any noticeable difference between the two GUIs. However several of the test users said that it was easier and they thought it went quicker to find the relevant abilities when they could group and place them in the way they want.

One user also mentioned that it takes more time to find the optimal layout with the customisable GUI and with this short test you don’t have time to find the best setting. With some more time to optimise it he thought he could do better with the customisable GUI.

Errors

How many errors the users make and how severe they are

The error rate was higher with the customisable GUI than with the original (fig. 8. Summary, original GUI) and (fig. 9 Summary, customisable GUI).
The error rate was measured by the test monitor; he made a note for every error that the user made.

All of the errors occurred during the configuration of the GUI.
Configuring the customisable GUI is more advanced and consists of more steps than configuring the original GUI.
As a result of this more errors are bound to happen when setting up a customisable GUI.

Once the users had both GUIs configured no more user errors occurred while using any of the GUIs.
Subjective satisfaction
What the user thinks of the design

Once the test users had tried the two GUIs they all agreed that the customisable GUI was more pleasant to use (fig. 5 User questionere).

The users graded their overall satisfaction with the two GUIs in a scale from 1-5, were 1 was terrible and 5 was very satisfied. The original GUI got an average of 2.8 and the customisable GUI got 4.2.

Most of the users thought the original GUI did the job but it was a bit too static. Two of the users commented:”It’s simple and easy but I think the icons are too small”.

Another user that had previous experience with playing “World of Warcraft” thought that the original GUI worked well at the start of the game. But once you advance in the game and get more abilities you need to be able to put focus on important abilities and that’s not possible with the original GUI.

With the customisable GUI the users felt that they could make more important abilities more accessible by either position them in a certain way or change the size of them.

It took a bit longer to configure the customisable GUI but according to the users it was worth the time since it took such a small amount of time compared to how long time you play a game.
CONCLUSION

When analysing our results we discovered that people were generally more satisfied with the customisable GUI compared to the original GUI. The original GUI was a good GUI to get started with; inexperienced users thought it was good enough. Experienced users thought that there was something missing. After the tests the inexperienced users shared the opinion of the experienced users – they wanted the possibility to customise the GUI.

However there can be a negative side of using a customisable GUI, sometimes it can be hard for the user to understand how to configure the GUI. This can be avoided by implementing easily understandable configuration options.

Another way to avoid these kinds of errors is to let the user choose if he or she want to customise the GUI or not. Users who aren’t interested in customising their GUI don’t need to be bothered with it. Instead you can let the advanced users enable GUI customisation through an options or settings menu. This can be extended by having different templates that the users can select. The templates could work like a base that the users can start from and then fine tune their settings.

According to our test participants the advantages of customisable GUI:s outweigh the disadvantages.

All of the test users thought that they had a better gaming experience while playing with the customisable GUI. The test users generally thought that the game was good and sufficient, but the customisable GUI made them more familiar with the game.

According to our usability test we can conclude that our hypothesis “Customisable GUI:s results in improved game experience” is true.

We also want to point out that all games might not gain from having a customisable GUI. All games are unique and have their own special appearance. A small game like “Tetris” would probably not gain anything from having a customisable GUI.
DISCUSSION

From our test we concluded that it’s good to have customisable GUIs, it’s now up to the game developers to consider implementing their games with customisable GUIs.

We tried to make the usability test as accurate and objective as possible, but it’s hard to measure game experience in a short test. The test could have been done differently; one option would have been to let experienced users use the GUI during a longer period of time. This was unfortunately not possible due to the time it took to develop the customisable GUI.

In our test we chose to have few essential questions rather than a lot of general questions. The reason behind this was that we think we got better, comprehensive answers to the question we had. We also put a great deal of effort to observe the test users and taking notes of their comments and behaviour.

If time allowed we would also have liked to test GUI customisation for more games than “World of Warcraft”. All though we think that the result would pretty much be the same as in our usability tests.

Usability testing is a well acknowledged method for evaluating the usability of software products. We are aware of that usability testing may not be the ultimate and that testing is always an artificial situation [RUBIN94]. However we think it was the best method to use to find the answer to our hypothesis.

The participants are rarely fully representative of the target population [RUBIN94]. We chose our test participants according to a well designed user profile criteria. With those criteria’s we believe that we managed to get the right people for the test.
FURTHER RESEARCH

When working/completing this thesis we came across some related areas that need further research.

- Development costs for developing game GUI customisation, is it worth it?
- Research about sound in customisable GUI:s, does sound affect your learnability or user apprehension?
- Expand the customisation usability test with more and different type of games.
LITERATURE AND OTHER SOURCES

Books


Web sites

[NIELSEN03] Jakob Nielsen’s Alertbox. 2003
http://www.useit.com/alertbox/20030825.html

[UIDG] David Kieras, *University of Michigan*

[MOHAN99] Mohankumar C Zade 1999
http://www.cse.iitk.ac.in/research/mtech1997/971126/all.html

APPENDICES

Appendix I Question form

Question form

User profile:

Name: ____________________________________________________________

Age: ______

Education: ________________________________________________________

Part 1
To be filled before testing the GUI

1. How many computer/console games have you previously played?
   - More than 10
   - A few
   - Almost none or none

2. Previous experience of playing World of Warcraft
   - Played for more than a year
   - Played it several times
   - Played it few times
   - Never played it

3. Previous experience of World of Warcraft GUI customisation (add-ons)
   - Used several GUI add-ons
   - Used GUI add-ons at some extent
   - Never used GUI add-ons

Part 2
To be filled after testing the GUI

1. Which GUI did you think was easiest to get started with?
   - Original
   - Customisable

2. Did you think it was hard to learn how to use the customisable GUI?
   - No, not at all
   - I had some trouble, but it was ok
   - Yes
3. Did you notice any improvement doing tasks by clicking the icon with the customisable GUI?
☐ Yes
☐ No

If yes please comment
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

4. Did you notice any improvement doing tasks by pressing key binding with the customisable GUI?
☐ Yes
☐ No

If yes please comment
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

5. Overall satisfaction with the original GUI
☐ Very satisfied
☐ Satisfied
☐ Ok
☐ Not satisfied
☐ Terrible

Please comment your decision
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

6. Overall satisfaction with the customisable GUI
☐ Very satisfied
☐ Satisfied
☐ Ok
☐ Not satisfied
☐ Terrible

Please comment your decision
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Appendix II Note taking form

Note taking form

Original GUI Task list

- Set up key bindings
  - Measure time. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Cast spell (Test monitor will choose one random damage spell) on optional enemy using mouse click
  - Measure time it took to cast. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Cast spell (Test monitor will choose one random damage spell) on optional enemy using key bindings
  - Measure time it took to cast. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Cast spell (Test monitor will choose one random healing spell) on your character using mouse click
  - Measure time it took to cast. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Cast spell (Test monitor will choose one random healing spell) on your character using key bindings
  - Measure time it took to cast. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Let the tester run freely and test the GUI.
  - General comments.
    _______________________________________________________________________
    _______________________________________________________________________
    _______________________________________________________________________
Customisable GUI task list

- Configure the GUI.
  - Measure time.
  - Count of errors.
  - Count of negative comments
  - Count of positive comments.

- Set up key bindings
  - Measure time. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Cast spell (Test monitor will choose one random damage spell) on optional enemy using mouse click
  - Measure time it took to cast. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Cast spell (Test monitor will choose one random damage spell) on optional enemy using key bindings
  - Measure time it took to cast. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Cast spell (Test monitor will choose one random healing spell) on your character using mouse click
  - Measure time it took to cast. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Cast spell (Test monitor will choose one random healing spell) on your character using key bindings
  - Measure time it took to cast. _______ min _______ sec
  - Count of errors. _______ nr of errors

- Let the tester run freely and test the GUI.
  - General comments.
    ______________________________________________________________________
    ______________________________________________________________________
    ______________________________________________________________________
    ______________________________________________________________________

Observations
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
Appendix III Readme

How to use Benque GUI

Move elements by clicking and then drag it to a desired position.
Resize elements by ALT + clicking and then drag with you mouse.

Create new window
To create a new benque window, select the command window and type
/benque createframe

Create a new action button
To create a new benque action button, select the command window and type
/benque createaction

Lock the gui
/benque lock

Unlock the gui
/benque unlock

How to put an element into another frame
Simple drag the element to the frame and drop it.

If you have any questions regarding how to use Benque GUI, feel free to ask the test monitor.

Appendix IV Result of usability testing

Results from the question form

<table>
<thead>
<tr>
<th></th>
<th>User 1</th>
<th>User 2</th>
<th>User 3</th>
<th>User 4</th>
<th>User 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Game Programming at BTH</td>
</tr>
<tr>
<td>Previously played games</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>More than 10</td>
</tr>
<tr>
<td>Previous experience of playing</td>
<td>More than a</td>
<td>Never</td>
<td>Played</td>
<td>Never</td>
<td>More than a</td>
</tr>
<tr>
<td>World Of Warcraft</td>
<td>year</td>
<td>played</td>
<td>few times</td>
<td>Played</td>
<td>year</td>
</tr>
<tr>
<td>Previous experience of World of</td>
<td>Used</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>Used at</td>
</tr>
<tr>
<td>Warcraft GUI customisation</td>
<td>several</td>
<td>Never</td>
<td>Never</td>
<td>Never</td>
<td>some extent</td>
</tr>
</tbody>
</table>

Figure 4: User profile

<table>
<thead>
<tr>
<th></th>
<th>User 1</th>
<th>User 2</th>
<th>User 3</th>
<th>User 4</th>
<th>User 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which GUI did you think was</td>
<td>Original</td>
<td>Original</td>
<td>Customisable</td>
<td>Original</td>
<td>Original</td>
</tr>
<tr>
<td>easiest to get started with?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you think it was hard to</td>
<td>Not at all</td>
<td>Not at all</td>
<td>Not at all</td>
<td>Not at all</td>
<td>Not at all</td>
</tr>
<tr>
<td>learn how to use the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>customisable GUI?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you notice any improvement doing tasks by clicking the icon with the customisable GUI?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Did you notice any improvement doing tasks by pressing key binding with the customisable GUI?</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Overall satisfaction with the original GUI?</td>
<td>Not satisfied</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
<td>Ok</td>
</tr>
<tr>
<td>Overall satisfaction with the customisable GUI?</td>
<td>Satisfied</td>
<td>Very satisfied</td>
<td>Satisfied</td>
<td>Satisfied</td>
<td>Satisfied</td>
</tr>
</tbody>
</table>

*Figure 5: User questionnaire*

## Test results

### Original

<table>
<thead>
<tr>
<th></th>
<th>User 1</th>
<th>User 2</th>
<th>User 3</th>
<th>User 4</th>
<th>User 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration of GUI and key bindings</td>
<td>22 sec</td>
<td>1 min 20 sec</td>
<td>3 min 2 sec</td>
<td>1 min 12 sec</td>
<td>32 sec</td>
</tr>
<tr>
<td>Cast damage spell by clicking icon</td>
<td>1 sec</td>
<td>2 sec</td>
<td>3 sec</td>
<td>3 sec</td>
<td>2 sec</td>
</tr>
<tr>
<td>Cast damage spell with key binding</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>1 sec</td>
</tr>
<tr>
<td>Cast healing spell by clicking icon</td>
<td>1 sec</td>
<td>3 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>1 sec</td>
</tr>
<tr>
<td>Cast healing spell with key binding</td>
<td>1 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
</tr>
<tr>
<td>Count of errors</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Figure 6: Time and count of error measurements, original GUI*

### Customisable

<table>
<thead>
<tr>
<th></th>
<th>User 1</th>
<th>User 2</th>
<th>User 3</th>
<th>User 4</th>
<th>User 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration of GUI and key bindings</td>
<td>6 min 20 sec</td>
<td>7 min 50 sec</td>
<td>6 min 50 sec</td>
<td>4 min 5 sec</td>
<td>6 min 10 sec</td>
</tr>
<tr>
<td>Cast damage spell by clicking icon</td>
<td>1 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>1 sec</td>
</tr>
<tr>
<td>Cast damage spell with key binding</td>
<td>1 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>3 sec</td>
<td>2 sec</td>
</tr>
<tr>
<td>Cast healing spell by clicking icon</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>1 sec</td>
</tr>
<tr>
<td>Cast healing spell with key binding</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
<td>2 sec</td>
</tr>
<tr>
<td>Count of errors</td>
<td>4</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Summary

Original

<table>
<thead>
<tr>
<th>Task</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration of GUI and key bindings</td>
<td>1 min 18 sec</td>
</tr>
<tr>
<td>Cast damage spell by clicking icon</td>
<td>2.2 sec</td>
</tr>
<tr>
<td>Cast damage spell with key binding</td>
<td>1.8 sec</td>
</tr>
<tr>
<td>Cast healing spell by clicking icon</td>
<td>1.8 sec</td>
</tr>
<tr>
<td>Cast healing spell with key binding</td>
<td>1.8 sec</td>
</tr>
<tr>
<td>Count of errors</td>
<td>0.2 errors</td>
</tr>
</tbody>
</table>

Customisable

<table>
<thead>
<tr>
<th>Task</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration of GUI and key bindings</td>
<td>6 min 15 sec</td>
</tr>
<tr>
<td>Cast damage spell by clicking icon</td>
<td>1.6 sec</td>
</tr>
<tr>
<td>Cast damage spell with key binding</td>
<td>2 sec</td>
</tr>
<tr>
<td>Cast healing spell by clicking icon</td>
<td>1.8 sec</td>
</tr>
<tr>
<td>Cast healing spell with key binding</td>
<td>2 sec</td>
</tr>
<tr>
<td>Count of errors</td>
<td>2.2 errors</td>
</tr>
</tbody>
</table>
Appendix V User configured GUI:s