Exploring the Elements and Design Criteria of Massively-Multiplayer Online Role-Playing Game (MMORPG) Interfaces

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Abstract. A great many people play online games and sales of online games are considerable, but research has further shown that a major reason behind the failure of games in the market is poor user interface design or usability, highlighting even more the importance of these issues in games design. This research uses surveys and focus groups to explore the factors influencing the usability and interface design of online games. First the definition and different types of game are discussed, and then the composition and features of online game interfaces analyzed. Second, a review is made of Human-Computer Interaction (HCI) research literature relating to design criteria for game interfaces. Finally, in discussion with experts, this study isolates the design criteria that should be emphasized when designing each key element of an online game interface.

Keywords: Massively-multiplayer online role-playing games (MMORPG), interface design, elements of game interfaces.

1 Introduction

Online games are already at the core of the digital entertainment industry. According to analysis of Taiwan's Internet entertainment market carried out by the Market Intelligence Center (MIC) between 2006 and 2007, online games occupy 52.4% of the market, the largest share. Online gaming (48.8%), online music (40.2%) and online television and movies (31.4%) are top three in the list of types of online service that Taiwanese Internet users are willing to pay for. The average Taiwanese user spends considerable time and money every day on Internet-based entertainment services.

Besides this, the MIC's 2006 report analyzing Internet entertainment behavior in Taiwan also found that online games were the particular form of game, at 81.4% of the total, with MMORPGs constituting 74.5%.

Despite this, there has been a distinct lack of research into the usability of online games [5, 6]. Cornett [3] has further pointed out that future development of the online games industry is focused on attracting new players, but that novice players flinch at the complexity of the interfaces of online games. Ye & Ye [12] noted that 80% of

games fail in the market, a major reason for which is that principles of HCI research have not been implemented, forcing players to rely solely on their intuition and experience to operate games. Besides this, currently there exists in the games industry a lack of criteria and guidance that games designers can follow. Many interface design criteria are excessively abstract and general, lacking any detailed explanation of how they may be met [1].

2   Purpose of Research

With this in mind, the goal of this research is to explore the elements that comprise online games interfaces and criteria for interface design. First, this study looks back over the context of the development of online games in order to understand the basic definition of online games and the types and composition of interfaces. Second, taking MMORPGs as a case study, this paper analyzes and comes to some conclusions about the elements that make up the interfaces of online games. Finally design criteria important within the field of HCI are discussed, and in the process corresponding detailed design criteria for each interface element are identified. It is hoped that these findings will provide a reference for online game development and interface design.

3   Games and Interface Design

3.1   Definition and Types of Computer Game

Computer games generally refer to electronic games played on personal computers (Zhou Rong, 1998), and are one of the important forms of game to emerge in the digital age. On the basis of past definitions and revisions, Juul [7] concluded that games possess six characteristics: they are rule-based, provide different possible outcomes, attach positive or negative values to these outcomes, involve player effort, players are attached to the outcomes and negotiate any consequences of success or failure.

   The specialist computer game magazine Computer Gaming World has divided electronic games into eight genres: action/arcade, adventure, role-playing, simulation, sports, strategy, classic/puzzle and war games.

   Novak [9] alternatively categorized games into action/arcade, adventure, arcade-adventure, casino, puzzle, role-playing, simulation and strategy games. Rollings & Adams [10] divided games into action/arcade, strategy, role-playing, sports, vehicle simulation, construction and management simulation, adventure, growth and puzzle games.

   MMORPGs currently dominate the online games market, and so accordingly this study will focus mainly on exploring this type of game, discuss the course of the development of online role-playing games and briefly describe their characteristic qualities.

3.2   Online Role-Playing Games

Online role-playing games originate with pencil and paper tabletop role-playing games (TRPG). In a TRPG, using the game's rulebook and scenario, players play

characters in a story and interact with other players playing other characters in accordance with the rules of the game. Dungeons and Dragons is the most well-known TRPG, and has deeply influenced the way that later multiplayer role-playing games are played, the arrangement of their plots and framework of their stories (Shuffle Alliance, 2002).

Embryonic forms of today's online role-playing games, MUDs (Multi-user Dungeons), first appeared in the late 1970s, and were conducted entirely in text, lacking any graphics [4]. Today's online role-playing games can be said to be a kind of graphical MUD. A MUD allows many players to simultaneously log into a computer program and participate in adventures, roam around and interact. In this virtual space, players can play their characters and interact with other players, as well as create their own objects and environments to their own liking (Su Fenyuan, 1996).

In an ordinary single player role-playing game, the player tries to reach successive break points and finally complete the game. However in a MUD, there is no such end point or success and failure. In fact, players can add new objects and scenes to its database at any time, expanding the entire MUD world. As in current online games, in a MUD players can simultaneously interact, communicate and participate in social interaction with many other players [4].

Although online role-playing games have inherited the characteristics of MUDs, they differ in that they are conducted via completely graphical user interfaces (GUI). A GUI not only increases the entertainment factor of the games, but also creates a more complete virtual reality. (Zheng Rongji, 2006). According to past related research, online role-playing games share four characteristics (Lin Peiyuan, 2007; Rolling & Adams, 2003): role-playing attributes, combat and adventure, a field of play and group interaction.

To summarize, MMORPGs are games conducted in a virtual environment in which players attempt to increase their standing within the game, carry out tasks and missions, or simply enjoy interacting with other players within the rules of the game. However, a game can only progress by means of players' interaction with the game mechanism via a control interface. Below some discussion is now given and conclusions drawn regarding the constituent elements of games interfaces according to past related research.

3.3   Games Interfaces

The definition and types of games interfaces. Novak [9] believes a game's interface allows players to be able to control characters in a game, move through the whole environment of the game, and make decisions during the course of the game. If there were no games interface, then a game would be merely a story, an animation or a static environment – a game that would be impossible to actually *play*. Consequently, an interface provides the connection between the player and the world of the game, allowing the player to then interact with the content of the game.

As far as the definition of an interface is concerned, Clanton (1998) distinguished two components of interfaces: a motor component, including for example how a joystick operates a game; and a perception component, including the design of menus, tools and buttons and how they are displayed on the screen. Ding Zhaochen (2006) defined a game interface as the spatial environment on a screen of a game and its

interactive mechanism. The above shows that there are broad and narrow definitions of games interfaces, Clanton's (1998) definition being the former, includes both hardware input devices and graphic display; the latter refers solely to the display of illustrative and operational screens.

Rollings & Adams [10] point out that the main function of a game interface is to allow the user to interact with the game, and can be split into two parts. The first is to receive the player's commands, and the second is to inform the player of the state of play during the course of the game, and to endeavor to display all options open to the player with images. These different functions and capabilities require interfaces to be made up of different constituent elements. Saltzman [11] divided a game's interface into exterior interface and user interface components; the former refers to menu screens mainly used for game-related setup options such as adjusting sound, changing game type, equipment control and saving the game; the latter refers to the screens that the player will encounter during the course of the game, such as the appearance of avatars, maps of the environment and skill buttons.

Looking at interfaces from the perspective of presentational form, Boyd [2] divided games interfaces into two types, configurational interfaces and pictorial interfaces. A configurational interface chiefly refers to the control panes in a game, the majority of which are located on the edges of the screens of a game which provide the player with appropriate hints and messages; the emphasis in a pictorial interface differs from a configurational interface's emphasis on function, in that it resembles a real picture, namely the spatial environment of the game during play.

Novak's [9] definition of a game interface is somewhat broader, including both a non-video interface (namely operating interface) and a video interface. The former includes hardware components such as control buttons, keyboards and mice, which allow the player to carry out choices, such as use a particular weapon, walk around within the game space, or to interact with computer characters or other players. The video interface refers to those functional features displayed on the screen that allow the player to know the status of other avatars within the world of the game, the location of the enemy, distance and direction and other information important to game play. Players base decisions about their own behavior in the game upon this information.

The video interface may be further divided into an active video interface and passive video interface, according to whether or not it is under the player's control. The active video interface refers to that with which a player may interact. Normally this is carried out by clicking on options displayed on the interface, normally presented on the interface in the form of menus or actional systems. The passive video interface consists of those interface elements with which a player is unable to directly control or change, such as players' avatar status, score and time remaining. This information may be grouped in the same place on the screen, or may be scattered in different places [9].

The above is summarized in Table 1. From this table it can be seen that Novak's [9] video interface category encompasses the categorizations given by both Saltzman [11] and Boyd [2]. If we then differentiate according to whether or not a player has control, then the active video interface encompasses the external interface, user interface and configurational interface; and the passive video interface includes the user interfaces and pictorial interface. With these categorizations in mind, this research will now discuss the common elements constituting the video interfaces of ordinary games and online games.

Table 1. Categorizations of game interface types (source: this paper)

Scholar	Type	Definition
Saltzman [11]	External Interface	refers to menu screens, mainly used for game-related setup options
	User interface	refers to the screens that the player will see during the course of the game
Boyd [2]	Configurational Interface	chiefly refers to the control panes in a game
	Pictorial Interface	the screens displaying the spatial environment of the game during play
Novak [9]	Active video interface	Players can click to carry out interaction, normally presented on the interface in the form of menus or actional systems
	Passive video interface	Elements of an interface the player is unable to directly control or change, such as score and time remaining

Constituent elements of a game interface. As described above, the interface within the screens of a game can be regarded as its video interface, and divided into active and passive types depending on whether the player has control. Novak [9] remarks that both the active and passive video interfaces in games share many common constituent parts, including information that the player can utilize and actions that a player must take in order to complete tasks in the game. This normally includes interface elements such as points/level, number of lives/stamina, maps, the character and the game startup menu. If one then divides these according to whether or not the player can control them, then score/level and number of lives/stamina and maps all belong to the passive interface; the character and game startup menu are both part of the active interface. This is clarified in table 2.

Table 2. Game interface element types (source: this paper)

Game interface type				Constituent elements of games interface
Video interface	Active	External interface	Configurational Interface	Game startup menu
		User interface	Configurational Interface	Character (Avatar's actions and functions)
	Passive	User interface	Configurational Interface	Points/level, number of lives/stamina, maps
			Pictorial interface	Maps (the spaces and scenes in the game), character (appearance of avatar)

The start menu and the avatar's actions and functions are components that the player can click to control, and so both form part of the active video interface. They may be further categorized as exterior interface and user interface according to their function during the course of the game. In the passive video interface are included the player's score, stamina and maps. The player has no way to directly interfere with or manipulate these, and they belong to the configurational interface; the pictorial interface mainly consists of a representation of the game's virtual space and the player's avatar. The elements that constitute interfaces differ with game type; those that make up MMORPG interfaces in particular are now dealt with below.

Elements of MMORPG interfaces. This paper will look at three games that occupy a relatively large share of the market in Taiwan – 'World of Warcraft', 'Maple Story' and 'Perfect World', summarize the elements common to their interfaces, and then one by one categorize them according to previous scholars' schemes (Table 4).

Fig. 1. MMORPG game user interface screen (grabbed from *World of Warcraft*)

A game's active video interface chiefly incorporates two main types of interface, the user interface and the exterior interface. The former is primarily for game-related setup before the player logs in, while the latter includes the chat/message channel, avatar information, shortcut keys, backpack/toolbag, social activities, game menu/options and seek help/report abuse functions; these all closely related to the player during the course of the game. Manipulating or clicking these functions enables the player to interact with the game mechanism or other players. For details see fig.1.

In a game's passive video interface, although the player does not possess control, this kind of information informs the player of current circumstances and status, and so is very important to game play. This mainly appears at the top of the game screen, and includes the functions avatar status and map information. The former shows the present status of the player's avatar, providing the player with information on which to base subsequent actions. The latter tells the player his physical location within the game's spatial environment, aiding orientation. The game's pictorial interface occupies the center of the screen, and includes a graphical representation of the spatial environment and the full view of the player's avatar.

4   Discussion of Criteria for Game Interface Design

Traditional HCI research has accumulated a great many interface design criteria and evaluation methods, and has already successfully been utilized in the design of interfaces of many systems and web pages. Scholars have repeatedly also cited

Table 3. Correspondence of MMORPG interface elements to design criteria

Design criteria	Suggested by	Design criteria	Suggested by
1. Affordance	Friedl(2003); Debbie Stone(2005)	12. Mapping	Rollings & Adams [10]
2. Consistency	Novak[9]; Alberta(n.d.); Sanchez-Crespo Dalmau(1999); Nielsen(1993); Rollings & Adams [10]	13. Efficiency	Preece, Rogers & Sharp(2002)
3. Ability to cancel	Novak [9]	14. Error correction	Alberta(n.d.); Nielsen(1993); Preece, Rogers & Sharp(2002)
4. Grouping	Rollings & Adams [10]; Alberta(n.d.); Friedl(2003)	15. Notification upon completed action	Nielsen(1993)
5. Visibility	Debbie Stone(2005); Rollings & Adams [10]; Malone(1982); Shneiderman(1992)	16. Shortcut keys	Alberta(n.d.); Novak [9]; Nielsen(1993)
6. Easy to learn	Shackel(1991); Sanchez-Crespo Dalmau(1999); Preece, Rogers & Sharp(2002)	17. Minimizes mental load	Rollings & Adams [10]; Friedl(2003); Shelley(2001); Nielsen(1993); Novak [9]
7. Ability to undo	Nielsen(1993); Alberta(n.d.)	18. Satisfies player's desire for control	Nielsen(1993); Novak [9]
8. Feedback	Rollings & Adams [10]; Alberta(n.d.); Novak [9]; Nielsen(1993); Debbie Stone(2005)	19. Standardization	Novak [9]
9. Effectiveness	Shackel(1991); Preece, Rogers & Sharp(2002)	20. Easy to use	Shelley(2001)
10. Easy to remember	Preece, Rogers & Sharp(2002)	21. Aesthetic appeal	Schenkman & Jonsson(2000); Tractinsky et al. (2006); Schaik & Ling(2008)
11. Customizability	Novak [9]; Bickford(1997); Sanchez-Crespo Dalmau(1999)	22. Distinctness	Mullet & Sano(1995)

examples of design principles in games interfaces, but at present the actual use of design principles is still overly general [1]. The elements present in game interfaces differ with game type and function, and so detailed design criteria for each interface element are analyzed at this stage.

4.1 Method

A review of relevant literature and a focus group are the main methods used at this stage to analyze the important criteria for the design of online game interfaces. This research summarizes 22 criteria from traditional HCI and related literature, as follows: affordance, consistency, ability to cancel, grouping, visibility, easy to learn, ability to undo, feedback, effectiveness, easy to remember, customizability, mapping, efficiency, error correction, notification upon completed actions, shortcut keys, minimizes mental load, satisfies player's desire to control, standardization, easy to use, aesthetic appeal and distinctiveness. For sources and references for the definitions and explanations of each design criteria, please see Table 3.

This study uses a focus group to collect qualitative data. A focus group is a kind of group interview where people share ideas [8]. This study uses a small group consisting of five experienced game or interface designers.

First the research topic is explained to the participants, and then there follows a discussion of the relationships between 11 elements of MMORPG interfaces and the

22 design criteria. The 11 interface elements all appear on a computer screen and the group must openly discuss decide the importance of the criteria in interface design.

4.2 Result

The focus group decided slightly different design criteria are important for different interface types (See Table 4).

The group considered that a game's exterior interface should be easy to remember and use, allow the player to undo actions and be laid out so that related functions are grouped closely together.

As for the design of a game's chat and messaging channel, the group decided that ease of use is important in order to facilitate rapid communication with other players. They also believed that in terms the provision of information, an interface should provide rapid, timely feedback, allowing the player to know the current state of play at any time during the game.

The group of experts indicated that the important criteria in avatar information design are aesthetic appeal, the ability to customize according to player preferences, visibility and mapping. Thus in the design of avatar-related images and colors, the primary emphasis should be on aesthetic appeal, and at the same time the connection between the images and their meaning should be clear, in order to enable the player to know his own status.

In designing shortcut keys, it was decided that the important design criteria should include grouping of closely related functions, affordance, mapping and easiness to learn. Thus buttons with closely-related functions should be grouped together to allow a new player to easily learn how to use the interface, and at the same time the design of images should be such that the player can quickly understand their meaning, function and method of manipulation.

When designing images for the toolbag and social interaction functions, first and foremost the principles of grouping related functions, distinctness of images and standardization should be borne in mind, so that the player is able to readily pick out the desired function from among many images. The design of game menus and help functions, apart from requiring the same emphasis on distinctness and standardization, also needs to emphasize affordance and customizability, to enable the player to immediately see how to operate each function, and at the same time be able to adjust the functions of the interface to suit his needs.

In a game's passive visual interface, the focus group considered it important that the design of the avatar status indicator be visually distinct and clear, enabling the player to be able to see his current status at a glance, and quickly notice any updated information. In map design, importance should be placed on good mapping, minimization of load on the player's short term memory, ease of use and effectiveness. This is to reduce the level of difficulty the player encounters using the map, to efficiently assist the player's movements in the game. In terms of the design of the pictorial interface, the group decided that aesthetic appeal, ease of use, and satisfying the player's desire for control are all important design criteria, the goal being to make the player feel more entertained and a heightened sense of immersion in the game.

Table 4. Categorization chart of elements of MMORPG interfaces and design criteria

Game Interface Type			MMORPG Interface Element (function)		Design Criteria concluded by the focus group
Video Interface	Active	External/System Interface	Choose game server, create new character, choose character, delete character		Easy to use, Easy to remember, Ability to cancel, Grouping, Customizability, Aesthetic appeal
		User/Game Interface	Chat/message channel	Channel selection, channel setup	Easy to use, Feedback, Effectiveness, Notification upon completed action, Aesthetic appeal
			Avatar information	Avatar's equipment/props, basic properties/ability values, renown/prestige, skills/talents	Aesthetic appeal, Customizability, Visibility, Mapping, Distinctness
			Shortcut keys		Grouping, Affordance, Mapping, Easy to learn, Aesthetic appeal
			Backpack/toolbox		Grouping, Distinctness, Standardization
			Social activities	Grouping, Distinctness, Standardization	Grouping, Distinctness, Standardization
			Game menu/options	On-screen display setup, sound effects, shortcut key setup, return to game, quit game	Affordance, Distinctness, Customizability, Standardization
			Seek help/report abuse		Affordance, Distinctness, Customizability, Standardization
	passive	User/game interface	Avatar character status	Character's headshot, profession, level, stamina , magical energy, experience level	Affordance, Distinctness, Customizability, Standardization
			Map information	Position, small/large scale maps, target tracking, zoom in/out	Mapping, Minimizes mental load, Easy to use, Effectiveness, Easy to learn, Aesthetic appeal, Customizability
		Pictorial interface	Representation of the game's spatial environment and avatars		Aesthetic appeal, Easy to use, Satisfies player's desire for control, Easy to learn, Customizability

5   Conclusion

The online games industry continues to flourish, and has become one of the focal points of development in digital entertainment media. How the design of an online game's interface can enable a player to more easily get into a game, reduce difficulty in learning a game, and then more easily become immersed in the world of the game are extremely important issues. However, much research shows that the current criteria used in the design of interfaces for online games are excessively abstract and general, lacking the detail and methodicalness of real design. This study uses surveys and focus groups to explore the characteristics of the constituent elements of online game interfaces. Second, it analyzes related HCI research into the criteria in game interface design. Finally the important criteria that should be emphasized when

designing the constituent elements of online game interfaces are discussed with experts. It is hoped that the findings of this research provide both practical design suggestions and also a foundation for future research into the design of online game interfaces.

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