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Usability News is a free web newsletter that is produced by the Software Usability Research Laboratory (SURL) at Wichita State University. The SURL team specializes in software/website user interface design, usability testing, and research in human-computer interaction.
Barbara S. Chaparro, Editor

Examining the Critical User Interface Components of First-Person Shooter (FPS) Games

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Summary: First-person shooter (FPS) video games have become the 3rd highest selling genre of video game in the entertainment software industry. One important component of a FPS is the interface that provides feedback on a player's status in the game. In this study, gamers were surveyed on the most critical design elements of FPS user interfaces. They rated ammunition, radar, and health indicators as three of the most critical interface aspects for gameplay. Specific design characteristics of each of these indicators were also provided. These design specifications can assist game developers in creating intuitive FPS interfaces.

Entertainment software has quickly become one of the fasting growing industries (ESA, 2008). The Entertainment Software Association (2008) reported that computer and video game revenue had reached $9.5 billion in 2007, a 6% increase. This translates into an annual growth rate of over 17%, compared to an annual growth rate of less than 4% for the entire U.S. economy (Siwek, 2007). About 65% of American households play games. One genre of video games that is becoming increasingly popular is the first-person shooter (FPS) video game. A FPS game immerses a player in a virtual 3D environment with a first-person-view of their character and equipped weapon (see Figure 1). First-person shooters have become the 3rd highest selling genre of video games, comprising 12.1% of sales. Halo 3™ accrued more revenue its first day of sale than the movie "Spiderman 3" in its opening weekend (ESA, 2008).

With the popularity of this genre, it is important to ensure that the games are accessible and usable to all those who wish to play them. One way to do this is to determine the most important aspects of FPS interface design, and specifically, the best way to design these aspects so that they are intuitive and usable to the majority of players. This study reports on a survey distributed to gamers which queried the most critical design elements of FPS game user interfaces.

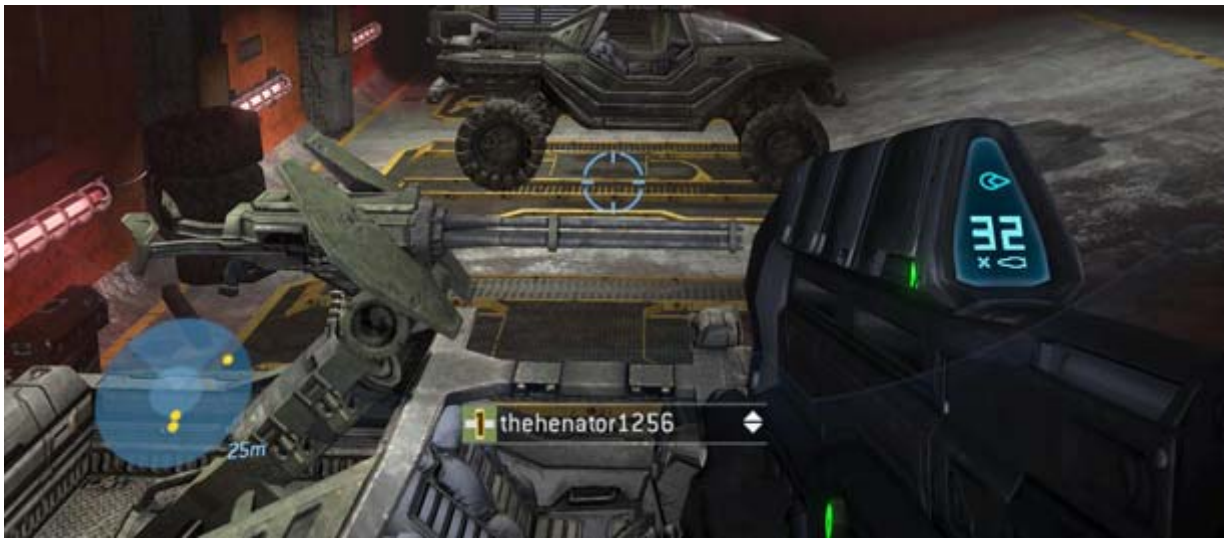


Figure 1. First-person shooter view in Halo 3.

METHOD

Participants

Ninety-four participants (9 female, 85 male; Mean age = 27.9(SD=8.0) years) participated in this study. All participants used a computer at home on average for 2.8 hours per day and at work or school for 3.3 hours per day. Participants reported playing games on the computer for 4.6 hours per day. They spent an average of 7.3 hours a day on the Internet, playing online games for an average of 4.6 hours per day. All were experienced PC and mouse users, and most had experience with gamepads and joysticks (see Table 1). Ninety-three participants reported using the internet daily. Forty-five reported playing games daily, while 29 played at least 5 times per week. Eighty-five reported playing games online.

Table 1. Number of participants having experience with the following types of computers or computer devices.

	None	1 to 5 months	6 to 11 months	1 to 2 years	3 + years
PC or Compatible	0	0	1	1	92
PlayStation Gamepad	16	5	4	11	58
Xbox Gamepad	30	7	4	6	47
Mouse	0	0	0	1	93
Joystick	11	11	4	8	60

Materials

An online survey constructed in mrInterview™ pertaining to varying aspects of FPS interface design and demographics was used.

Procedure

A link to the online survey was provided in the July 2008 issue of Usability News, as well as to gaming listservs and local organizations.

RESULTS

Survey results revealed that three of the most important aspects of interface design are ammunition, radar, and health indicators—with 87% of the gamers reporting ammunition information important, 90% indicated that radar was important, and 93% reporting that health information was important. Design specifications for each element were reported as follows:

Ammunition

Over half the gamers (57%) indicated that placement of the ammunition indicator onscreen is critical to gameplay. Most gamers (53%) preferred the bottom right as the placement for the ammunition indicator (see Table 2). When ammunition is low, a "flash" or change of color for the indicator was the most preferred warning signal (see Table 3).

Table 2. Most gamers (45) preferred the bottom right for placement of the ammunition indicator.

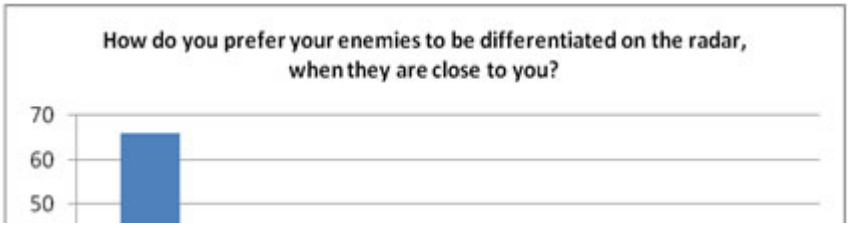
Top Left	Top Right	Bottom Left	Bottom Right	Other
3	18	16	**45**	12

Table 3. Gamers preferred a "flash" or change of color for warnings of low ammunition.

What type of "Low Ammunition" warning to you prefer?	Frequency
Ammunition indicator "flashes"	**40**
Ammunition indicator turn a different color	**49**
Warning message appears	9
Game makes an audio noise (i.e. beeps)	23
Game make a verbal warning (i.e. "low ammo")	12
Other	7

Radar

The placement of the radar was also very important, with 83% of those surveyed indicating that that it was important to gameplay. The most preferred location of the radar was the top right portion of the screen. In order to successfully track enemies on the radar, gamers suggested that they be displayed using a differentiating color (see Figure 2). There was no clear consensus for the most preferred radar design (see Table 4). There was about an even split between the compass style radar (see Figure 3a) and the fixed center radar (see Figure 3b), while the full map view was the least preferred radar (see Figure 3c).



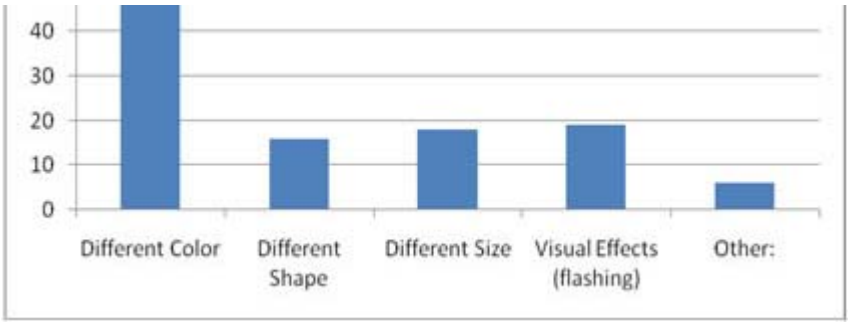


Figure 2. Most gamers preferred that enemies be differentiated by color on the radar.

Table 4. Gamers had no clear preference for radar design.

Compass/Cardinal Direction Style	Fixed Center Style	Full Map View
46	31	17

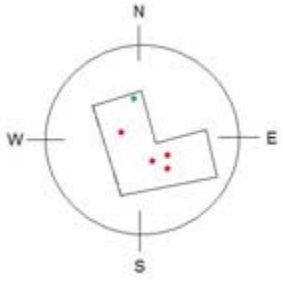


Figure 3a. Example of compass radar.

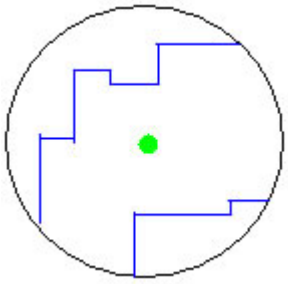


Figure 3b. Example of fixed center radar.

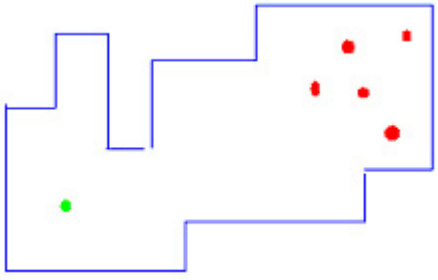


Figure 3c. Example of full map radar.

Health

Health placement was also indicated as important by 77% of the gamers. However, there was not a clear preference for the location of the health indicator (see Table 5). Flashing of the indicator was the most important warning of damage to the character (see Table 6). As for health status, the majority of the participants reported that the color green should be used to represent "good" health and red for "low" health, with 84% of gamers selecting green and 96% choosing red.

Table 5. Results indicated that there was not a preferred location placement for the health indicator.

Top Left	Top Right	Bottom Left	Bottom Right	Other
15	14	26	23	16

Table 6. Gamers preferred a flash of the indicator when their character experienced damage.

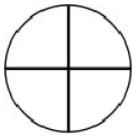
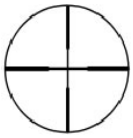
How do you prefer to be notified of damage to your character's health?	Frequency
Flashing of the indicator	**65**
Changing of color or size of the indicator	35
Audio Warnings	19
Other	19

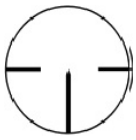
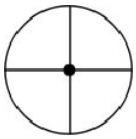
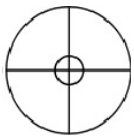
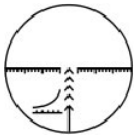
Aiming

In addition to display information, the preferred method of aiming was also examined by crosshair design. Being able to aim and acquire targets is highly dependent upon this element.

A fine crosshair or duplex crosshair were two of the most preferred crosshair styles for short-range weapons (i.e. machine guns) and long-range weapons (i.e. sniper rifle). In addition to fine and duplex crosshairs, modern range finding and mil-dot were also crosshairs commonly selected for long-range weapons. Table 7 lists the crosshair preferences.

Table 7. Frequency results for the crosshair chosen based on whether it was used for a short-range weapon or long-range weapon.

Crosshair	Crosshair Example	Short-range Weapons	Long-range Weapons
Fine crosshair		**29**	**20**
Duplex crosshair		**23**	**21**

German reticule		8	0
Target dot		12	12
Mil-dot		4	**15**
Circle (shotgun style)		10	6
Modern range finding		5	**18**
SVD Type		3	2

DISCUSSION

Based on these survey results, there appears to be consensus on the important aspects of FPS interfaces. Ammunition, radar, and health indicators are all considered critical to gameplay by users, and the majority agree on how these should be displayed. This type of information is important for game developers so they design game interfaces in a way that is intuitive to the majority of users. Future research should focus more on areas of FPS interfaces for which there was not a clear consensus, such as the placement of the health indicator, radar design, or style of crosshair. In addition, usability testing of the alternative interface styles should be done to examine the extent to which user performance may be influenced by each.

REFERENCES

Siwek, Stephen. (2007). Video games in the 21st century: Economic contribution of the US entertainment software industry. Entertainment Software Association, 1-36.

Entertainment Software Association. (2008). 2008 essential facts about the computer and video game industry. Entertainment Software Association, 1-16.
