How Responsiveness Affects Players’ Perception in Digital Games

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Virtual Characters Are Common in Digital Games


Aline Normoyle  Responsiveness in Digital Games  August 3, 2012
People Are Very Sensitive to Small Delays

De-synchronization in conversations
Delay between audio and video
Delay between finger and body motions
Head tracking latency in virtual environments

McDonnell et al. 2009
Carter et al. 2009 Jörg et al. 2010 Mania et al. 2004

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Responsiveness in Digital Games
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Responsiveness of a Character

Delay between an input from the user or player and the associated response

Also called response lag, controller latency/lag, or input lag

Very common topic in blogs

Reasons for delays:

- extensive computations, e.g. physics engine, game AI
- network latencies
Dick et al. 2005: CounterStrike and Unreal Tournament 2004
- 150ms are noticed
- 500ms rated acceptable
- performance does not necessarily decrease

Clayton and Clayton 2006:
- 100ms for first-person shooters or racing games
- 500ms for role-playing games (3rd-person)
- higher values for other types of games

different delays are compared, players rate playability of a game
Our Study

How does latency change the whole game experience?

User is not conscious about delay

Closer to real world experience

No comparison, every user plays in one condition
Our Game

Two conditions: Quick and Delay (150ms)
Platform game, three levels

Map Level 1 & 3
Map Level 2
Measurements

18 participants (6f, 12m)
9 Quick condition, 9 Delay condition

We measure: 1. Control
             2. Performance
             3. Enjoyment
             4. Frustration

Is there a learning effect?
Does the level of challenge matter?
Data Analysis: Control

Two-way repeated measures ANOVA, factors Responsiveness and Level

Results as expected: Main effects of Responsiveness and Level
Learning effect, quick response important for challenging task

1 = very difficult, 7 = very easy
Data Analysis: Performance

More health points lost in Delay condition, on average 1.3 more.

More time spent in tutorial area in the Delay condition, on average 37s longer. (Delay = 106s, Quick = 68s)

Players followed path more accurately in Level 3 → learning effect.
Data Analysis: Enjoyment

No effect of Responsiveness
Main effect of Level
Interaction effect not significant with $p < 0.06 \rightarrow$ data is inconclusive but tendencies point in the expected directions.
Data Analysis: Frustration

Main effects of Responsiveness and Level.

Delay < Quick
Level 1, Level 2 < Level 3

Participants felt significantly less satisfied about their performance when they played the Delay condition.
Players felt most satisfied after playing Level 3.
Data Analysis: More Signs of Player Frustration

Multiple metrics indicate that players’ frustration increased with a delay.

Not collecting the gems
Going around the laser beams
Complaints during the game
Conclusion: Delays Significantly Alter the Game Experience

Even a small delay of 150ms affects the player’s experience in several ways.

Delay reduced performance, satisfaction, and ease of control.

Quick responsiveness becomes crucial for more challenging tasks.
Vary the amount of delay.

Test different types of games.

Investigate the effect of further types of errors in games.
Questions?

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Thanks to Max Likhachev, Lavanya Sharan, ONR, and NSF.