ACHTUNG!

The Technology Demands Attention (And We Demand the Same)

TECHNISCHE UNIVERSITÄT CHEMNITZ

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ABSTRACT

Interactive technologies play a prominent role in how humans interact with their world, with touchscreens and voice-recognition interfaces becoming commonplace in both our digital and analog realities. As technologies broadly defined, these tools are designed with the goal of facilitating our daily deliberations. Yet, advances in computer processing far outpace the human adoption and integration of those tools into our daily discourse, environments, and experiences. Over the next 90 minutes, Dr. Bowman will discuss recent research and writings on the notion of “demand” in virtual systems, focusing specifically on how the study of video games (as simulations of human behavior and interaction) can help us better understand “demand” in terms of its cognitive, affective, behavior, and social dimensions. **The goal of this presentation is to encourage closer examination into these notions of demand, so that we can better understand the lived experience of today’s (and tomorrow’s) technology.**

WHAT IS A VIDEO GAME?

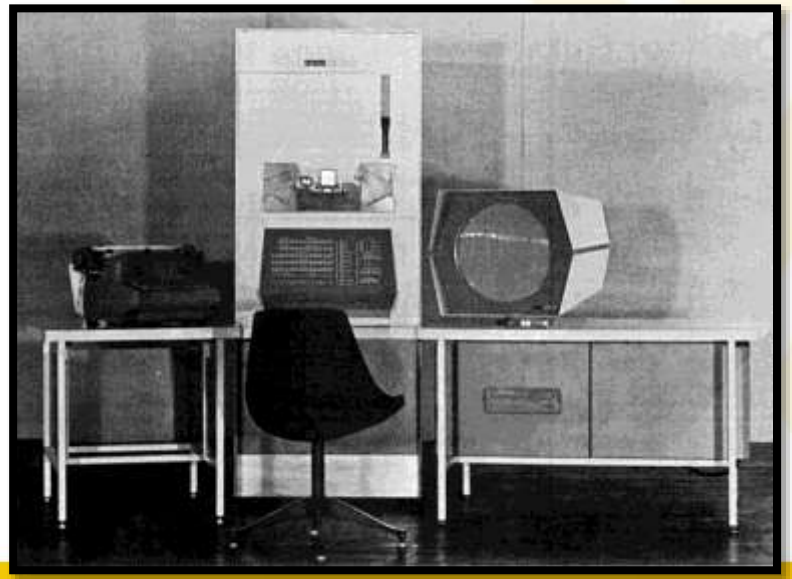
- A “computer demonstration program” should:
  - (a) demonstrate as many of a computer’s resources as possible,
  - (b) generate a new and unique “run” each time (programming language, referring to the individual usage of any given program), and
  - (c) involve the onlooker “in a pleasurable and active way” (Graetz, 1981, para. 26).

WHAT IS A VIDEO GAME?

Video games are a series of "**interesting decisions**" (Meier, 2012)

WHAT IS A VIDEO GAME?

Extensions of HCI



MIT's Kluge Room saw the creative birth of SpaceWar!, [the first video game](#).

Exemplars of HCI

PRESS START

VIDEO GAMES ARE DEMANDING

What happens next?

That's up to you.

- Video games are **inherently unfinished texts** requiring players to exert agency
- "…in a video game, if somebody is crying **it's likely because the player both caused it and can solve it**."

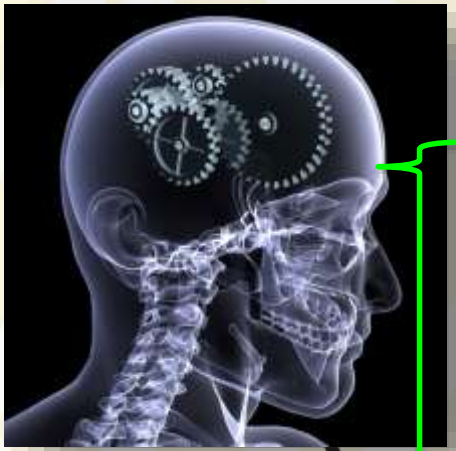
(Oliver et al., 2015)

VIDEO GAMES ARE DEMANDING

- Interactivity is **Demanding**
  - Cognitively demanding
  - Behaviorally demanding
  - Affectively demanding
  - **Socially demanding?**

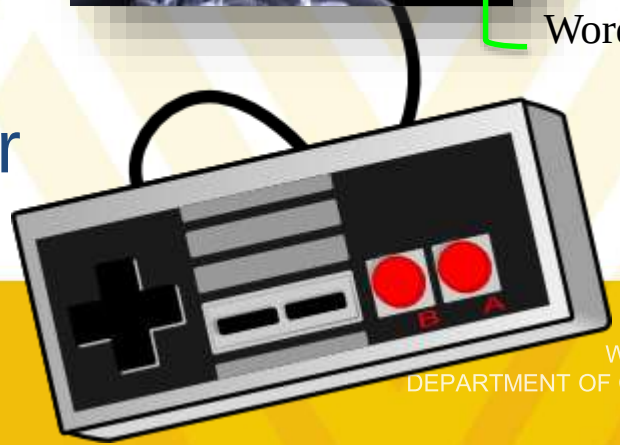
COGNITIVE DEMAND

- In video game, performance is based on our ability to control the interactivity (form + content)
- One such control is our **cognitive abilities**



(a few) cognitive skills found to correlate w/ game performance:

2D mental rotation
3D mental rotation
Moving targeting
Fixed targeting
Eye-hand coordination
Fine motor skill
Word completion



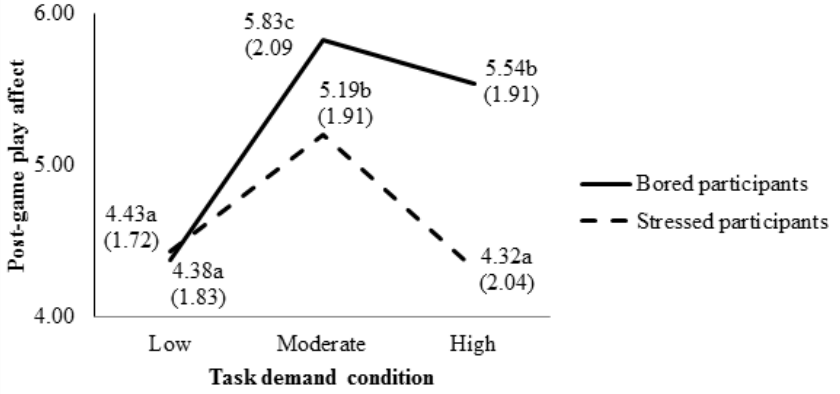
COGNITIVE DEMAND

Table 1. Controls available to the user in each task demand condition, at the start of game play.

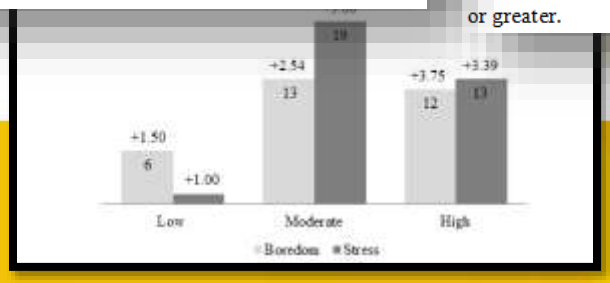
Low task demand*	Medium task demand	High task demand
Flight controls • [none]	Flight controls • Joystick • Throttle • Rudders	Flight controls • Joystick • Throttle • Rudders
Avionics • [none]	Avionics • [none]	Avionics • Airbrake • Landing flaps • Landing gear • Drogue chute • Wheel brakes

*The low+ task demand condition replicates the controls of the low task demand condition, with the addition of the memorization task.

Figure 2. Post-game play affect scores as a function of task demand from [Authors], comparing bored and stressed participants.

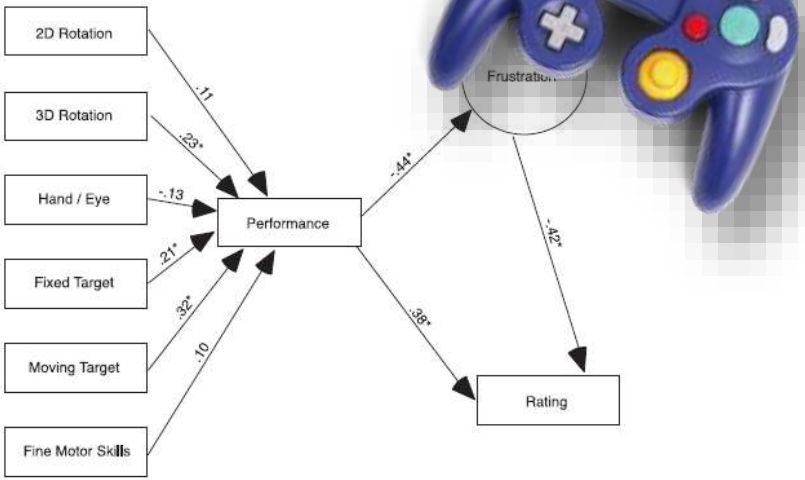


Note: Standard deviations in parentheses. Means with different subscripts differ at $p < .05$ level or greater.



COGNITIVE DEMAND (+BEHAVIORAL?)

Works!



del for traditional controller, standardized regression coefficients shown. χ^2 (28) = 35.16, p = .16, CFI = .97, RMSEA = .05. * indicates p < .05 or greater.

No Works.

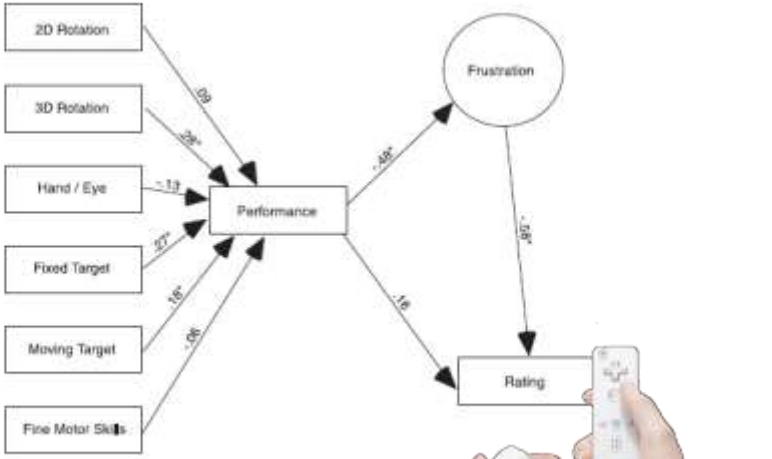


Fig. 4. Model for motion controller, standardized regression coefficients shown. χ^2 (28) = 68.82, p < .00 ZA = . or greater.

AFFECTIVE DEMAND

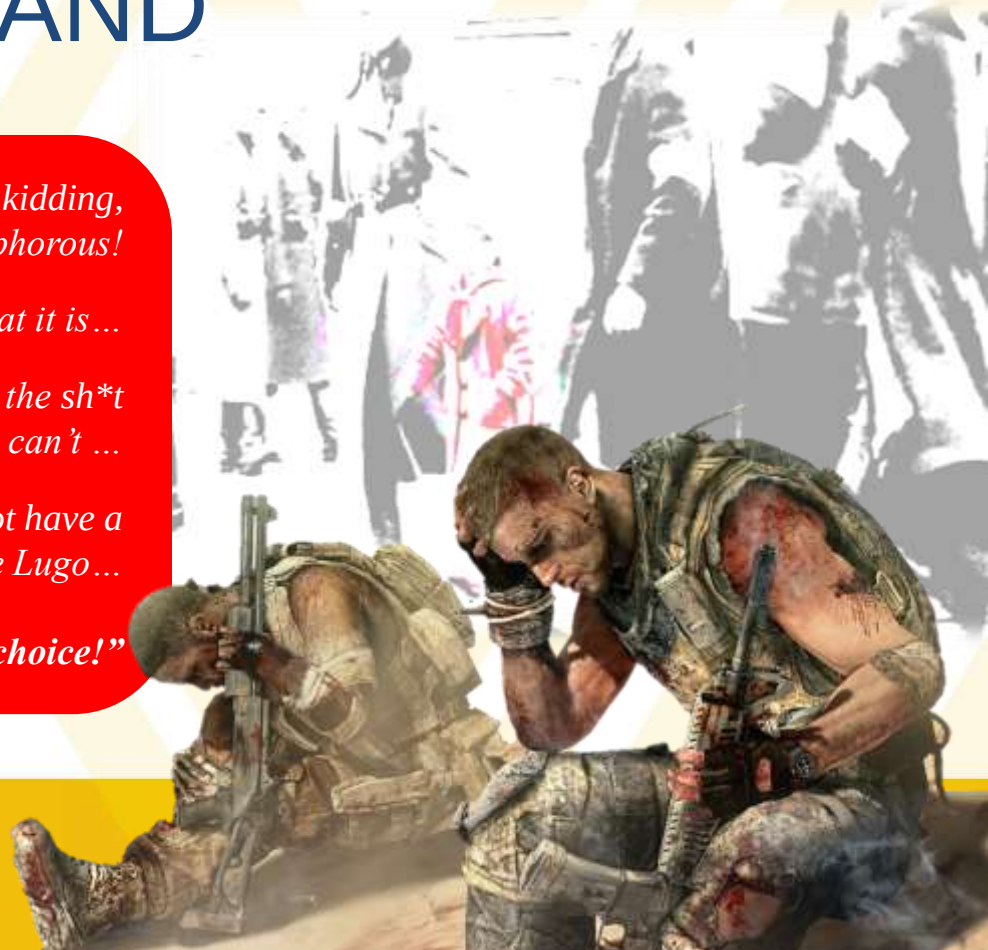
*"Lugo: You're f*cking kidding, right? That's white phosphorous!*

Walker: Yeah I know what it is…

*Lugo: You've seen what the sh*t does! You know we can't …*

Adams: ...We might not have a choice Lugo…

Lugo: There's always a choice!"

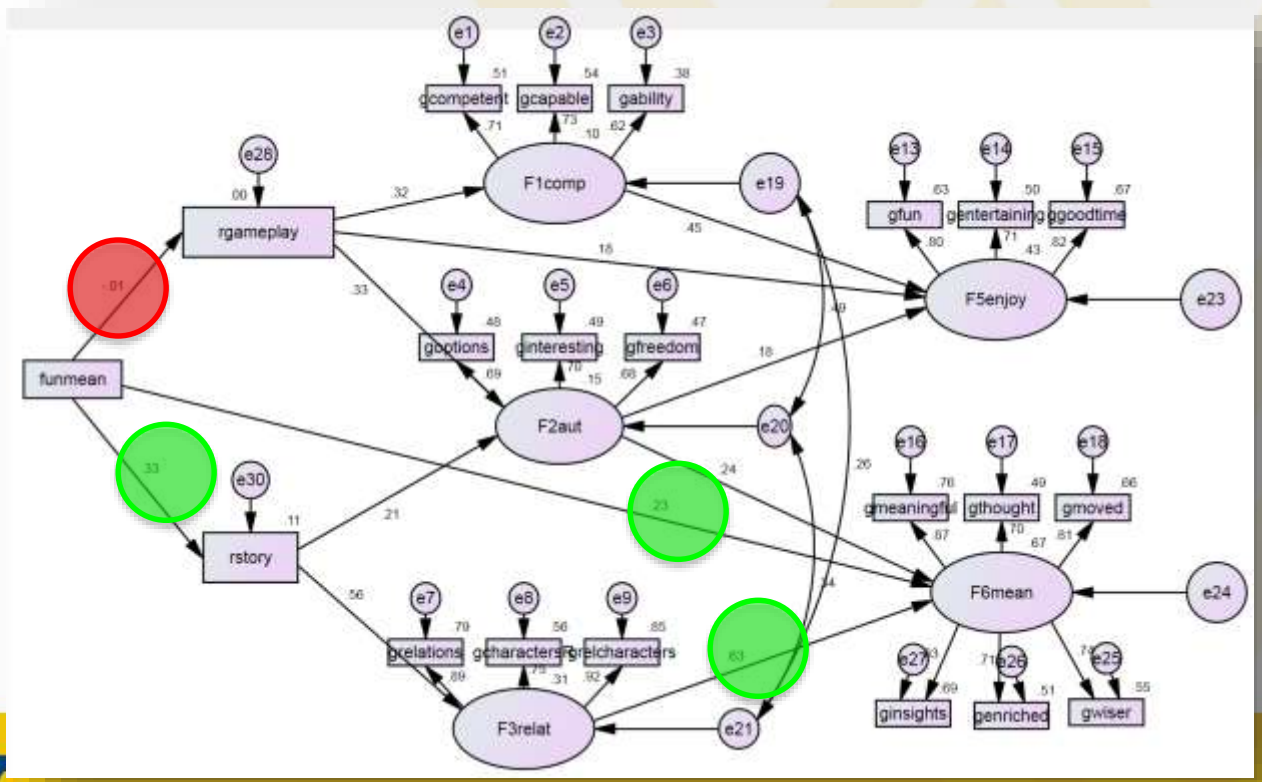


AFFECTIVE DEMAND

- Games can be as meaningful as carrots

"But the bitter truth we critics must face, is that in the grand scheme of things, **the average piece of junk is probably more meaningful than our criticism designating it so."**

AFFECTIVE DEMAND



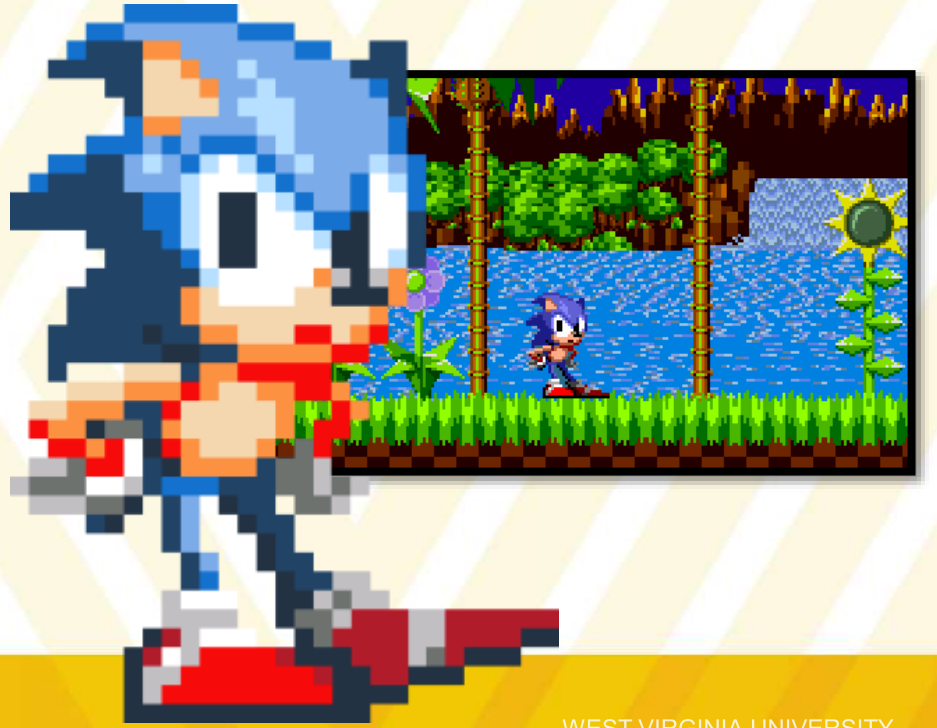
"When players recall meaningful gaming experiences, they reported on how those storylines helped them feel a sense of **poignancy** and **insightfulness as they were able to relate to the story content**"

AFFECTIVE DEMAND

	Enjoyment	Appreciation
	β	B
Step 1: Controls		
Gender	-.029	**-.175****
Age	.010	-.038
R^2 (adj.)	~.001 (-.005) F(2,319) = .146	**.033 (.027)**** **F(2,319) = 5.44**
Step 2: Character Attachment		
Identification	-.070	**.241****
Suspension of Disbelief	.059	.069
Control	**.364*****	.089
Responsibility	-.023	**.122+**
ΔR^2 (adj.)	**.125 (.108)*** **F(6,315) = 7.50**	**.180 (.165)*** **F(6,315) = 11.56**

BEHAVIORAL DEMAND

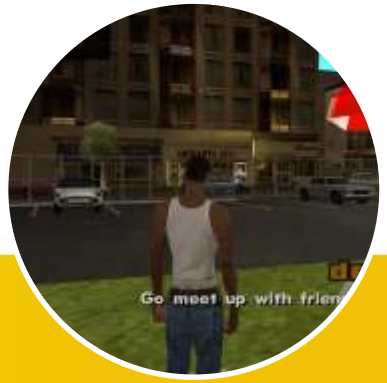
- As a **“lean-forward”** medium, games are one of the first forms of entertainment media that **require consistent physical input**



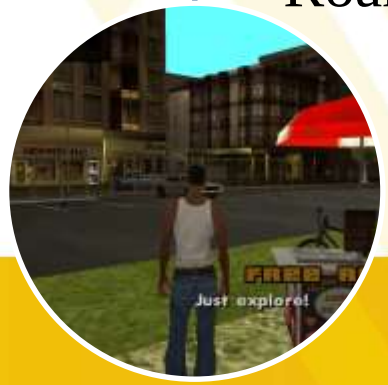
BEHAVIORAL DEMAND

n = 110 (63 ♀)
Training

n = 57
Mission



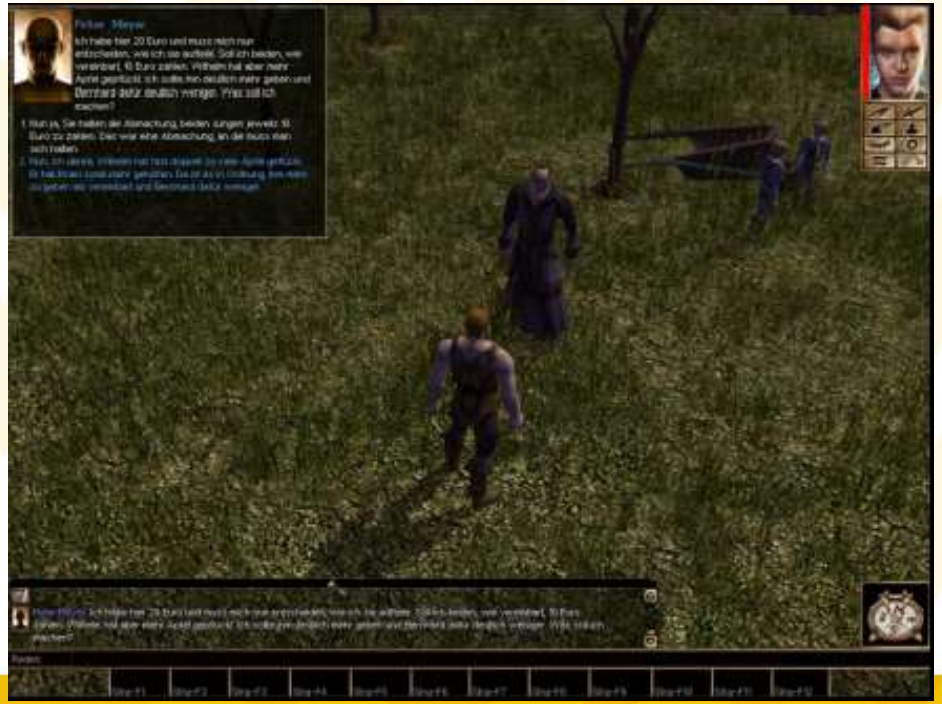
n = 53
Roaming



Walkers relied on their dominant habit, while non-walkers let the game guide them!

BEHAVIORAL DEMAND

When players are faced with non-based moral dilemmas, they tend to make random ("game") decisions unless the game violates their moral intuitions!



SOCIAL DEMAND

- Gaming and sociability
  - Games as “third spaces of discourse”
  - Extraverts prefer gaming
  - Gaming fosters relatedness
  - Task interdependence fosters transactive memory

SOCIAL DEMAND

TABLE 1 Effect of Audience Presence on Video Game Performance

	B	*SE B*	*β*
Low-challenge game			
Rotation ability	17.06	2.88	.570**
Hand-eye targeting ability	9.07	2.62	.334**
		$\Delta R^2 = .435$**	
		F for $\Delta R^2 = 24.48$	
Rotation ability	17.39	2.71	.581**
Hand-eye targeting ability	10.65	2.52	.392**
Audience presence	16.31	5.47	.276**
		$\Delta R^2 = .073$**	
		F for $\Delta R^2 = 8.89$	
High-challenge game			
Rotation ability	4.43	.814	.543**
Hand-eye targeting ability	2.38	.739	.322**
		$\Delta R^2 = .414$**	
		F for $\Delta R^2 = 20.81$	
Rotation ability	4.48	.806	.549**
Hand-eye targeting ability	2.63	.748	.355**
Audience presence	2.52	1.63	.157
		$\Delta R^2 = .023$	
		F for $\Delta R^2 = 2.41$	

When playing in front of an audience, easy games became easier…

…but hard games didn't change at all!

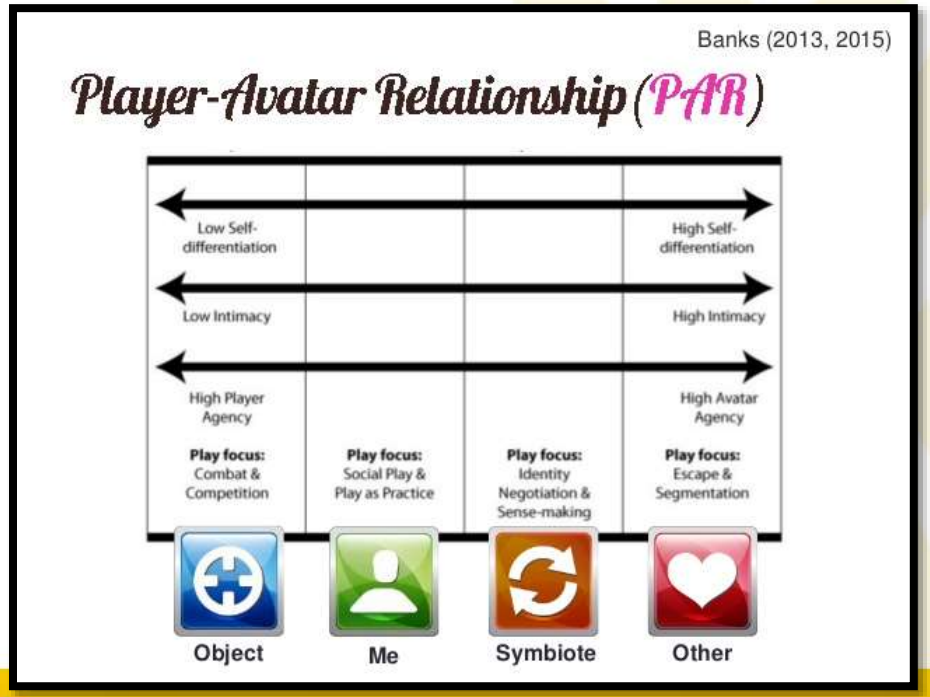
SOCIAL DEMAND

- Enjoyment highest when co-playing (5.23) than alone (4.69); especially w/prior inclusion

	Alone	Co-Play
Ostracized $t(32) = .237$, $p = .814$	5.10a	5.19a
Included $t(35.4) = 2.72$, $p = .01$	4.46b	5.29a

Enjoyment impacted by performance, game choice (co-play) and game self-efficacy – but only for those socially included.

SOCIAL DEMAND

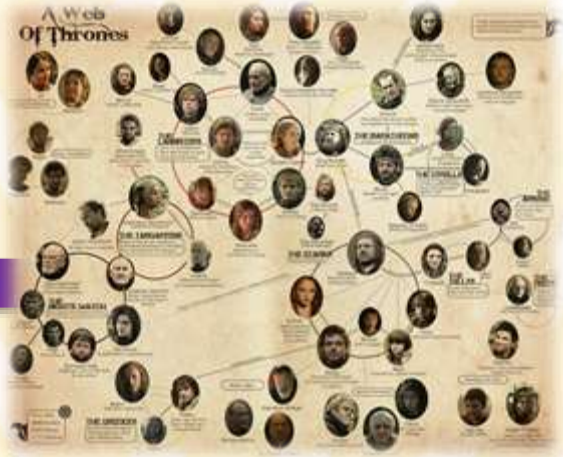


- Work by Banks (2013) has found that many player-avatar relationships are **social** rather than **parasocial**!

VIDEO GAMES: DEMANDING

- Gaming is a constant co-production with a dedicated and demanding digital partner
- **Gaming is a process**, not a consumption

VIDEO GAMES: DEMANDING



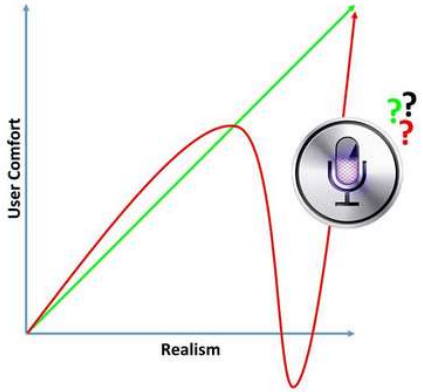
VIDEO GAMES: DEMANDING

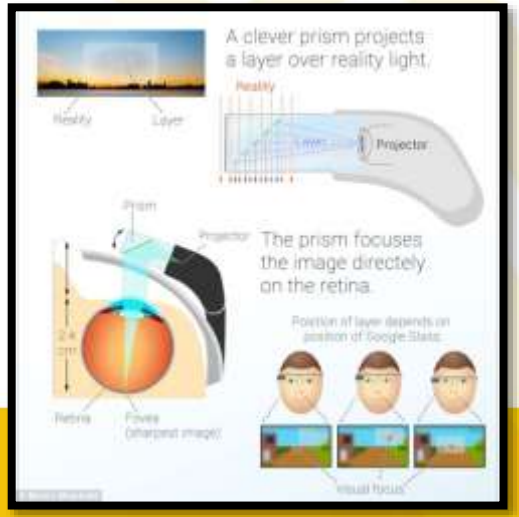
Communication is a “process by which we **stimulate meaning in the minds of others**.”

(McCroskey & Richmond, 1996)

TECHNOLOGY: DEMANDING

- Games could be understood as **bleeding edge** interactive computing proving grounds





TECHNOLOGY: DEMANDING

- Cognitive: Interfaces make us think.
- Emotional: Interfaces make us feel.
- Behavioral: Interfaces make us do.
- Social: Interfaces make us human.

"**Even astonishing advances in communication technology** like the printing press, the telephone, and the Internet **do not take us away from this past; they draw us closer to it**." (Christakis & Fowler, 2009)

TECHNOLOGY: DEMANDING

Mental Demand: How much mental and perceptual activity was required (e.g., thinking, deciding, calculating, remembering, looking, searching, etc)? Was the mission easy or demanding, simple or complex, exacting or forgiving?

Low ——— High

Physical Demand: How much physical activity was required (e.g., pushing, pulling, turning, controlling, activating, etc.)? Was the mission easy or demanding, slow or brisk, slack or strenuous, restful or laborious?

Low ——— High

Temporal Demand: How much time pressure did you feel due to the rate or pace at which the mission occurred? Was the pace slow and leisurely or rapid and frantic?

Low ——— High

Performance: How successful do you think you were in accomplishing the goals of the mission? How satisfied were you with your performance in accomplishing these goals?

Low ——— High

Effort: How hard did you have to work (mentally and physically) to accomplish your level of performance?

Low ——— High

Frustration: How discouraged, stressed, irritated, and annoyed versus gratified, relaxed, content, and complacent did you feel during your mission?

Low ——— High

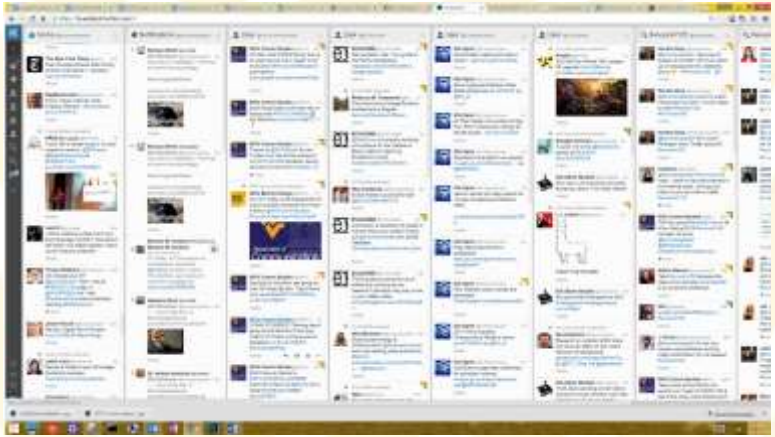
Video games might tell us a great deal about how interfaces are "experienced" by the h… f HCI.

TECHNOLOGY: DEMANDING

Video games might give us insight into the types of virtual experiences humans want or are capable of having

TECHNOLOGY: DEMANDING

Video games might give us insight into the what information (design?) we can handle virtually



TECHNOLOGY: DEMANDING

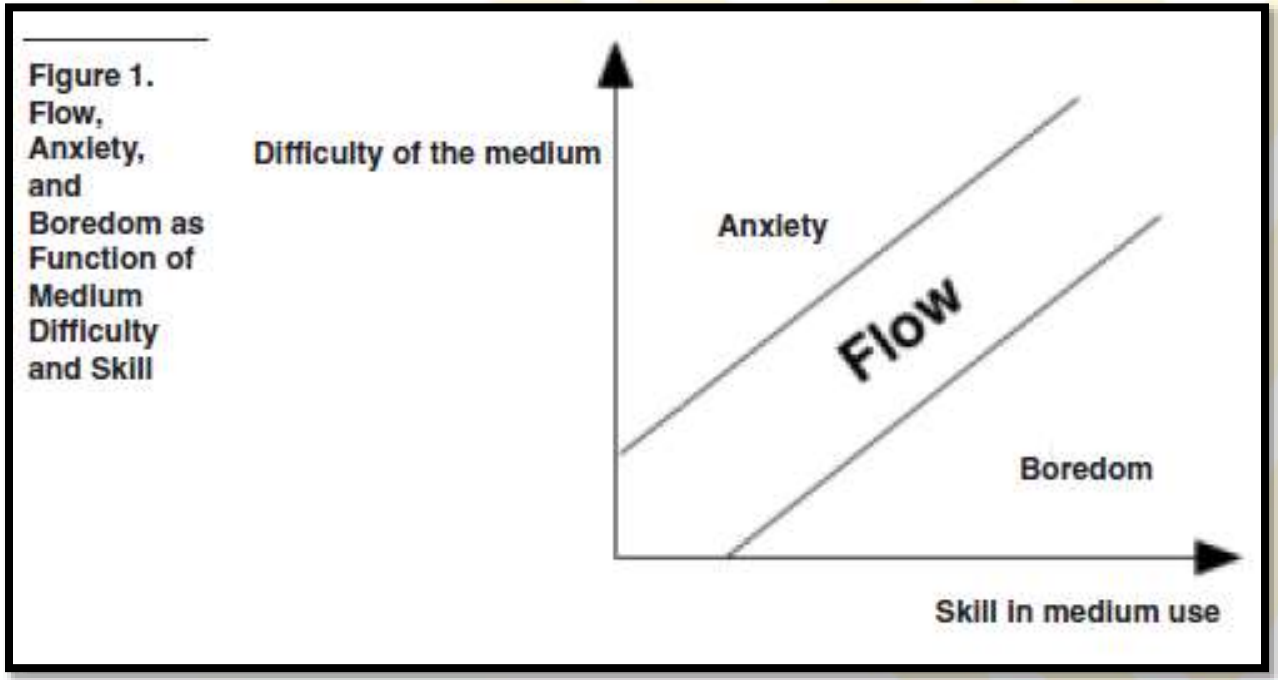


Figure 1. Flow, Anxiety, and Boredom as Function of Medium Difficulty and Skill

Video games might tell us a great deal about balancing tasks and demands placed on the human side of HCI

Play.

With.

Digital.

Make.

Interesting.

Decisions.

INTRODUCTION

- Technology as **tools** for **goals**

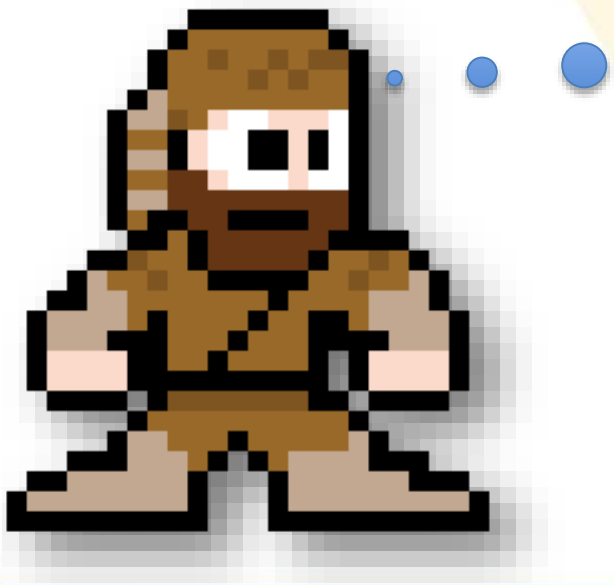
INFORMATION

RELATIONSHIPS

PERSUASION

ENTERTAINMENT

FOR MORE INFORMATION



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