Intro Videogame Design Workshop
Summit 2007 Workshop

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Dates & Times:
Jan 11 Thurs – Jan 13 Sat
10:00am – 12:00 noon

Location:
Newell Simon Hall 3002

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Disclaimer: These notes were originally intended only for my personal use in preparing for the daily presentations; they have since been expanded and lightly updated to reflect points of class contribution/discussion from each day. Unfortunately, they are still organized as a hierarchical outline - which certainly isn't the easiest way to digest the information, but the ideas are there. I am continually working on improving my notes, but I'm considerably more comfortable presenting than writing...

Day 1

1. Course Overview
    a. 3 mornings, 2 hours each, 10am-noon in NSH 3002
    b. Day 1 – Seeing and Identifying Videogame Design
       Who am I, who do I think you are
       What this course is about
       Clarification of common misconceptions about videogame design
       Class design activity
    c. Day 2 – Understanding and Discussing Videogame Design
       Considerations and common techniques for videogame design
    d. Day 3 – Promoting and Defending Videogames
       The often-ignore or misunderstood benefits of videogames

2. Background, Qualifications
    a. 10 years developing games, several dozen completed
       Programming, game design, level/puzzle design, interface design, 2D/3D art/animation, project management, sound effects, writing, voice acting, manual, marketing…
       www.chrisdeleon.com
    b. Cofounder of Game Creation Society
       Sole manager for 3 semesters, overseeing 5-7 projects per semester (direct involvement with 1-3 games each semester)
       www.gamecreation.org
    c. Past 2 summers as a Technical Game Designer at Electronic Arts
       Working on Medal of Honor: Airborne for next-gen platforms
    d. Familiar with academic, sociological, and critical literature on the topic
       Since this is casual introduction environment, I'll hold references, but recommended reading list will be available to anyone interested

3. What I assume about people attending this workshop
    a. You have played videogames before
        i. Atari, Arcade, NES, Game Gear, X-Box, Wii, PC… something.
    b. Most of you probably have not actually worked on making videogames before; those of you who have, probably have not worked on very many
    c. You're interest is in the game aspect of videogames
        i. Videogames do *have* stories, art, algorithms, project schedules… but videogame design is about the interplay/use of those things, as opposed to those things in themselves (writing, modeling…)
    d. You're willing to work with me to learn this topic
        i. I have a lengthy background in the topic, and I've even taught it a handful of times in a handful of ways…
        ii. That does NOT mean I am any sort of expert in teaching
        iii. If what I'm saying is unclear, please ask a question; my goal is to help people here better understand videogames, and if you can help me do that more effectively, then you're helping everyone (including me!)

e. We can focus primarily on Independent Game Design
    I.e. non-corporate; you have say over the whole structure of what work needs to be done for the project
    Additionally: you won't win any graphical/audio nuclear arms race, so you'll need your videogame to succeed on it's gameplay
f. You're willing/ready to dust off and use your imagination a bit
    By far, the brain is the most rapid mock-up/prototyping tool
g. You have an interest in, if not making, then at least intelligently discussing videogames as a medium
    Being able to articulate strengths of one game's design over another, propose and consider fundamental changes to a videogame's mechanics, and so on

4. What is a *Videogame*?
    a. Not referring to a…
        i. Explicit/technical simulation
        ii. Digitization of a (novel or preexisting) board/card/gambling game
    b. Notably, "videogame" does not mean the same thing as simply "game"
        i. Playground play, board games, card games, dice games, sports…
    c. While influenced by other media, it has distinctly different concerns than
        i. Film
        ii. Comic books
        iii. Literature
    d. Referring to something that (typically)…
        i. Self as the avatar, team, or other directly controlled element
        ii. Steers towards an objective ('failure' exists, and "doing better")
        iii. Happens in real-time
            1. Clearly turn-based games exist; but these are a different animal altogether than my area of expertise…
            2. The study of turn based games has a much greater area of overlap with the study of storytelling, gambling, and board games, none of which we'll cover in this workshop

5. <u>What this course covers:</u>
    Videogame design

6. <u>What this course does not cover:</u>
    Game (board, dice, sport) design, semantics/definition of play, programming, level/puzzle design, digital art, AI algorithms, cultural/sociological effects of videogames, project production, adaptive scheduling, technical writing, writing design documents, 'modding', character design, story writing, cognitive psychology, statistics, 3D math, architecture, classic/retro videogame history or trivia
    All of these fields get mixed up with game design from time to time…

7. Why distinguish between game and videogame
    a. Paper prototypes scale poorly to real-time interactivity; why board/dice/gambling/paper games tend to be poor sources of inspiration
        i. Old Nick Hypocrite
            Tic-Tac-Toe where either player can play an X or an O on any given turn, and the first to get 3 in a row of either symbol on their turn wins; points for a tie round pile into a piggy bank, all of which gets awarded to the next winner. Demonstrates how increasing the number of possible board configurations by a minor rule modification can dramatically increase the depth of a game…
        ii. We can learn from it, but not much, and esp. not much more than we could have figured out from a brief conceptual consideration of any of a number of games/experiences.
    b. Reality places very tight limits on physicality; why sports and real activities tend to be less-than-ideal sources of inspiration
        i. No eating mushrooms to double size (power-ups)
        ii. No health bar, constant running, etc. (contrivances to assist player reading and interacting with the environment's state)
        iii. Inefficient use of 2D space and building layouts, except in plainly contrived cases
        iv. When the basis is "What's realistic" rather than "What makes sense within the context of this videogame's design?" then the videogame frequently winds up polluted with boring/frustrating/undesired tactical/literal simulation aspects

8. Misconceptions and myths about Videogame Design
    a. Misconception: "Reality" is better than unreality
        i. "I should be able to break open every lock with my shotgun"
        ii. Obsession over this forces strange affordance contrivances, ridiculous gadgets, and pointless wastes of precious project time
            ("We should make all doors heavy steel, so the player knows it can't be shot down…" which limits art & environments)
            ("How *could* our gun/vehicle really work?")
        iii. Often bleeds undesired elements of reality into game world
            "Running meter" – annoying, virtually no effect on gameplay
            Random gun jams – anticlimactic, frustration
            Injury affecting mobility – Positive feedback loop on failure
        iv. Trap strongly motivated by move towards 3D FPS games
            The "Uncanny valley" effect; fidelity breaks iconography; in 3D space gamers are typically far less accepting of violations to natural laws (collision, physical interactions…) than in 2D
    b. Misconception: "Immersion" is a desirable goal for every videogame
        i. i.e. "The player wants to feel like they're really there"
        ii. Extension of self, or absorption in experience may be desirable, but this isn't accomplished by "immersive" graphics/sound, or by

removing all HUD elements (however either of those aspects done very poorly will certainly hurt matters)

iii. The player needs to have a concept of what's going on. A video screen and electronic input are distinctly different means of interaction than the real world (ex. 3rd person car camera can be MORE effectively immersive, since it simulates peripheral vision in a way that 1st person camera cannot)

c. Misconception: "Non-linearity" improves any game
   i. "Players want open worlds"
   ii. It's one of a wide range of tools for a designer's consideration
   iii. Has pros/cons, often strongly dictates other feature needs
   iv. To many, the appeal of games is that the goals are clear/definite!

d. Misconception: Adding content or features improves a game's design
   i. "What if we could go inside every building!?"
   ii. Picking battles for a limited budget/schedule
   iii. Focusing on the game's strengths and purpose

e. Misconception: Good Art+Good Story+Good Programming=Good Game
   Understanding Comics example
   Mash up; Divergent art, story out of touch with gameplay, programming that "fixes" elements critical to gameplay design

f. Misconception: Every game has characters, a setting, etc.
   It isn't a movie stage. Player can control the world, switch bodies, dictate strategy to armies, shuffle pieces…
   *Before "where and who" ask "if those are relevant, and why"

g. Misconception: Criminal behavior sells
   Venn diagram successful games, criminal behavior games.
   *The overwhelming majority of successful games are either pure fantasy or at least place the player in an honorable hero role;
   *The overwhelming majority of criminal games have done poorly critically and commercially
   *The overlaps in the diagram are rare/notable exceptions: GTA3-5

h. Misconception: "Licensed" games are all good (or, all bad)
   Neither categorically applies, and it has more to do with game design than the source material. There are plenty of both good/bad X-Men games, James Bond games (in this case, both are named "Goldeneye"), etc.

i. Misconception: Different or original is always better
   Sometimes different is better. More often than not, it's a huge mess; this is a major reason why the market keeps producing rehash games, and the consumers keep buying rehash games

j. Misconception: Intelligent AI is more fun to play against
   Why we have so many zombies, ogres, robots, insects, aliens… they're persistent. They can be understood. They don't cower.

k. Misconception: Complex behaviors make for "intelligent" AI
   Semi-random and simple rules yield seemingly intelligent AI.

It's often largely a sell via character/setting design (angry monster visibly looking behind corners for the player), audio ("I can't find her!"), artwork (animations conveying primitive underlying decisions), and designer hints to the AI (cover/mount/jump nodes). In the case of AI, perception is often more important than reality.

9. It's valuable for game designers to have literacy in other areas of design
    a. Design decisions often have implications reaching other areas of project – difficulty and resources (time, people, money) to make it happen will be a definite consideration in a proposed design's success
    b. Art, animation, programming, sound effects, scheduling…

10. There's *particular* value to having technical skills as a game designer
    a. In reality: math, logical, and physical are "models" to reflect our World
    b. In videogames: The World *IS* its math, logical, and physical models
    c. Game Designers may have to work with crude, buggy, partially developed software tools (level design or otherwise), and/or write simple programming-type script code to execute scenes and orchestrate actions

11. Class activity (peer-based review of today's topic, exercise to help tomorrow)
    a. List top 1-3 favorite videogames
    b. Identify design aspects of the game (i.e. not artistic, story, programmatic, etc.)
    c. Articulate, as well as you can, what you like about the game's design
        NOTE: It's entirely possible to like a game for reasons other than it's design (!). Games have certainly been sold, and enjoyed, based heavily on artistic, musical, story, or other merit which eclipses the quality of a game's design. A videogame can have a relatively simple or less-than-ideal design and still be an enjoyable market success
    d. Break into groups of 4-8 to share and discuss; encourage comments and questions among the groups

Day 2

1. The constant fluctuation of lexicon in the industry
    a. Videogame industry is younger than our parents
    b. None of them 'grew up with it,' and certainly none of them had the opportunity to hear adults speak or read about growing up with it
    c. But progress *is* being made; today we'll highlight some of the reoccurring concepts and vocabulary used by game designers in their work
2. Designing to Impulses – What does the player want to do? Why? Can we affect that?
    a. Source/Cause
        i. Story (ex. "zombies are overtaking the earth" – blind aggression)
        ii. Character (ex. "Jill saved your life" – protect the defenseless)
        iii. Gameplay
        iv. Innate
        v. External/Cultural
    b. Impulse types – what does the player want to do?
        i. Self-preservation
        ii. Triumph over obstacles
        iii. Collect
            1. Originally a micro-compulsion: coins, rings…
            2. Later a macro-compulsion: time unlocked cheats/features!
            3. Has an added benefit of serving as a coverage mechanism (making Pac-Man go everywhere) or inverse-"breadcrumbs" to help the player realize where he's gone (where there are no coins left, or little ammo/health/armor packs in Doom).
        iv. Organize, match
        v. Creation/design
        vi. Thrill, vertigo
        vii. Protect the defenseless
        viii. Explore
        ix. Solve novel problems
            1. Puzzles, asymmetric balance…
        x. Extermination of a threat
            1. Halo "firefighting" level design – esp. in early levels, action is always happening a few rooms away, and running to resolve the matter strings the player through
    c. Overriding/conflicting philosophies about Design by Impulses
        i. Focus on a select set, avoiding distraction by others
        ii. Breadth of Appeal
            1. Required – runs risk of turning off fans of particulars
            2. Optional – runs risk of wasting time on design & content
3. Playground for heuristic development
    a. Playground for mistakes
    b. Sources of difficulty
        i. Difficulty in input scheme (SF2 specials, RE4 shooting, Bust-a-Move)

        ii. Difficulty in discovering goal (Myst puzzles)
        iii. Difficulty in hand-eye reflex time (Punch-Out)
        iv. Difficulty in managing attention (Galaxian)
        v. Difficulty in anticipating opponents (Pac-Man)
4. Recognition and Affordance
    a. Getting the player to realize "I know what that's supposed to do"
        i. Identifying when a design is failing because the player didn't know a lever could be pulled, a weak wall could crumple, a pressure plate could be stepped on, etc.
    b. Knowing the characters, objects, and behaviors, externally or internally
        i. IP/sequel recognition value; ex. imagine the difference between a first time player's response to Smash Brothers (they have expectations for how Link, Kirby, Mario and Samus/"Metroid" behave) vs. Guilty Gear (10 characters no one's ever heard of = steeper learning curve)
    c. Being able to naturally or easily figure out what's going on
        i. Angry monsters want to eat you
        ii. Unarmed people want to talk to you
        iii. Falling blocks will keep falling
5. Striving to make player decisions interesting
    a. Keeping decisions significant
        i. In-air mobility (Metroid)
        ii. Differentiate weapon behaviors (Pistol, Machinegun, Shotgun)
        iii. Insignificant decisions (tie/untie boots? Send or not send transmission in Doom 3 prior to demon invasion?) generally ought to be removed or somehow attached to a distinguishable outcome
6. Emergent complexity
    a. Few simple pieces, train user in the vocabulary, then speak the language
        i. Doom enemies – Zombie, Imp, Demon
        ii. Many old classic games
            1. Bubble Bobble
            2. Zelda titles (esp. earlier years)
    b. RTS armies (simple unit designs, complex strategies when together)
        i. Ceases to be emergence when meta/team tactics are written into AI
7. Tech talk terms (words and concepts that game engineers/programmers will relate to)
    a. Triggers – area/button/door that stimulates some other definable action when moved into or shot; ex. push button to open door, step on blue floor tile to spawn demon behind player, shoot rope to crash chandelier (see "Gags")
    b. AI - Artificial Intelligence
        i. Typically not even remotely "intelligent"
        ii. Just a series of simple behaviors, and logic justifying transitions between said behaviors (see Finite State Machines, or FSMs)
    c. Waypoints – generally there to provide human-placed hints to the AI
        i. AI/Pathfinding Node – marks points in the lines that AI should consider when traversing between hallways/areas to follow or find the player
        ii. Patrol nodes – Points that AI should wander back and forth between

iii. AI Cover Nodes – Places AI should stand when firing to make effective use of cover or advantageous lines of sight
iv. Pure Waypoint – Used to query an in-game location for use with game script or code, ex. to create ("spawn") something at that location

d. Scripting
    i. Simplistic programming-like code which can be used to adjust aspects of the videogame logic/behavior. Sometimes designers will help write script code specific to levels or simple features, otherwise programmers/engineers will generally be in charge of any major scripting
e. INI ("innie")
    i. A file extension for a file which holds starting values or parameters for numerous in-game elements, such as unit health, weapon rate-of-fire…
f. Gags
    i. Elaborate pre-scripted sequences, often initiated by a Trigger ("when the player walks into this room") and utilizing a mix of scripting and triggers to set off a series of 'canned' (deterministic) events ("the room behind the player will explode, causing boards to collapse and block the door, while aliens will begin pouring through the opposite door")
g. Pathfinding
    i. The technical challenge of efficiently determining how a unit can navigate from point A (where I am now) to point B (where the player is, where a health pack is, where the player clicked for an RTS unit to move to) around obstacles, threats, etc. This is almost always a problem solved by engineers/programmers instead of designers, but designers need to recognize the notion to realize the limitations it may place on the complexity of environments in which AI operates (ladders, teleporters, water, moveable climbing blocks, and so on may require extra work to get the AI to use them in their pathing)
h. Finite State Machines
    i. The concept of a set of states ("Wandering," "Charging Player," "Search for player," "Retreating for backup," "Moving to position to throw grenade from") and the set of transitions which will cause one state to end or switch to another state ("Have never seen player," "See player," "Have seen recently but can't see player," "Health below 30%," "Grenades in inventory >0 and within 30% threshold of optimal grenade throwing range")
i. Asynchronous logic updates
    i. The notion that not every operation is going to happen every cycle, especially when there are many units on screen at once (RTS games, certain FPS titles); ex. unless attacked/touched/interrupted, a unit may open reconsider it's FSM state once every few seconds or more.
j. Checkpoints
    i. Some way of measuring player progress; in a racing game, these track player progress during laps; in most other genres, checkpoints serve as automatic save points where the player can start again upon dying.

This is to make the game less frustrating by requiring less replaying of areas which have already been defeated/mastered. Many otherwise pretty well made games are declared frustrating by critics due to poor distribution of checkpoints (ex. Far Cry).

k. Spawning. Spawners
    i. "Spawning" is the creation of something out of nothing in the world, e.g. placing enemies into the level that didn't previously exist, making a mission required item ("Flight Recorder Black Box" in GE64) appear at some waypoint, etc.
    ii. Spawners are regions or special units which pump out new creatures/units, either when triggered or continually
    iii. Spawning often plays a role in (A.) ambushes (or B.) to reduce the framerate stress of having all enemy AI thinking and rendered the entire time, certain enemies may only spawn when the player gets within a certain range

l. Frame Rate
    i. How many frames per second (fps; not to be confused with FPS in all caps which is for First Person Shooter) the game is played. 30 is typically considered the min. acceptable, with 60 preferred, and anything over 60 virtually undetectable to the human eye
    ii. Rendering/drawing too many things, or computing too many calculations for AI and game logic every frame (by pathfinding, for example) may incur a hit to the frame rate
    iii. An otherwise good game may lose points with critics and players if its framerate is instable or regularly drops below 30 (e.g. Perfect Dark)

m. Level of Detail (LOD)
    i. With regard to graphics: lower polygon count or lower resolution (fewer pixels and smaller filesize) texture maps ('skin' stretched over the models) for characters which are only used at certain distances, to reduce the memory
    ii. With regard to AI, using simpler/abbreviated decision making processes when at a great distance or out of player sight, to save processing cycles and keep the frame rate high

8. Examples of overarching design concepts
    a. Hierarchical Compulsion Loops – goals/motivators always "on the horizon"
        i. It's the light at the end of the tunnel… inside a bigger tunnel… etc.
        ii. Macro – story motivations (captured princess, evil scientist amok, etc.)
        iii. Medium – get to new setting, see new enemies
        iv. Micro – stay alive, fill combo meter, get next coin
    b. Burning fuse (aka "Potential Function")
        i. Time, fuel, or other constantly decaying resource
        ii. Health bars without health packs
        iii. Growing pile of increasingly inaccessible blocks
        iv. (Nearly-) Invulnerable chaser enemy
            1. Joust, Bubble Bobble

    c. Live Attractors/Repellers
        i. Pong paddle mechanics
        ii. Pac-Man power pellets ‘Tag’ effect
    d. Information, Reflex, and Anticipation Overload
    e. Escalation
    f. Positive Feedback Loop (Acceleration of winning)
        i. Most RTS games
    g. Negative Feedback Loop (Handicap to present/predicted winner)
        i. Super Mario Kart
    h. Dilution of skill – introduction of randomness complicates optimal strategy
9. Activity: Identify the simplest game you know, and propose/discuss a design addition or subtraction and its implications to “improve the game.” Aiming for an engine (game mechanics – underlying logic) level change, as opposed to a content (extra boss, extra level, more of what’s already there)
    a. Simple is better; the more complicated the game is, the more any particular change will percolate to all other facets of the game (ex. changing pong can be a description of a single change;
    b. If anyone hasn’t heard of the game you’re modifying, be ready to explain the basics of how the game mechanics work
    c. Bear in mind: Popular games and classics, while you may like them and understand them well (ex. Minesweeper) may be some of the hardest to improve upon without massively alienating an existing fanbase… consider some of the simple games you REALLY haven’t liked, and think about what you didn’t like about them – if it’s resolvable, maybe it’ll increase appeal to other folks with your interests!

Day 3

1. Main topic for the day: Sticking Up For Our Medium
    a. See following pages for notes from the talk. Assembled from a mix of class contributions and my notes going into the meeting…

2. Some recommended reading / works cited from this year's workshop
    a. The Game Design Reader: A Rules of Play Anthology
        Edited by Katie Salen, Eric Zimmerman
    b. Playing Video Games: Motives, Responses, and Consequences
        By Peter Vorderer and Jennings Bryant
    c. Understanding Comics: The Invisible Art
        By Scott McCloud
    d. Indie Game Development Survival Guide
        By David Michael
    e. Unit Operations: An Approach to Videogame Criticism
        By Ian Bogost
    f. A Theory of Fun
        By Raph Koster

Point/Counterpoints on…

Media/Parents say games are BAD b/c:

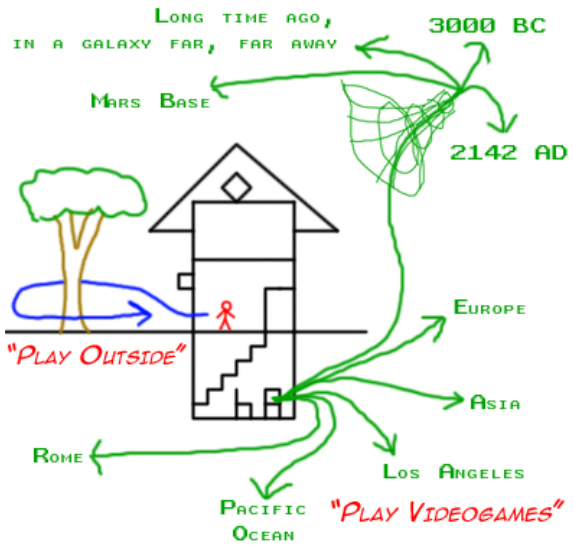
- Lack of physical activity
  - Also true of reading…
  - In many cases, happening in city apartments without a farm/yard to play on
- Promotes aggressive behavior
  - Drives home that the world won't save itself. It's up to YOU.
- Promotes racism/hate/sexism
  - Again, can apply to reading or any other medium
  - In fact, can provide a unique empathetic experience when men play as female MMORPG characters (and experience all the ways other men belittle their characters in-game), or a window into the life of families raised among troubled neighborhoods and the whole spectrum of human existence
- Mindless zombie generation
  - Here was appears to be nothing from the outside is mistaken for inactivity; it's focus. An incredible amount of rapid activity is happening as the player figures out what to do next, why, and how to do it – but the avatar onscreen is living out the player's constant and active decision making.
- Starves imagination
  - Feeds imagination, and of the part of the population that's often farthest from satiating this need: tech/engineering types.
  - Mythology for a new generation
- Kids don't read; promoting illiteracy
  - RPGs and many other games require a

Misc. notes on industry defense

In most violent games, the player is a hero, a policeman, a US soldier… a good guy.

Even San Andreas*, the target of the much attention from parents, starts as an anti-drug story and becomes above overcoming corrupt a police forces in a bad part of town.*

When children play cops and robbers in their imaginations as kids, are we seriously concerned about the maturation of the child that chooses to play as the robber?



An admittedly tongue-in-cheek exaggeration to make a point, but the heart of the point is that videogames can provide an affordable window to see and experience new locations, characters, stories and events, in a way never before possible.

We say games are GOOD b/c:

- Analytical practice
- Hand-eye coordination
- Learning healthy competition
- Artistic exposure (art, music…)
- Problem solving "on the spot"
- Safe outlet for impulses
- Can influence perspectives
- Mental stimulation
- Versatile medium
  - Potential to unlock markets that are currently off radar (as The Sims did for young and old women gamers)
- Labeled rating
  - Parents can then decide the content suitable for their children.
- Infinite playgrounds in infinite worlds
  - Ease of transitioning from one to another helps the player learn how to get good at many things, and switch focus/mindset on a moment's notice.
- Globally shared experience
  - Shared experiences that, no matter where we're from, we can relate to. We can all share in what happened to Zelda, and what it was like to live for so long in Hyrule…
- Often free or cheap

Teaching tool – because "Edutainment" sucks, but games often teach indirectly!

- Taking action (non-passivity)
  - The king has been turned into stone. No one else in the world can fix that – only the player – but he'll need some of everyone else's help, and he'll need to apply himself to the problem continually until it's

great deal of attentive reading to succeed, and place a strong emphasis on good story development

- ADD promoter
  - Anyone that does the same thing for 10 hours day probably doesn't have ADD. ;)
  - The nature of videogames where things are always either happening, falling apart, or standing still (while the enemy assembles a larger army) may be motivating a new generation of people more restless for forward progress than the last.
- Sparks interest in occult
  - Yep. And history, police corruption, revolution, weather, animals, mythology…
- Time away from more stimulating activities
  - It's a very stimulating activity, and therefore can be a part of a healthy balance of experiences.
- Impairs social skill development
  - For those with less social skill development anyway, it provides a learning ground to (A.) interact with NPCs in a way that typically rewards following through on favors and kindness (B.) organize and lead guilds of other players from around the country and the globe
  - Many games are played socially, with 2-8 players sharing a television or hooking up computers in a LAN
- Ranks people
  - So do sports. Except that in sports, people are considerably more likely to receive a major injury, and not

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The appeal of games has contributed greatly to the dissemination of improved computing hardware – first with Myst selling CD-ROM drives, and later with the FPS craze pushing graphics accelerator cards into a mandatory spot in virtually all PCs, so that operating systems are now being developed to take advantage of the power they can deliver!

Videogames are helping to make early development of technical skills seem not only less nerdy, but more valuable and admirable than ever. A group outcast in former generations for wearing pocket protectors and thick-rimmed glasses is now more than ready to hand you your ass in a console deathmatch.

Videogames have to the potential to be (and often are/were) the shared projections of other people's dreams, in a way that the mainstream public can see, experience, relate to and reflect upon.

Mod (Commercial game "mod"-ification) communities are providing a growing outlet for young developers-to-be to try their hand at creating content of a wide variety of integrated and technical areas of expertise, from 3D modeling/animation to programming, from audio to level design.

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resolved.

- Rewards exploration/curiosity
  - Often the best weapons, powerups, and goodies are saved for those player's curious enough to ask themselves, "What happens if I climb *underneath* this bridge?"
- Cooperative play
  - Something safe to do with friends, regardless of the weather
- Resource/$ management
  - Parents used to give a few dollars allowance to help kids understand managing money. Now 6 year olds can rapidly assess whether they should invest $1400 on a new harvester to increase their early cash flow and risk being unprotected for a tank rush, drop the money on an advanced guard tower to stop the attack, or keep the money in the bank so they can be prepared to spend it on whatever situation might arise.
- Complex risk/reward assessment
  - Another business skill that is sometimes mistaken for a "gut instinct" – videogames provide constant practice for this type of problem.
- "Storybooks for engineers"
  - Star Trek was the inspiration for an entire generation of inventors, and a source of such dreamy notions was necessary for a group which historically has been less interested in keeping up with literature or theater. What will inspire the next

consistently receive pay off for intelligent behavior (reality referees and playing fields are inevitably less precise than their digital counterparts)

- Addictive
  - A good single player or co-op game can be somewhat like a good book: hard to put down until it's finished, because the reader is captivated
  - MMORPGs are more social software than videogames in the traditional sense, and in this regard to many they operate as a Bar that never kicks them out at 3am.
- Item of Materialism
  - Many games are available for free or very low bargain bin costs (!)
  - The urge to collect many videogames is not unlike the urge to establish an exemplary library of books, and is somewhat a reflection of the human need to travel, see new things, and try new experiences

Tremendous confidence booster for the young, since it can be configured to teach/train, or help the underdog win. It also helps people vicariously live out their dreams as an NFL athlete, a movie star, and an ancient Roman war general, all without needing to quit their day job.

What makes it ok for two young animals to bite one another playfully is because each knows the bite isn't a bite, it's play; what enables a child with a healthy upbringing to commit crimes in a videogame is that s/he knows it isn't a crime, it's play.

A simplification of a theory Raph Koster writes about in Theory of Fun*: every day there is a minimum amount of stimulation our brain desires (say, 8,000 "brain power units"). If it's continually fed as much as it craves, it'll sustain that rate (maybe even raise it to accommodate), but if stimulation isn't present, the brain may lower its standards to, say, 4,500 BPUs/day, leaving the other 3,500 BPUs unavailable.*

By satiating the desire for mental stimulation by the challenges and content of videogames, that threshold can be kept high, so that when a time comes along requiring more work out of someone, it can borrow from the time that otherwise would have satisfied the higher limit.

Attorney Jack Thompson, "I'm O.K."...
Wikipedia: "A Modest Videogame Proposal"

generation of inventors?

- Plants seeds of interest in fields
  - Carthage and Zeus seem way cooler in class when you're familiar with them at even a Hollywood-level through videogames
- Heuristic development
  - Videogames require the player to make smart decisions even when there's very little time or information for any perfect answers to exist
- Spatial exercise
  - Mapping and navigational sense; if we can't learn a new deathmatch map quickly, we'll be in poor shape online…
- Personal development
  - If the player wishes to move forward towards his/her grandest goals, they're going to need to accumulate some assets, upgrade their stats…
- Global cultural enrichment
  - Ask a kid to talk to you about the difference between Japanese videogames and American videogames.