Game Experience Design

10 Game Feel

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04.07.2017
Swink: Game Feel (2009)

1. **Input** -- How the player can express their intent to the system.

2. **Response** -- How the system processes, modifies, and responds to player input in real time.

3. **Context** -- How constraints give spatial meaning to motion.

4. **Polish** -- The interactive impression of physicality created by the harmony of animation, sounds, and effects with input-driven motion.

5. **Metaphor** -- The ingredient that lends emotional meaning to motion and provides familiarity to mitigate learning frustration.

6. **Rules** -- Application and tweaking of arbitrary variables that give additional challenge and higher-level meaning to motion and control.

http://www.gamasutra.com/view/feature/130734/game_feel_the_secret_ingredient.php?print=1
**Game Feel**

aesthetic sensation of control

**Polish** refers to any effect that artificially enhances interaction without changing the underlying simulation. This could mean dust particles at a character’s feet as it slides, a crashing sound when two cars collide, a “camera shake” to emphasize a weighty impact, or a keyframed animation that makes a character seem to squash and stretch as it moves. Polish effects add appeal and emphasize the physical nature of interactions, helping designers sell those objects to the player as real.

Swink: Game Feel, S. 5
what people are talking about when they refer to the ‘feel’ of a game is its capacity to get us into a flow state.
Stand der Praxis
Juice it or Loose it

https://www.youtube.com/watch?v=Fy0aCDmgnxg

Martin Jonasson & Petri Purho (2012)

- Color
- Tweening / Easing (Position, Rotation, Scaling)
- Random Delay
- Paddle Stretch (Velocity)
- Ball Rotation, Stretch
- Animate Stretchin (Wobble)
- Color Change on Impact
- Scale Blocks on Impact
- Sound (Walls, Block, Paddle)
- Music
- Particles (Impact)
- Animation (Block Hit)
- Shatter
- Ball Trail
- Screen Shake
- Anthropomorphisation (Big Eyes, Blink, Smile)
- Screen Color
- Multiple Balls

https://love2d.org/forums/viewtopic.php?t=77734
https://github.com/grapefrukt/juicy-breakout
The Art of Screenshake

Jan Willem Nijman (2013): „Just fill your game with love and tiny details.“

https://www.youtube.com/watch?v=AJdEqssNZ-U

- Basic Animation and Sound
- Lower Enemy HP
- More Shooting / Enemies
- Bigger Bullets
- Muzzle Flash (First Frame is a Circle)
- Faster Bullets
- Less Accuracy
- Impact Effect
- Hit Animation
- Enemy Knockback
- Permanence (Corpses)
- Camera Lerp
- Camera Position
- Screen Shake
- Player Knockback
- Sleep (Pause Game on Hit)

- Gun Delay
- Strafe
- More Permanence (Bullet Shells)
- More Bass to SFX
- Super Machinegun
- Random Explosions
- Faster Enemies
- More Enemies
- Even higher rate of fire
- Camera Kick (Opposite Direction of Shoot)
- Bigger Explosions
- Even More Permanence (Smoke)
- Meaning (Game Over Screen)
- Slow Motion
Secrets of Game Feel and Juice
Game Maker's Toolkit
Mark Brown (2015)

https://www.youtube.com/watch?v=216_5nu4aVQ

- Hotline Miami (Dennaton Games, 2012)
- Random Heroes (Ravenous Games, 2012)
- Super Time Force (Capybara Games, 2014)
- Rogue Legacy (Cellar Door Games, 2013)
- Super Meat Boy (Team Meat, 2010)
- Castle Crashers (The Behemoth, 2008)
- The Binding of Isaac: Rebirth (Nicalis / Edmund McMillen, 2014)
- Super Mario World (Nintendo, 1990)
- Super Mario 64 (Nintendo, 1996)
- Nuclear Throne (Vlambeer, 2015)
- rymdkapsel (Grapefrukt, 2013)
- Ridiculous Fishing (Vlambeer, 2013)
- Gunbrick (Nitrome, 2015)
- Street Fighter II: The World Warrior (Capcom, 1992)
- God of War (Santa Monica Studio, 2005)
- The Legend of Zelda: The Wind Waker (Nintendo, 2002)
- Shantae and the Pirate's Curse (WayForward, 2014)
- Guacamelee (Drinkbox Studios, 2013)
- Shank (Klei Entertainment, 2010)
- Gun Godz (Vlambeer, 2013)
- Super Crate Box (Vlambeer, 2010)
- Peggle (PopCap Games, 2007)
- Alien Hominid HD (The Behemoth, 2007)
Bringing Your Game to Life in 10 Simple Steps
Sonny Bone (2015)


1: Basic Core Mechanics
2: Adding Animation
3: Adding Basic Sound Effects
4: Adding Stage Tiles
5: Verticality and the Introduction of Variation
6: Improving the Feel of Gunplay Through Feedback and Randomization
7: Enemy Knockback
8: Particles!
9: Enemy Death and the Value of Permanence
10: Final Touches

https://www.youtube.com/watch?v=cpXkF1vJx8
Why Your Death Animation Sucks

Nicolae Berbece (2015)
https://www.youtube.com/watch?v=pmSAG51BybY

- Animations (Sprite Sheets | Asset Sheets)
- Sound Effects (Movement | Death | Environment)
- Death Paint (Depth | Foreground Mask)
- Particles
- Screen Shake
- Chromatic Aberration
- Shockwave
- Haptic Feedback
- Props
- Landing Dust
- Eyes
- Rhythm (Background Animation)

Move or Die
Game Juice

adding layers of satisfying bits of animation and audio to improve its feel.
http://www.gameanalytics.com/blog/squeezing-more-juice-out-of-your-game-design.html

Jelly Jump

Animation
Tweening / Easing
Landing Dust
Pausing
Trails
Procedural Movements
Shader and Vertex Colors
Sparkles
Audio
Music
If there is only one possible, unambiguous, non-regrettable action, the action button should just do that one thing.

Juice adds pleasure, Oil removes pain.
Taxonomie

**Graphics**
- Animation: Tweening, Blend
- Deformation: Stretch, Rotation
- Shader: Color, Chromatic Aberration
- Model: Anthropomorph, Following Eyes, Bigger Bullets
- VFX: Trail, Lens Flare, Halo
- Particles: Explosions, Smoke, Landing Dust
- Permanence: Death Paint, Corpses, Shells, Particles

**Time**
- Pause
- SloMo

**Physics**
- Kollision: Tolerance
- Knockback
- Jump

**AI**
- Irrational Behaviour

**Ludition**
- Balancing
- No. Enemies
- Variation
- Randomization
- Triple Shoot
- Mechanics

**Controller**
- ADSR
- Haptic Feedback

Game Juice kann in jedem Modul einer Game Engine hinzugefügt werden
Animation
Tweening / Easing

http://robertpenner.com/easing/

http://easings.net/de
Tweening / Easing

https://chicounity3d.wordpress.com/2014/05/23/how-to-lerp-like-a-pro/

float t = currentLerpTime / lerpTime;
t = Mathf.Sin(t * Mathf.PI * 0.5f);

float t = 1f - Mathf.Cos(t * Mathf.PI * 0.5f);
t = t*t * (3f - 2f*t)

https://gist.github.com/Fonserbc/3d31a25e87fdaa541ddf
iTween http://answers.unity3d.com/questions/976723/easing-curves.html
https://gist.github.com/cjddmut/d789b9eb78216998e95c
http://hotween.demigiant.com/getStarted.html
12 Principles of Animation

http://the12principles.tumblr.com/
http://animationsmears.tumblr.com/post/113185794269/finally-writing-about-something-thats-been-on-my
Responsiveness

The Floor is Jelly

https://vimeo.com/83281882
Jump

- “Stiff Nonsense”
- “Responsiveness”
- “Precision”
- “Floaty Nonsense”

http://www.gamasutra.com/blogs/MarkVenturelli/20140810/223001/Game_Feel_Tips_I_The_Ghost_Jump.php
Camera
Camera in Side-Scrollers

Itay Keren: Scroll Back: The Theory and Practice of Cameras in Side-Scrollers

Vortrag: https://www.youtube.com/watch?v=pdvCO97jOQk


Super Mario World Camera Logic Review
https://www.youtube.com/watch?v=TCIMPYM0AQg
#4: Using a default camera distance that’s likely to break line-of-sight.

- The smaller the danger zone, the easier it is to avoid.
- Line-of-sight must be small enough to fit through levels.
- Looming obstacles can intersect from the side, from behind, from ahead, or from below...
void OnCollisionEnter2D(Collision2D coll)
{
    shakeAmt = coll.relativeVelocity.magnitude * .0025f;
    InvokeRepeating("CameraShake", 0, .01f);
    Invoke("StopShaking", 0.3f);
}

void CameraShake()
{
    if(shakeAmt>0)
    {
        float quakeAmt = Random.value*shakeAmt*2 - shakeAmt;
        Vector3 pp = mainCamera.transform.position;
        pp.y+= quakeAmt; // can also add to x and/or z
        mainCamera.transform.position = pp;
    }
}

Controller
On the left, you can see the gamepad input curve. To mimic this signal for the keyboard, we used an input curve that takes into account how long the steering button was pressed, which is allowed to turn the digital input from the keyboard into an analog signal. The curve is quite fast, with a very short delay time (the game has pretty arcade-style driving), but even such subtle mechanism makes control of the car much more natural and smoother.

Control Assists

predict the player intention and help to perform desired actions

Designing Game Controls

Magnetism

Magnetism is a very powerful paradigm to use when we need the user to be precise. For example, consider a first-person shooter where the player needs to aim at enemies from far away in combat. At least in “easy” mode, it makes sense to code an auto-aim, so that if the enemy is located more or less in front of the player, it takes care of the precise aiming. This is what magnetism is about: making some positions dominate, so the user can have more fun with less effort. But sometimes magnetism can get in the way of realism. An advanced player will want to aim manually, so magnetism should always be an option, not a must.

Another interesting use of magnetism is found in strategy games or, generally speaking, games where we must be able to pick units or positions on a map. In a strategy game, we need our mouse cursor to gravitate around units so it is easier to select them. Imagine that you have one unit selected and are in “combat” mode, so you must click on the position of the map where the unit should move in order to engage in a fight. Because it doesn’t make sense to fight against a rock or a piece of land, you can code the GUI so when the user clicks, it automatically detects the closest unit to the cursor and sends the player unit there. This way we can prevent the inexactitudes in user control that make the game less fun.

Core Algorithm In Game Technology
Dual Stick Control

http://www.gamasutra.com/blogs/MarkVenturelli/20150817/251387/Everything_I_Learned_About_DualStick_Shooter_Controls.php
Mario’s Jump

- The Secret of Mario's Jump (and other Versatile Verbs)
- Game Maker's Toolkit [https://www.youtube.com/watch?v=7daTGyVZ60I](https://www.youtube.com/watch?v=7daTGyVZ60I)

- Button: Press, Hold, Release,
- Cooldown Time
- Multipress (Double Jump)
- Combo (Multiple Buttons) (State Machine)
- Modify another Verb (Aim)
- Modify with Analog Input (Velocity)
- Combining Verbs
Expression Space
Designing Game Controls


Expression instead of learning
Hard to master
Different skill level
Control states
Skill Combinations
Different goals and context
Physics
Collision Tolerance

- Graceful platform edges
- smoothing off the sharp corners!
- Insgesamt: Toleranzen des Systems erhöhen

https://twitter.com/dandyycg/status/763428957819506688
Platform Ledge Forgiveness

Kyle Pulver: [http://kpulv.com/123/Platforming_Ledge_Forgiveness/](http://kpulv.com/123/Platforming_Ledge_Forgiveness/)

```java
if (jumpInput) {
    if (onGround || graceTimer > 0) {
        jump();
    }
}

//somewhere else in the code:
public function jump():void {
    //pretend theres more jumping logic here
    graceTimer = 0;
}
```
Physics

Bennett Foddy
Designing with Physics: Bend the Physics Engine to Your Will

- Floaty vs Stable Physics
- Gravity, Units, Timesteps
- Mass values, Iterations, Non-resolvable scenarios, Drag Force

http://www.gdcvault.com/play/1021921/Designing-with-Physics-Bend-the
Building a Better Jump

In this 2016 GDC talk, Minor Key Games' Kyle Pittman shows how to construct natural-feeling jump trajectories from designer-friendly input like desired height and distance, modeled programatically using one of a few available integration methods.

https://www.youtube.com/watch?v=hG9SzQxaCm8
You Say Jump, I Say How High?

Martin Fasterholdt (2016)

http://martinf.dk/jump/
Mechanics: Combat Systems

God of War

Bayonetta

http://www.gamasutra.com/view/news/261698/7_combat_systems_that_every_game_designer_should_study.php
Kontraindikation

Juice ohne Kontext kann Immersion zerstören

Walking Dust in der Luft

Tweening hard elements (Rock felt like rubber)

Grading and dynamic lighting on pixel art

< Shadows in the Sky

http://www.gdcvault.com/play/1020861/Don-t-Juice-It-or
Make your game feel juicy with Unity

https://www.youtube.com/watch?v=WfwRBwNz2bg

- Spawn Tween (Easing)
- Spawn Tween Noise
- Cam Shake
- Fireburst (Particles)
- Movement Scale
- Destroy Particles
- SFX
- Randomize Shoot
- EnemySmoothMove
- TrailRenderer
- EnemyPersist (Fall)
- Bloom Intensity

Beim Versuch, die Vorträge von Nijman und Jonasson & Petri Purho zu imitieren, zeigt Arturo Núñez (unabsichtlich), wie diese Effekt \textit{nicht} eingesetzt werden sollten.