A Theory of Fun

10 Years Later

Raph Koster
It's probably a good idea to start out recapping. A Theory of Fun started out as a talk at the very first Austin Game Conference.

"Fun is just another word for learning."
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Ahem.

Excuse me.

Chris Crawford
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When I said it first, it was "fun is the emotional response to learning."

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Pithier. Subtler. I daresay, more accurate. And I am sure you want to quote correctly.

Chris Crawford
It’s probably a good idea to start out recapping.

A Theory of Fun started out as a talk at the very first Austin Game Conference.

That’s all.
Pray, continue.

Chris Crawford
The talk led to a book.
The talk led to a book, which fell in and out of print multiple times,

People actually paid $300 on eBay for this??
The talk led to a book, which fell in and out of print multiple times, and had lots of amateurish illustrations.
"Fun in games arises out of mastery. It arises out of comprehension. It is the act of solving puzzles that makes games fun. With games, learning is the drug."

...And it has sold over 30,000 copies and been translated into Japanese, Chinese, and Korean.
I did Theory of Fun because I had been chatting with some friends... 

Dave Rickey

Noah Falstein

... Well, and I had been told (not by them!) that my games weren’t actually fun.
The basic idea came out of cognitive science and evolutionary psychology.
There's a lot of evidence now that "thinking" is actually "memory"-
We learn patterns and apply them to reality, often unconsciously.
The idea was, games are systems built to help us learn patterns.
And fun is a neurochemical reward to encourage us to keep trying.
This was not a new idea.

The most effective kind of education is that a child should play amongst lovely things.
Play is the child's most useful tool for preparing himself for the future and its tasks.

Bruno Bettelheim
Play is the highest form of research.

Albert Einstein
Play gives children a chance to practice what they are learning. . .

Mr. Rogers
I could go on . . .

For a small child there is no division between playing and learning.

Penelope Leach
I could go on . . .

For a small child there is no division between playing and learning.

Play is by its very nature educational.

Joanne E. Oppenheim
For a small child there is no division between playing and learning.

Play is by its very nature educational.

The child amidst his baubles is learning the action of light, motion, gravity, muscular force. . .

Ralph Waldo Emerson
I could go on . . .

For a small child there is no division between playing and learning.

Play is by its very nature educational.

The child amidst his baubles is learning the action of light, motion, gravity, muscular force. . .

A child loves his play, not because it's easy, but because it's hard.

Dr. Benjamin Spock
I could go on...

For a small child there is no division between playing and learning.

Play is by its very nature educational.

The child amidst his baubles is learning the action of light, motion, gravity, muscular force...

A child loves his play, not because it's easy, but because it's hard.

Almost all creativity involves purposeful play.

Abraham Maslow
For a small child there is no division between playing and learning.

**Play is by its very nature educational.**

**The child amidst his baubles is learning the action of light, motion, gravity, muscular force...**

**A child loves his play, not because it's easy, but because it's hard.**

**Almost all creativity involves purposeful play.**

**Play is the answer to how anything new comes about.**

Jean Piaget
Some theorists on games and play have made a point of dividing up the spectrum

FINITE GAMES
Have starts and ends
And a goal of winning

INFINITE GAMES
Are played in order to keep playing

James P. Carse
Some theorists on games and play have made a point of dividing up the spectrum.

**GAMES**
- Externally imposed rules
- Goals

**PLAY**
- Freedom from all but personally imposed rules
- No goals

Bruno again...
Some theorists on games and play have made a point of dividing up the spectrum

LUDUS
Structured activity and explicit rules

PAIDIA
Unstructured and spontaneous activities

Roger Caillois
... but Theory of Fun calls this a false dichotomy.

It's all games now!

STRUCTURED PLAY
has few rules, openly stated

UNSTRUCTURED PLAY
has tons and tons of unstated rules
In Latin, there was just one word for all of it. It is remarkable that *ludus*, as the general term for play, has not only not passed into the Romance languages but has left hardly any traces there, so far as I can see...

Johan Huizinga
We live in a world of systems, and choose whether to make a given system a game.

I said lusory attitude, not loser.

Bernard Suits
And further, since games implicitly teach systems—
that we have art form on our hands that
actually changes brains. So we had better use it
responsibly.

Cartoon idea: a guy with a Tetris
block for a head says to a girl
with a Ms Pac Man for a head,
"Hey, what happened to that guy
over there who’s missing his head?"

"I dunno, he must have played
too much Bomberman!"

I’m here all week, folks.
There have been a range of critiques in the years since I gave the talk, especially after the book.

I really liked the book, but the cartoons were TERRIBLE. Like, painfully bad. Why didn't you get an artist to draw them? It made it hard to look at the pages, because they were so bad. It was distracting. Did someone tell you that you could draw? Because they were wrong, I mean, these are so amateurish, it's embarrassing. But I did like the book, I mean, you had good things to say, it's just too bad it was so effin' UGLY, man.

* Actual critique someone gave me once at GDC
Could physical activities qualify?

My conclusion was yes.
Isn’t this just flow? Nah, fun was not the same thing as flow.
Flow represents a neurological event that differs in degree rather than type from other similar events.

Arthur Marr, in Athletic Insight: The Online Journal of Sport Psychology
I intentionally excluded a lot of stuff we call "fun" from the definition.

Easy Fun

Hard Fun

Altered States

Social Fun
I said that delight was an act of recognition, and transitory.

Delight, not fun

HARD FUN

VISCERAL FUN

SOCIAL FUN
I concluded that social interaction IS a game to master, though it provides other emotions too.

Delight, not fun

HARD FUN

VISCEERAL FUN

Psych is hard Fun!
And I also decided that mastery of your own body is a game as well: a pattern to learn.

Delight, not fun

HARD FUN

Autonomic system: The Game!

Psych is hard fun!
Some folks, in fact said that we might as well call my kind of fun KFUN.
Basically, $k_{fun} = \text{dopamine release.}$
Research says that dopamine can release for "richly interpretable" situations.

Irving Biederman

Edward A Vessel
This means it can happen in all sorts of situations, but not all game experiences may trigger it.

Perfectly valid non-fun reasons to use games.

**PRACTICE**
Can be fun done right, but often isn't

**STORY**
Usually works best with minimal game

**MEDITATION**
As a focus for repetitive action

**COMFORT**
is comforting, not fun
A fair amount of people just hate evolutionary psychology...
But honestly, the more science comes out, the more the basic premises of the theory are validated.

Subjects who played casual games for 30 minute periods showed an 87 percent improvement in cognitive response time and a 215 percent increase in executive functioning.

East Carolina University’s Psychophysiology Lab
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Expert gamers outperform novices across several measures of attention and perception. Studies who played casual games for periods showed an 87% improvement in cognitive function and a 215 percent increase in executive functioning.

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But honestly, the more science comes out, the more the basic premises of the theory are validated.

Expert gamers outperform novices across several measures of attention and perception.

Participants who played casual games for periods showed an 87% improvement in cognitive function and a 2.15 percent increase in executive functioning.

Brain structure appears to predispose you towards game skill—and more, towards success in specific skills.

Erickson, U Pittsburgh
Brain structure appears to predispose you towards game skill and more, towards success in specific skills.

Expert gamers outperform novices across several measures of attention and perception and a 2.5 percent increase in executive functioning.

Periods showed an 87% period improvement in cognitive performance, and a 25% premere.

Playing games can cure lazy eye better than an eye patch.

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Playing video games – especially those that require planning and strategy – and Sudoku also were beneficial to working memory.

Alloway, University of Stirling

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Playing games can cure "lazy eye" better than an eye patch.

Training with Wii Fit and Wii Sports improved balance in Parkinson's patients.

Brain structure appears to predispose you towards game skill - and more, towards success in specific skills.

Research in gaming periods showed an 87 percent improvement in cognitive time and a 215 percent improvement in executive functioning.
One of the things people complained about in the book was a perceived sexism.

I admit, for some reason I did a cartoon based on the Lockharts.
That said, it’s undeniable at this point that there are cognitive differences that must affect predisposition towards specific games.

<table>
<thead>
<tr>
<th>Possibility of tetrachromats</th>
<th>Frequently dichromats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faster response time for seeing static objects</td>
<td>Faster response time for seeing moving objects</td>
</tr>
<tr>
<td>Male child leaves DNA in the brain</td>
<td></td>
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</tbody>
</table>
And rather than all the various different personality models I mentioned in the book, I’d probably point towards the Big Five or OCEAN model today.

We should quit making up models, and use Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism instead.

Jason VandenBerghe
Oh, and in the book I commented on how there weren't any farming games anymore.
A consequence of all this was being led into approaching games themselves in a science-y way.
I came to see games as "deliberate practice" machines.

Designed to improve performance? Check.
Repeated a lot? Yup.
Continuous feedback? Sure!
Mentally demanding (focus & concentration)? Of course!
Hard, like off the top end of flow? Absolutely!
Requires clear goals? That's it, it's deliberate practice!

K. Anders Ericsson
I ended up finding a definition that encompassed both this notion and the earlier thoughts about turning anything into a game:

Playing a game is the act of solving statistically varied challenge situations presented by an opponent who may or may not be algorithmic within a framework that is a defined systemic model.

A "game" is an intentionally designed artifact for the above.
In this I drew other people's thoughts on toys, puzzles and riddles.

TOY
Goal not externally imposed; open solution set.

PUZZLE
Closed solution set; the opponent does not fight back.

GAME
Goal; opponent who fights back; open solution set.

Greg Costikyan
In this I drew other people's thoughts on toys, puzzles and riddles.

PUZZLE
Closed solution set; the opponent does not fight back.

Actually, I hope you don't mind, but I deserve some credit here too...

Goal; opponent who fights back; open solution set.

Greg Costikyan
This led me to the question of whether there is a Grammar of Games, and if there is, could it be written down in notation?
The basic structure was born from another conversation with a friend, as we tried to solve a specific design problem.
A game atom
One of the key premises of Theory of Fun is the vast gulf between a game’s surface and its actual meaning...
An avenue of discussion that these days is known as

"ludonarrative dissonance."

Clint Hocking
Magnitude of problems

- Deciding the move
- Moving there
- Finding the path
- Steering the car

A board game | A racing game

Game grammar went further. For example, we talk about “the game is the interface” but game grammar says it isn’t.

The interface might be ANOTHER game, though.
Instead games are like this, abstract models.
Game grammar has been developed largely independently by several folks at this point, and it’s important.

This is very much the birth of a science of game design. . . We are seeing some of the mathematical and structural bones of our folk systems laid bare.

"Skill atoms"
Ben Cousins
Early work on cognitive patterns

Stéphane Bura
Petri Net game flows
Joris Dormans and Ernest Adams

The Machinations framework and interactive tool
The only four core mechanics in games

Solving problems perceived as NP-hard using heuristics

Understanding other people & social relationships

Mastering your physical reactions

Exploiting the brain software bug around probability estimation

I ended up concluding that there are only four kinds of problems sitting at the center of game atoms.
Four other core mechanics in games

AGON
Competition or contest

MIMICRY
Roleplay and make-believe

ILINX
Visceral reactions and vertigo

ALEA
Chance operations

Of course, plenty of others have found similar patterns.

Caillois
Four other core mechanics in games

**AGON**
is hard fun vs an NP-hard problem or opponent

**MIMICRY**
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Four other core mechanics in games

**AGON**
is hard fun vs an NP-hard problem or opponent

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is pattern mastery of NP-hard frames of reference

**ILINX**
is the hard fun of mastery of autonomic body systems

**ALEA**
Chance operations

Of course, plenty of others have found similar patterns.

Caillois
Alas, all this did was reinforce the degree to which "games are math."

- **AGON**
  - is hard fun vs an NP-hard problem or opponent

- **MIMICRY**
  - is pattern mastery of NP-hard frames of reference

- **ILINX**
  - is the hard fun of mastery of autonomic body systems

- **ALEA**
  - is a brain bug tricking us into thinking chance is an NP-hard problem

He's misappropriating my terms, the jerk.
It made me unhappy to think that, and I questioned what games could achieve as an art form.

Or a game with shades of gray, instead of 256 levels of grayscale?

Can you make a game about the taste of a peach?
Jason Rohrer, "Passage"

Rod Humble, "The Marriage"

See, an unintended consequence of Theory of Fun was inspiring key folks in the art games movement.
The book explicitly called for the key artistic messages in games to be embedded in the mechanics.
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- Used for social norming
- Empathy for the Other

Entertainment  Art
The book explicitly called for the key artistic messages in games to be embedded in the mechanics.
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The further I got into game grammar, the more I saw surface elements as being part of the way the game gives you feedback on your actions.

All forms of feedback: Art, animation, sound, music, movement, story.
Brain hacks turn out to be a core aspect of game design . . .
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Brain hacks turn out to be

a core aspect of game design . . .

Press button

You almost always lose

Small problem, opaque mechanic
Brain hacks turn out to be

a core aspect of game design . . .

Press button

You almost always lose

WOW! YOU ROCK!

Small problem, opaque mechanic, huge feedback
... which also led to the book being a key inspiration to the nascent field of gamification.

Which has a whiff of evil.

Ian Bogost

You are dead to me, Koster.
This led me to become deeply skeptical that authorially constructed story has a formal role in games.
This led me to become deeply skeptical that authorially constructed story has a formal role in games.
Not that it shouldn't exist, but that it is like a second medium woven into games.
Which means we maybe need a new name for some kinds of what we call games.

**DESIGNED GAME**

Is a

**INTERACTIVE EXPERIENCE**

Is a

**PLAYABLE SYSTEM**

Can be

**IMPROVISED GAME**

Can be

Exists independent of any and all presentation: e.g., chess in your head.

This includes many of life's systems, economics, politics, etc.

There are things here that are not "formally" games, like the interactive fiction Photopia.

A ball is a toy. Catch is a game with a ball and the physics ruleset.
One of the things I have come to wonder about is the "Train gambit" - where the mechanics of a game are designed to make you complicit in something distasteful, unethical, or outright evil.

Brenda Garno Brathwaite
I wonder if it has staying power, or if it is like the ending of The Murder of Roger Ackroyd.

Dame Agatha Christie
Or, perhaps, there is a sort of ludonarrative consonance, where mechanics are surprisingly apt for a fiction.
I think games have two ways of meaning: prescriptive and descriptive.

It is questionable whether the descriptive form is really even possible.

In either case, we can understand “what” happens without understanding “why.”

Will Wright
That's a bit scary.

What, really, is the gap between a cluster analysis and a stereotype?
Entertainment is useless, in that sense.

- Plays you
  - For money
  - Is lazy

- Is played
  - Earns prestige
  - Is demanding

Entertainment  Art
I arrived at a systemic view of games, but it might be that games trained me to see everything as systems.
It has trained me in essentialism, which isn’t culturally popular...

but which may be biologically inborn in all of us, for good or ill.

Progression of colors added to languages, according to Berlin & Kay (1969)
The problem with games being treated as reality, or reality treated as games, is that there is the scary potential for the opposite of play: a permanent rat race.

The real world just doesn't offer up as easily the carefully designed pleasures, the thrilling challenges, and the powerful social bonding afforded by virtual environments. Reality doesn't motivate us as effectively. Reality isn't engineered to maximize our potential. Reality wasn't designed from the bottom up to make us happy.
Should we treat life as a game?
Aristotle defined a hero as someone who faces up to tough luck.

Man, I've had tough hamartia lately. FML.

In a game you can walk away.

But learn something. Joyously.

*this slide would not exist if not for Sebastian Deterding
There's a science of happiness now, and they know what drives feeling happy in life.

- Gratitude
- Using your strengths
- Social connection
- Generosity
- Mindfulness: savoring your experiences
- Striving for goals
- Optimism
- Don't reduce the bad - increase the good

That list looks a lot like what we get from games at their best.
In the end, I am reminded of a different Greek philosopher: Epicurus.
He saw the world as made of atoms.
Everything that exists, just
the chance arrangement
of particles
coming together
for a time.
then parting.
Which means everything passes.
And
also comes together.
This led to a life philosophy: you’re going to be oblivious dust, so you should enjoy your conscious time.
This idea had some powerful adherents-
powerful enough that they tried to make it a basis of government.
powerful enough that they tried to make it a basis of government.

Thomas Jefferson
To me, a theory of fun says that games are in many ways not just deliberate practice machines,
not just a swirl of systems,
But a space between the dust from which we came
happined

and the dust we shall be
in which we can engage in the grand pursuit.

life, liberty, & the pursuit of happiness
in which we can engage in the grand pursuit.

life, liberty, & the pursuit of happiness

Ahem. Done yet?
in which we can engage in the grand pursuit.

life, liberty, & the pursuit of happiness

CHARGE!
And YOU.