



United Business Media

FEATURE 7TH ANNUAL SALARY SURVEY

APRIL 2008

# gamedeveloper

THE LEADING GAME INDUSTRY MAGAZINE

» **A GAME OF FEW WORDS**

WHY SHORT DIALOG  
MEANS HAPPY PLAYERS

» **TOOL BOX**

GDC PRODUCT NEWS  
AND INTERVIEWS

» **SEVEN STRATEGY SINS**

CLASSIC PITFALLS TO  
AVOID IN STRATEGY GAMES



POSTMORTEM:  
NAUGHTY DOG'S  
**UNCHARTED:**  
**DRAKE'S FORTUNE**



**CREATE**

In *Assassin's Creed*, Ubisoft used Autodesk® 3ds Max® software to create a hero character so real you can almost feel the coarseness of his tunic.

**ANIMATE**

Autodesk® MotionBuilder™ software enabled the assassin to fluidly jump from rooftops to cobblestone streets with ease.

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**HOW UBISOFT GAVE  
AN ASSASSIN HIS SOUL.**

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Image courtesy of Ubisoft

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## POSTMORTEM

### 24 NAUGHTY DOG'S UNCHARTED: DRAKE'S FORTUNE

UNCHARTED: DRAKE'S FORTUNE is one of the most critically-acclaimed PlayStation 3 games so far, and features the best shirt-wetting physics bar none. It takes the childhood dreams of developers raised on *Indiana Jones* and brings them to virtual reality. Naughty Dog takes us through the treasures and snake-filled pitfalls of their first game based in a realistic human world.

*By Neil Druckmann and Richard Lemarchand*

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How does your salary stack up against that of the rest of your field? Where are developers more likely to own homes? Does higher education mean higher pay? We break down the hard truth for you in this annual feature, which shows that developers as a group on average now make about \$73,600 per year across all disciplines and experience levels. If you want to get your due, this is the feature you can't afford to miss!

*By Jeffrey Fleming*

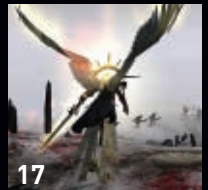
### 17 ODE TO SHORT DIALOG

Game developers are in the habit of producing epics—or trying to at least, and there's often a perception that long, sprawling dialog is a path toward that end. Ben Schneider, formerly of Iron Lore Entertainment, calls that idea into question, offering the possibility that direct, purposeful writing in games leads to a better experience for the player.

*By Ben Schneider*



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## HOW AM I NOT MYSELF?

**THERE ARE A LOT OF THINGS THAT FRUSTRATE ME** about the game industry, and to read my monthly editorials you might think I dislike it. But I don't, of course. The frustration comes from love and an awareness of unrealized potential that I think almost everyone in the industry also feels.

Specifically I've been thinking recently about why good people make bad games. It's amazing to me that I can go and speak with someone working on a movie licensed title, and they'll be full of legitimate enthusiasm, real ideas, and almost convince me—OK, this time they're going to get it right. Then the game comes out, releasing day and date with the movie, with under a year of development time, and totally flops critically.

What's depressing about this scenario is that nobody wonders why. Everybody on the team already knows! The schedule was too short, the demands from the licensor were unreasonable, and the project wasn't well managed. I've heard of licensor requests such as the hero not being able to die, or appear to be mean, or that developers couldn't use X character from the franchise yet, because they're saving it for the sequel, even though the books upon which the movie is based have been out for years. So why do developers do this to themselves?

### MONEY

Yes, money. What other explanation is there? Companies need money to survive, and there's plenty of it in license tie-ins. I understand why some companies do it—they still haven't had a breakout hit, or are still finding their specialty, so are doing licensed games until they can figure it out (though some might say if you can't figure out the market, why are you still in the business?). But for companies with a pedigree, and a stock of original IP, and the bright, creative people available to make more—why? If you know that 80 percent of these games are going to be poor, and difficult to make and complete, and if you know that the project will most likely not match the vision, why sign on?

And you, reader—why do you do it? There's a lot of pressure to stick with one team for the long haul, but what about realizing your dream as a developer, or making your creative mark? It's true that licensed games can be good, or at least have glimmers of brilliance. I've seen it in Ubisoft's KING KONG and some of the LucasArts STAR WARS games for instance, as well as the Konami SIMPSONS arcade game, and Capcom's DUCKTALES on the NES—but these are, of course, the exceptions, and I don't

know that most people have any such illusions when making a game based on oh, let's say *Jumper*.

### THE BEST INTENTIONS

It's not just licenses, either. I see conferences and talks on the future of games and design, and the true integration and collaboration of games with other media, and many of these ideas are sound, genuinely intriguing, and some of them are even possible to implement. Yet, where are they? There are so many fantastic ideas out there not getting realized. GRAND THEFT AUTO is a classic example of a difficult-to-realize concept getting honed into an almost universally influential game experience. Games like that don't happen without someone taking the plunge.

That's the big question. How do you take that plunge? I can't count how many people I've talked to who have great ideas for games, or who had better concepts for sub-par games that were eventually released. Why don't their games get made? Too daunting? Too many bosses? My coworker and previous editor-in-chief of *Game Developer* Simon Carless says that in his experience, the only way to make a very different game if you've got an idea is to just get some coders and artists, and make it. I think that might be the case right now. But it shouldn't be. There should be methods within our current structure which allow individual creativity to blossom.

It's said that there's only so much original IP to go around—only so many brilliant studios out there. Maybe that's true. But with the number of intelligent people in mediocre studios, there could be quite a few more brilliant ones. Take a look at our Salary Survey article, and if you're not all the way at the top of your respective field yet, maybe it's time to cut your losses with your work for hire company and join or form one with more potential. I'm just saying. If you're one of those with ideas, vision, and passion for this industry, don't waste it at a studio that doesn't respect you enough to let you bring those things to light.

### FOND FAREWELL

Our code columnist of several years, Mick West, and our practically eternal design columnist Noah Falstein will both be leaving us, across this issue and the next, and we truly thank them both for their tireless service to the magazine. Introductions for the new columnists will be made in the following issue.

—Brandon Sheffield

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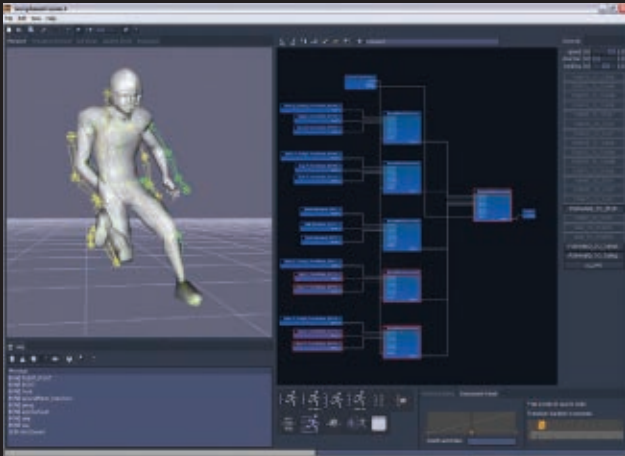
advanced animation system

morpheme is the industry's first graphically authorable animation engine. morpheme consists of morpheme:runtime: an advanced runtime animation engine for PLAYSTATION®3, Xbox 360™, Wii™ and PC. morpheme:connect: a highly-customizable 3D authoring application.

morpheme gives animators and developers unprecedented control over the look and feel of their animations in-game: blends, transitions, compression, etc. can all be previewed and modified graphically in morpheme:connect and live on the target platform.

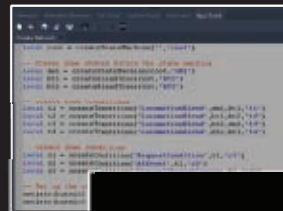
morpheme:runtime ships with full source code and integrates seamlessly with euphoria, NaturalMotion's Dynamic Motion Synthesis technology.

For more information, visit [www.naturalmotion.com](http://www.naturalmotion.com)



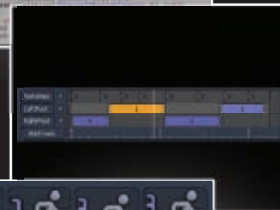
## scripting

Full Lua scripting for automating tasks, adding AI logic or polling game pads for real-time input



## timeline

Graphical mark up of animation data to add one-shot and duration events, for highlighting footfalls, sound effects, etc.



## node palette

Advanced blend notes for dragging and dropping into transition network. Fully customizable node types through C++ and scripting



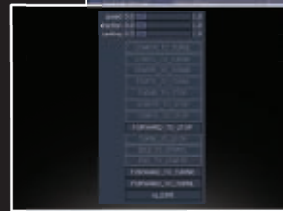
## animation browser

Easy browsing and selection (drag & drop) of source animation. Animation list is automatically updated to reflect changed source files



## transition requests

Exposure of custom transition messages. In-tool emulation of interaction between morpheme:runtime and game AI system



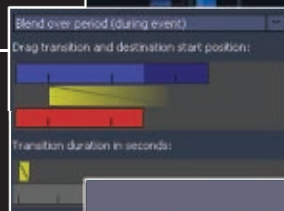
## blend tree

Advanced graphical tools for building complex blend trees. Real-time visualization of animation source contribution through node highlighting



## blending

Graphical control of transition blending between states in the transition graph



## multiple characters

Visualization of multiple runtime characters in morpheme:connect for easy authoring and analysis of character interaction



## network

Advanced graphical tools for creating and visualizing transition networks through drag-and-drop



## control parameters

Exposure of custom high-level controls for entire animation system. Real-time manipulation through sliders or game pad controller



## OVERHEARD AT GDC 2008



### Erik Wolpaw and Kim Swift

**writer and lead designer of PORTAL** (respectively) on why more companies don't prototype from the start of projects

Erik Wolpaw: "I'm just speculating, but there's a psychological component to it. Valve's—for lack of a better term—corporate culture is 'playtest, playtest, playtest.' PORTAL was being playtested in the first week. But when you're working on some sort of creative project, your natural inclination is to not want to show anyone until it's in a state that you think you can be proud of. But at Valve, we're putting you out there, and you're going to fail, fail, fail. You'll have little successes and little failures, and until you get used to the process, it's a little bit scary and painful. But it's really worth it."

Kim Swift: "Yeah, we definitely start by showing players very unpolished stuff. For instance, in the levels, once we all sit down together and decide what a level's going to look like, we try to build it as fast as possible, and in two to five days we'll have it up and running. We'll get someone to go through it for the first time, and you know, [the levels are] not pretty looking. They'll definitely need a lot of polish and care before we're ready to ship, but the sooner you start getting player feedback, the better off you're going to be."



### Raigan Burns

**co-founder of Metanet Software** on the stagnation of Xbox Live Arcade from an indie perspective

"I remember the last year and the year before, when we were first talking with Microsoft about doing [N+ for Live Arcade], it was really exciting, because [it] had just come out, and they were like, 'Oh, it's new. It's not going to be like retail. There's not going to be all this crap. There's going to be all these small, fun things.' But now it's exactly the same. There's all these big-budget games with big publishers making them, and the real problem, I think, is that the same people who are deciding what retail games get green-lit are deciding what Live Arcade games get green-lit. I guess it's because they have a lot of power that nobody's pointed out that that's the primary reason."

"Those decisions that are ruining Live Arcade ... who green-lit WORD PUZZLE? Who green-lit that hoverboard game that's just shit? Nick [of Slick Entertainment] has this racing game. You know IRON MAN OFF-ROAD RACING, the old arcade game? It's four-player, and has little isometric trucks. Nick made a melee racing game like that, and Microsoft was like, 'Well, racing is too saturated on Live Arcade.' But that's because they've green-lit like ten really shitty racing games. There's no good racing."



### Peter Molyneux

**head of studio for Lionhead Studios** on game market and mindshare versus other entertainment media

"It seems to me that the number of people that use computer games as entertainment isn't getting exponentially bigger, though the market is getting bigger, and we're selling eight million units. I remember back in the seventies, when Clive Sinclair in England released the Sinclair Spectrum, he famously said: 'Every home in Britain will have one of these; and people won't watch television anymore, they will play computer games.' That was a dream that was put forth in the seventies, when this thing had 1K of RAM. And for a little while, we all believed that. Now, there seems to be this big barrier that exists."

"I was actually just in the shops, down here [in San Francisco] and I was talking to the bloke who's selling me a shirt, and he said: 'Aw, I don't play games. Because I'm not good enough. I can't get my head around this thing. Every time I do it, I hit my head against this wall.' Now that's a huge failure. That's our failure, for not being really, truly as big as movies. Because we're not. Because they sell [to tens of millions]. What do we sell? Eight million? I think we have confused ourselves with the success of what we've made. But is that truly success? [We're] measuring it by dollar value rather than by the number of people that consume and enjoy our games."

### Fumiaki Shiraishi

**a lead programmer at Square Enix**

on the benefits of WiiWare filesize constraints

"I think we designed [FINAL FANTASY CRYSTAL CHRONICLES: THE LITTLE KING] to fit in the memory space. It wasn't so much that we had a game and had to squeeze it down. If anything, I think the size restriction helped us. I don't think we would've had this game design idea if we didn't have the memory restriction to begin with. Once we had the restriction—all our artists are veterans, so if you tell them the size, they'll hit

it right on. And once we started making it, in the beginning, a lot of people didn't think we could fit this game in the given size, but we were actually quite a bit under. It uses a little bit of compression, and a little bit of technique. You can fit a lot of game in a small size."

"When Nintendo first talked about downloadable games, I wrote down a bunch of ideas that we could make for this game. The

one that I wanted to do at the time was a simple action role-playing game. It was kind of a tried-and-true formula. But I thought that we had to make several games [with the same assets] to make it profitable, maybe. So based on the action role-playing game [idea], I came up with a lot of other game ideas that would use the same resources and the same source code."



# GAMES AS MUSICAL INSTRUMENTS

## OR IS IT MUSICAL INSTRUMENTS AS GAMES?

GAMES HAVE ENTERED MANY OTHER SPHERES OF INDUSTRY, FROM EDUCATION AND TRAINING TO MOVIES AND

graphics work. Recently though, a new trend has emerged—games and music. While it can't be denied that game music has already influenced several decades of professional musicians, aside from a few outliers, games themselves were rarely used in performance. Several companies are looking to change this, creating either software which turns a console into a musical instrument, or instruments with game-like interfaces. Two of the most notable examples are Korg's collaboration with famed composer Yasunori Mitsuda (CHRONO TRIGGER), and music game designer and interactive media artist Toshio Iwai's work with Yamaha.



### KORG DS-10

At the March 2008 International Musikmesse trade show in Frankfurt, Germany, musical instrument manufacturer Korg revealed the Korg DS-10, a Nintendo DS version of its

venerable MS-10 analog synthesizer. Designed

in partnership with Cavia and frequent Square Enix composer Yasunori Mitsuda's Procyon Studio, the Korg DS-10 models two dual-oscillator synths and a four part drum machine. Songs can be created with a six-track, 16 step sequencer while delay, chorus, and flanger effects can be applied to the output. Notes are entered via the touch-screen and multiple DS units can synchronize or exchange data through their wireless communications links. The original MS-10 synthesizer was first released in 1978 and the Korg DS-10 promises to accurately model the distinctive character of the classic instrument's analog bite. The Korg DS-10 will be published by AQ Interactive and should be available in Japan in July 2008. According to AQ Interactive's web site, a worldwide release is planned but no firm date was given.

### TENORI-ON WORLD LAUNCH TOUR

ELECTROPLANKTON designer Toshio Iwai is embarking on a world tour to show off his latest creation, the Tenori-on. The Tenori-on is a unique hand-held instrument that combines synthesis, sample-playback, and sequencing on an illuminated control surface with 256 LED switches. The Tenori-on, which was designed in collaboration with the Yamaha Corporation, was initially released in the U.K. in the fall of 2007 but is now being introduced to the world at large on a multi-city tour. The launch tour includes a presentation by Iwai as well as Tenori-on performances from a variety of artists such as Sutekh, I am Robot and Proud, To Rococo Rot, Atom Heart, and Jim O'Rourke. The tour, which includes dates in Berlin, Paris, Montreal, New York, and San Francisco, began on March 12th in Frankfurt and will conclude in Tokyo on April 25th. Check [www.global.yamaha.com/tenori-on/event](http://www.global.yamaha.com/tenori-on/event) for locations.



—Jeffrey Fleming

## CALENDAR

### ION Game Conference

Seattle Marriott Waterfront Hotel  
Seattle  
May 13–15  
Price: \$495–\$995  
[www.ionconference.com](http://www.ionconference.com)

### Nordic Game 2008

Malmömässan  
Malmö, Sweden  
May 14–15  
Price: €127–€548  
[www.nordicgame.com](http://www.nordicgame.com)

### CoGames 2008

The Hyatt Regency Irvine  
Irvine, CA  
May 19–23  
Price: \$100–\$700  
<http://cisedu.us/cis/cts/08>

### Vancouver International Games Summit

Hyatt Regency Vancouver  
Vancouver, BC  
May 21–22  
\$450–\$875 CAD plus GST  
[www.vancouvergamesummit.com](http://www.vancouvergamesummit.com)



**CHANGE  
THE  
GAME**

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YOUR  
GAME**

The logo for XNA, featuring the lowercase letters 'xna' in a blue sans-serif font. The 'x' is stylized with a red-to-orange gradient and a dotted trail.

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# 7<sup>TH</sup> ANNUAL SALARY SURVEY

» jeffrey fleming

» **WELCOME TO THE SEVENTH ANNUAL GAME DEVELOPER'S SALARY** survey. This is your one-stop shop for gloating rights, raise demands, or simply another excuse to mope, unloved and alone, in your tiny cubicle.

As a group, game developers made an average of \$73,600 this year across all disciplines and experience levels. We broke down average salaries by region and state and ranked the top ten states for game industry employment. We also looked at who owned homes by region, state, and average salary. The results were somewhat distressing in that on average, less than half of the respondents were home owners. We found that while California boasts the highest average salaries across all disciplines, it actually has the lowest home ownership (33%) ranking. Note that unless otherwise mentioned, all statistics are for the United States.

Choices about education are very important to those seeking employment in the game industry so we correlated level of education

with average salary and broke it down by job discipline. The resulting data confirmed what is commonly held to be true—that a higher education results in more income. However, when we examined the salaries of those with only some college or an associate's degree, we found that in some cases their average incomes were not substantially less than those with four year degrees.

Those in management will also find much to consider in this survey, including an undercurrent of gender inequality running throughout the industry. The failure to compensate women on an equal basis has the potential to hold games back from being the culturally relevant, 21st century entertainment industry that it wants to be.

Hopefully this survey can do more than just help people decide what to ask for at their next performance evaluation. We would like for it to raise some questions and spark debate among developers. Let's step back and take a wide view of the game industry. Where is it going? What kind of life is it providing?

CONTINUED ON PG 8

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*Jeffrey Fleming is the production editor of Game Developer. In the early eighties he was kidnapped by leftist guerillas while working as parachute instructor in El Salvador. During his years of captivity he was re-educated on the need for the proletariat to regain the means of production. Email him at [jffleming@gdmag.com](mailto:jffleming@gdmag.com).*

CONTINUED FROM PG 7

## PROGRAMMING

### PROGRAMMERS AS A GROUP EARNED

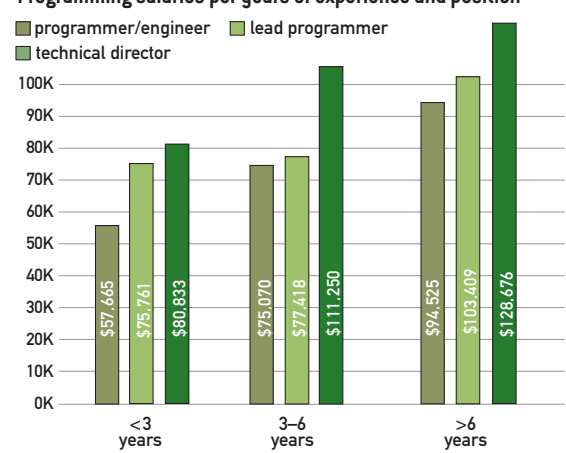
more than they did in 2006, with the most experienced among them enjoying significant raises over the previous year. Programmers/engineers and lead programmers with six or more years experience earned around \$5,000 more, while seasoned technical directors saw their salaries go up by almost \$10,000. Programmers remain the highest paid talent in the games industry, exceeded only by businesspeople.

In Canada and Europe programmers were paid less than their U.S. counterparts. The average salary for Canadian programmers was \$70,167 (USD) while European coders earned \$53,146 (USD).

Programmers are among the highest educated in the survey, with 50% holding at least a bachelor's degree while 26% carried their education further into post graduate study. When comparing programmers with associate's and bachelor's degrees we found less than a \$1,000 difference in average salary between the two education levels.

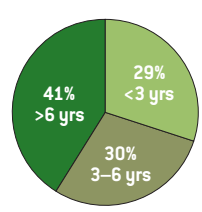
AVERAGE SALARY  
**\$83,383**

Programming salaries per years of experience and position



### ALL PROGRAMMERS AND ENGINEERS

#### Years experience in the industry



Percent receiving additional compensation **78%**

Average additional compensation **\$15,313**

Type of compensation

- Annual bonus ..... 50%
- Project bonus ..... 28%
- Royalty ..... 17%
- Stock Options ..... 41%
- Profit Sharing ..... 17%

#### Gender Stats for Programmers

| Gender | Percent represented | Average salary |
|--------|---------------------|----------------|
| Female | 3%                  | \$76,184       |
| Male   | 97%                 | \$83,579       |

Receive some benefits **94%**

Type of benefits received

- Medical ..... 97%
- Dental ..... 92%
- 401K/retirement ..... 84%

## ART AND ANIMATION

### ON AVERAGE, ARTIST SALARIES WENT UP

slightly (about \$1,487) over last year with the more experienced artists seeing the biggest increase.

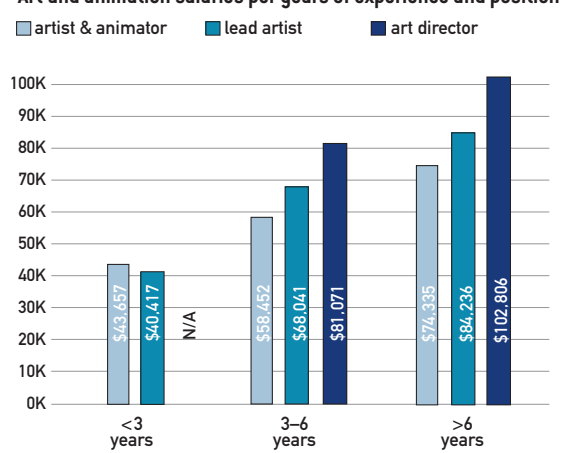
Like programmers, artists are also a highly educated group. According to our survey, 55% reported a bachelors degree. However, only 11% chose to pursue their education into postgraduate study. 18% entered the job market with an associate's degree. We saw a more significant correlation between education level and salaries in the visual arts field, with bachelor's degree holders earning \$5,644 more on average than those with associate's degrees.

Canadian artists are earning less than those in the U.S., averaging \$57,703 (USD) per year. Artists in Europe are paid even lower, averaging \$45,904 (USD) per year.

The percentage of artists with six or more years of experience increased to 40%, up 5% over last year, while the percentage of those with three to six years experience went up 3%. There were relatively few novices in art and animation with 25% of our respondents claiming three or less years of experience, down 7% from last year.

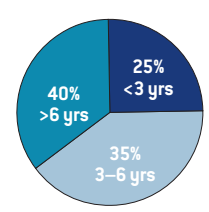
AVERAGE SALARY  
**\$66,594**

Art and animation salaries per years of experience and position



### ALL ARTISTS AND ANIMATORS

#### Years experience in the industry



Percent receiving additional compensation **80%**

Average additional compensation **\$14,984**

Type of compensation

- Annual bonus ..... 44%
- Project bonus ..... 31%
- Royalty ..... 22%
- Stock Options ..... 37%
- Profit Sharing ..... 17%

#### Gender Stats for Artists

| Gender | Percent represented | Average salary |
|--------|---------------------|----------------|
| Female | 8%                  | \$61,250       |
| Male   | 92%                 | \$67,056       |

Receive some benefits **91%**

Type of benefits received

- Medical ..... 99%
- Dental ..... 95%
- 401K/retirement ..... 87%



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— Kelly Myers, VFX Supervisor, *The WarDevil Project*, Digi-Guys, Ltd

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## GAME DESIGN

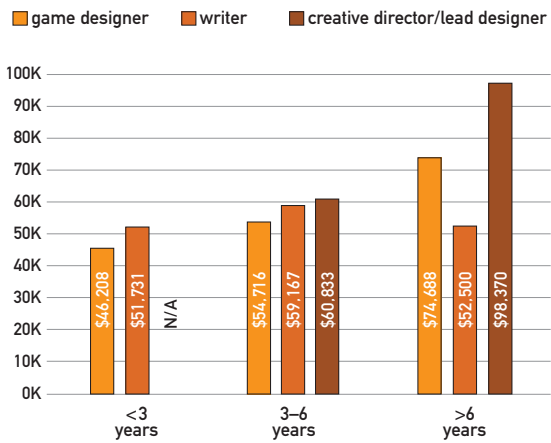
**GAME DESIGNERS AND WRITERS HAVE** a lower average salary than their fellow workers who fill creative positions in game development. Only quality assurance is paid less on average. However, their average salary as a whole went up \$2,111 over last year and writers new to the industry are enjoying higher average salaries, up \$6,000 over last year. Lead designers with six or more years of experience saw their average salary go up \$10,000 over last year.

**AVERAGE SALARY**  
**\$63,649**

About half (49%) of our respondents in the game design category had a bachelor's degree and 19% reported having some college but no degree. There was only a \$757 difference in average salary between the two, indicating that talent might be more important than formal education for game designers.

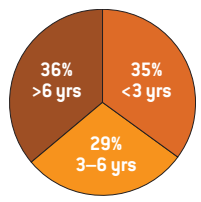
In Canada, game designers were paid more on average than last year, up almost \$10,000(USD) for average salary of \$57,435(USD), but still short of what U.S. designers earn. In Europe, game designers brought home an average of \$46,959(USD) per year.

**Game design salaries per years of experience and position**



### ALL GAME DESIGNERS

**Years experience in the industry**



**Percent receiving additional compensation** 79%

**Average additional compensation** \$13,921

- Type of compensation**
- Annual bonus ..... 40%
  - Project bonus ..... 36%
  - Royalty ..... 23%
  - Stock Options ..... 36%
  - Profit Sharing ..... 16%

**Gender Stats for Designers**

| Gender | Percent represented | Average salary |
|--------|---------------------|----------------|
| Female | 8%                  | \$55,156       |
| Male   | 92%                 | \$64,396       |

**Receive some benefits** 91%

- Type of benefits received**
- Medical ..... 98%
  - Dental ..... 92%
  - 401K/retirement ..... 84%

## PRODUCTION

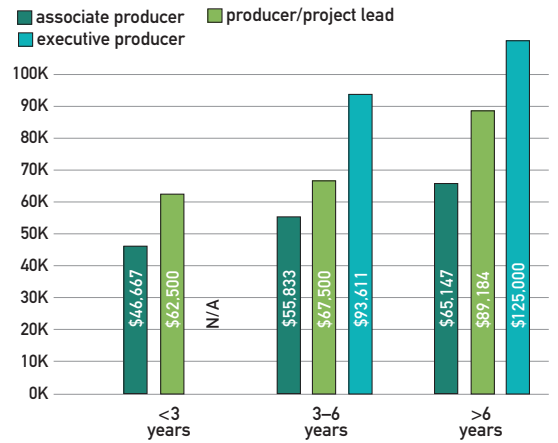
**PRODUCERS WITH THREE OR FEWER** years of experience saw their salaries go up somewhat over last year's \$52,885 average. However, the discipline as a whole enjoyed only a slight bump of \$1,585 over last year and the salaries of producers with more experience were largely static.

**AVERAGE SALARY**  
**\$78,716**

Of all the game development disciplines, production seems to be one of the most welcoming to women, with 18% of the workforce made up of females. Women continue to be paid less on average, however. While the average salary of a male producer is \$79,970, female producers average \$72,398. The difference between the two is quite high among the creative disciplines, exceeded only by the salary gap among game designers.

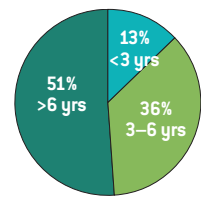
51% of game producers reported having a bachelor's degree, 8% had an associate's degree while 14% reported some college experience but no degree. Producers with bachelor's degrees average \$7,246 more per year than those with associate's degrees.

**Production salaries per years of experience and position**



### ALL PRODUCTION

**Years experience in the industry**



**Percent receiving additional compensation** 81%

**Average additional compensation** \$17,354

- Type of compensation**
- Annual bonus ..... 59%
  - Project bonus ..... 21%
  - Royalty ..... 15%
  - Stock Options ..... 41%
  - Profit Sharing ..... 15%

**Gender Stats for Producers**

| Gender | Percent represented | Average salary |
|--------|---------------------|----------------|
| Female | 18%                 | \$72,398       |
| Male   | 82%                 | \$79,970       |

**Receive some benefits** 95%

- Type of benefits received**
- Medical ..... 97%
  - Dental ..... 93%
  - 401K/retirement ..... 86%



# QUALITY ASSURANCE

**THERE IS SOMETHING TO BE SAID FOR PAYING** your dues, just don't make a career out of it. Quality assurance is the lowest paid of the game development disciplines and also receives the least in additional compensation. Still, the average salary overall has gone up \$1,202 over last year and a Q/A lead with six or more years of experience can expect to make \$70,658 on average.

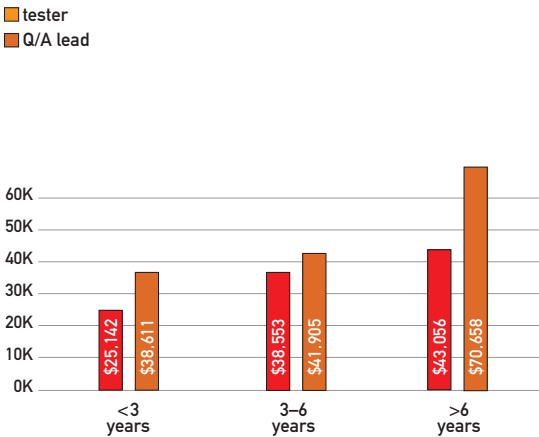
**AVERAGE SALARY**  
**\$39,063**

Quality assurance has always carried the reputation for being an entry-level position in the industry despite its importance to game development and testers with less than three years experience make up the largest percentage of its workforce.

45% of testers have a bachelor's degree and 12% hold an associate's degree. 29% of testers surveyed have some college but have not graduated.

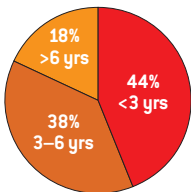
The gap in salary between Canadian testers and the U.S. is not so great as in other disciplines. Although it remains the lowest paid of all the job categories, testers in Canada earn an average of \$37,500(USD) per year for quality assurance work. Testers in Europe are also paid very close to their U.S. counterparts, averaging \$36,000(USD) per year.

**Q/A salaries per years of experience and position**



**ALL Q/A**

**Years experience in the industry**



**Percent receiving additional compensation** 59%

**Average additional compensation** \$8,833

**Type of compensation**

- Annual bonus..... 64%
- Project bonus ..... 15%
- Royalty ..... 2%
- Stock Options..... 37%
- Profit Sharing..... 6%

**Gender Stats for Testers**

| Gender | Percent represented | Average Salary |
|--------|---------------------|----------------|
| Female | 6%                  | \$34,375       |
| Male   | 94%                 | \$39,309       |

**Receive some benefits** 73%

**Type of benefits received**

- Medical ..... 96%
- Dental ..... 86%
- 401K/retirement ..... 79%

# AUDIO

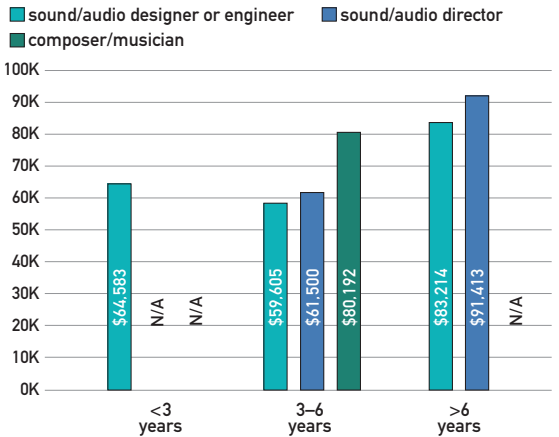
**THERE IS A SPECIALIZED COMBINATION OF** skill and talent required to work in game audio. Reflecting that, salaries were on the rise in the audio category, up \$3,474 on average over last year. Sound designers with three or less years of experience saw significant gains over last year. Sound designers with six or more years experience also saw their salaries go up.

**AVERAGE SALARY**  
**\$73,409**

45% of those working in game audio reported having a bachelor's degree while 14% had some college experience but no degree. Respondents with associate's degrees were very few. When we looked at the difference in average salary between those with a bachelor's and those with no degree, respondents with bachelor's degrees came out only \$1,035 ahead. Canadian sound designers earned quite a bit less than those in the U.S., averaging only \$56,750(USD), while the Europeans were closer at \$62,000(USD).

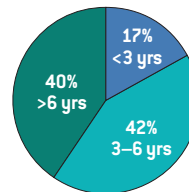
As most audio in games is still done on a contract basis, rather than in house, we had a lower number of respondents in audio than in other categories, necessitating a few passes where we lacked enough responses to make a firm analysis.

**Audio salaries per years of experience and position**



**ALL AUDIO**

**Years experience in the industry**



**Percent receiving additional compensation** 66%

**Average additional compensation** \$18,819

**Type of compensation**

- Annual bonus..... 38%
- Project bonus ..... 29%
- Royalty ..... 31%
- Stock Options..... 26%
- Profit Sharing..... 22%

**Gender Stats for Audio Personnel**

| Gender | Percent represented | Average salary |
|--------|---------------------|----------------|
| Female | 8%                  | \$69,375       |
| Male   | 92%                 | \$73,764       |

**Receive some benefits** 83%

**Type of benefits received**

- Medical ..... 97%
- Dental ..... 95%
- 401K/retirement ..... 85%

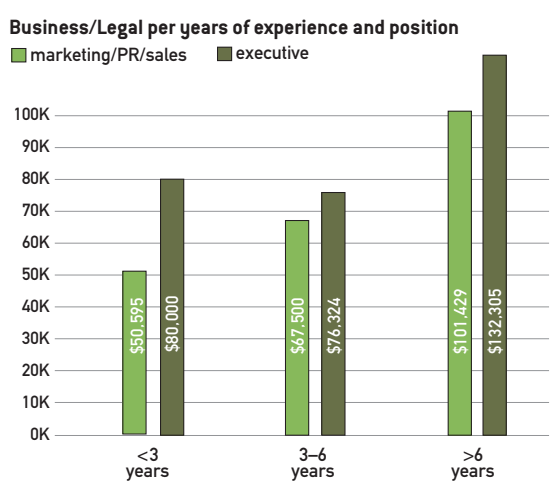
## BUSINESS AND MARKETING

**OUR SURVEY GATHERED SALARY DATA** from a wide variety of jobs situated within the business and administration side of development. Here we chose to focus on management and marketing as being the most relevant to game developers. The business field as a whole remains the highest compensated group in game development and also receives the highest amount of additional compensation. The biggest portion of that additional compensation comes from profit sharing.

**AVERAGE SALARY**  
**\$101,848**

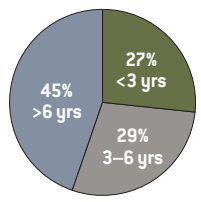
The business and marketing sector has a large percentage of females working in it but the average salary gap of \$32,081 between men and women is rather extreme.

There is a lower percentage of bachelors degree holders on the business side: only 38% compared to almost 50% for other disciplines. This just adds credence to the theory that your bosses are stupider than you, and make too much money. However, of those who got degrees, a good 16% went on receive a masters.



### ALL BUSINESS/MANAGEMENT

#### Years experience in the industry



**Percent receiving additional compensation** 78%

**Average additional compensation** \$24,937

**Type of compensation**

- Annual bonus.....56%
- Project bonus.....18%
- Royalty.....13%
- Stock Options.....40%
- Profit Sharing.....26%

#### Gender Stats for Businesspeople

| Gender | Percent represented | Average salary |
|--------|---------------------|----------------|
| Female | 17%                 | \$73,553       |
| Male   | 83%                 | \$105,634      |

**Receive some benefits** 79%

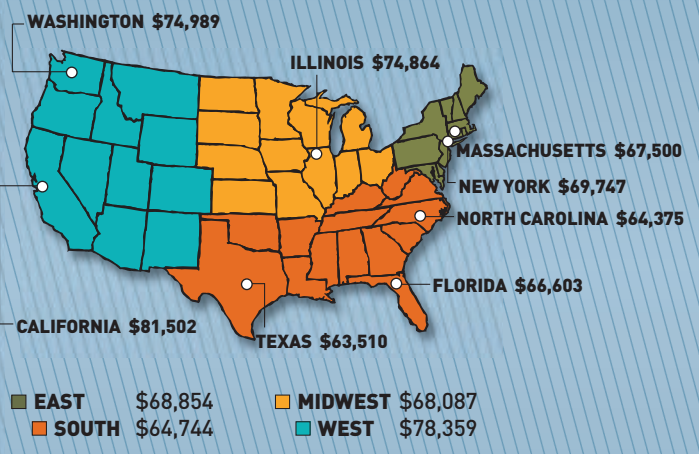
**Type of benefits received**

- Medical.....94%
- Dental.....88%
- 401K/retirement.....76%

## NATIONAL TRENDS

TOP 10 STATES FOR GAME DEVELOPERS ACROSS ALL DISCIPLINES AND LEVELS OF EXPERIENCE BY AVERAGE SALARY

| RANK | STATE         | AVG. SALARY | PERCENT WHO OWN HOMES | AVG. SALARY OF HOMEOWNERS |
|------|---------------|-------------|-----------------------|---------------------------|
| 1    | California    | \$81,502    | 33%                   | \$102,611                 |
| 2    | Washington    | \$74,989    | 55%                   | \$88,382                  |
| 3    | Illinois      | \$74,864    | 52%                   | \$92,045                  |
| 4    | Maryland      | \$73,566    | 46%                   | \$91,731                  |
| 5    | New York      | \$69,747    | 40%                   | \$85,294                  |
| 6    | Georgia       | \$69,265    | 52%                   | \$74,167                  |
| 7    | Oregon        | \$69,118    | 53%                   | \$86,912                  |
| 8    | Virginia      | \$67,619    | 42%                   | \$82,222                  |
| 9    | Massachusetts | \$67,500    | 36%                   | \$90,147                  |
| 10   | Colorado      | \$66,638    | 43%                   | \$86,667                  |



## AVERAGE SALARY FOR HOMEOWNERS VS. NON-HOMEOWNERS BY REGION

|                       | EAST     | WEST     | MIDWEST  | SOUTH    |
|-----------------------|----------|----------|----------|----------|
| <b>HOMEOWNERS</b>     | \$86,484 | \$95,103 | \$84,500 | \$78,067 |
| <b>NON-HOMEOWNERS</b> | \$54,719 | \$66,208 | \$49,038 | \$49,056 |

## AVERAGE SALARY BY REGION BY DISCIPLINE

|                    | EAST     | WEST     | MIDWEST  | SOUTH    |
|--------------------|----------|----------|----------|----------|
| <b>ARTISTS</b>     | \$61,866 | \$71,699 | \$58,864 | \$57,809 |
| <b>PROGRAMMERS</b> | \$75,206 | \$90,944 | \$73,732 | \$72,435 |
| <b>DESIGNERS</b>   | \$58,178 | \$68,314 | \$62,500 | \$56,317 |
| <b>AUDIO</b>       | \$60,658 | \$80,297 | N/A      | \$66,029 |
| <b>PRODUCTION</b>  | \$77,398 | \$82,608 | \$74,167 | \$65,000 |
| <b>Q/A</b>         | \$36,786 | \$41,366 | \$24,643 | \$32,000 |
| <b>BUSINESS</b>    | \$96,429 | \$95,652 | \$82,885 | \$84,886 |



# Unreal Technology News

by Mark Rein, Epic Games, Inc.

Canadian-born Mark Rein is vice president and co-founder of Epic Games based in Cary, North Carolina. Epic's Unreal Engine 3 has won Game Developer Magazine's Front Line Award for Best Engine for the past three years, and Epic was awarded Best Studio at the 2006 Spike TV Video Game Awards. Epic's "Gears of War" won overall Game of the Year in 2006, and sold over 4.5 million units on Xbox 360. Epic recently shipped the PC version of "Gears of War" for publisher Microsoft Game Studios, as well as "Unreal Tournament 3" for PC and PlayStation 3 for publisher Midway.

## Upcoming Epic Attended Events:

### E3 2008

Los Angeles, CA  
July 15-17, 2008

Please email:  
mrein@epicgames.com  
for appointments.

## NEW UNREAL ENGINE 3 FEATURES SHOWCASED DURING MICROSOFT'S GDC KEYNOTE

Unreal Engine 3 is constantly improving, and Epic CEO Tim Sweeney revealed several exciting new Unreal Engine 3 features to illustrate this during Microsoft's GDC keynote. A "meat cube" and gelatinous ball demonstrated soft body physics. Hundreds of *Gears of War* "Locust" characters ran down a wide city street to show off our new flocking technology, or crowd system. New structural analysis and fracturing tools were evidenced by firing weapons at stone walls and columns to reveal underlying structure and rooms below. We also presented new rendering features, including vastly improved character lighting and screen space ambient occlusion, which renders an approximation of global illumination for more realistic environment shadows. A new water physics system and improvements to UE3's Matinee cinematic toolset were also shown.

## NURIEN TAKES THE VIRTUAL DANCE FLOOR BY STORM WITH UNREAL ENGINE 3

Nurien Software is creating a stunning virtual world that shows off the versatility of Unreal Engine 3. Nurien's 3D social networking universe demonstrates the engine's versatility outside of traditional console action games. It includes "MStar," a rhythm dance game; "Runway," an innovative fashion show application; "QuizStar," a casual online trivia game and much more.

Users can personalize 3D avatars that interact and play games with each other online on Nurien's platform. Games and applications are built into the software client, which utilizes an advanced avatar system complete with content creation tools to offer unrivaled customization features.

Over 3,000 materials and textures enable users to invent a range of clothing and accessories for 3D avatars. Virtual designers can incorporate materials such as leather, jeans and velvet onto a single item, and even apply decals to create truly unique, wearable pieces of art.

Characters in the avatar system move realistically due to the assignment of unique physics values to body parts, hair and accessories. Each component moves independently within the avatar environment, enabling characters to simulate realistic physical movements and take on lifelike personas.



Nurien Software's 3D social networking platform is powered by Unreal Engine 3.

## MORE KOREAN DEVELOPERS LICENSE UNREAL ENGINE 3

Devroot Studio, a division of SONOV Corporation, has licensed UE3 to develop its unannounced title, codenamed "BK Project". Devroot Studio is a dedicated online game development team within SONOV, publisher of *Shaiya: Light and Darkness*, a wildly successful MMORPG. "Over the past six months, we have researched lots of game engines for our next project," said Jeon Min-Uk, product director of Devroot Studio and chief technical officer of SONOV. "And now, we proudly announce that Unreal Engine 3 is the most flexible and capable engine, and we believe it will enable us to fully harness our creativity."

Seoul-based developer Dragonfly also recently licensed UE3 for an unannounced project. Dragonfly developed *Special Force*, the top ranked game in Korea's Internet cafes with over 11 million registered users, a professional league with 36 teams and the largest cash prizes for online gaming in Korea. "Unreal Engine 3 is the right game engine for us," said Park Cheol Seung, vice president of Dragonfly. "While we have developed much of our own technology over the years, UE3 clearly provides the cutting-edge framework we

need to ensure the highest development standards in our project."

## SCALEFORM GFX INTEGRATION WITH UNREAL ENGINE 3 AVAILABLE NOW

Scaleform GFX, the best-selling user interface (UI) production tool for hardware-accelerated scalable vector graphics, has been integrated with UE3. Through its membership of Epic's exclusive Integrated Partners Program (IPP), Scaleform has developed a production-ready Gfx integration that is now available to all developers and publishers using UE3. Scaleform GFX is fully integrated into the UE3 hardware-independent graphical rendering system for superior cross-platform support, enabling artists to create scalable, data-driven UI elements for menuing systems, overlays, HUDs and animated textures directly on 3D objects.



For UE3 licensing inquiries email:  
[licensing@epicgames.com](mailto:licensing@epicgames.com)

For Epic job information visit:  
[www.epicgames.com/epic\\_jobs.html](http://www.epicgames.com/epic_jobs.html)

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## METHODOLOGY

**NOW IN ITS SEVENTH YEAR, THE SALARY SURVEY** was conducted February and March of 2008 with the assistance of research firm Audience Insights. Email invitations were sent to *Game Developer* subscribers, Game Developers Conference attendees, and Gamasutra.com members asking them to participate in our annual salary survey.

We gathered 4,863 responses from developers worldwide but not all who participated in the survey provided enough compensation

information to be included in the final report. We also excluded salaries under \$10,000 as well as salary figures from students and educators. The small number of reported salaries over \$202,500 were excluded to prevent their high numbers from unnaturally skewing the average. We also excluded records that were missing key demographic and classification numbers.

The survey primarily includes U.S. compensation but consolidated figures for Canada and Europe

were included as well. The total sample reflected in the data presented for the U.S. is 2,409, for Canada 394, and for Europe 382.

The sample represented in our salary survey can be projected to the overall game developer community with a margin of error, for the aggregate U.S. statistics, of plus or minus 1.7% at a 95% confidence level. The margin of error increases for specific subgroups reported within this community.

## THE GENDER REPORT

**AFTER AVERAGING SALARIES ACROSS ALL** disciplines we found that males earned an average of \$74,459 per year while females earned only \$64,643, a gap of \$9,816.

When looking at each discipline individually, the business sector showed the most notable divide. Although females comprise 17% of the business and marketing workforce, they are paid an average of \$32,081 less than their male co-workers.

The game design category has a low percentage of females (8%) working in it and also

a rather high \$9,240 salary discrepancy.

Production is the discipline with the highest percentage of female workers (18%) but routinely pays them \$7,572 less than males.

The programming field has a very small (3%) number of females represented and underpays them by \$7,395.

The art and animation discipline is 8% female and underpays them by \$5,806 while Q/A and audio have approximately the same percentage but only underpays by \$4,934 and \$4,389 respectively.

## COMMUNITY MANAGEMENT

**COMMUNITY MANAGEMENT IS TAKING ON A NEW** importance as the popularity of MMOs continues to grow. In our survey, we found that community managers bring home an annual salary of \$50,294 when averaged across all experience levels. Our survey also showed the field to have a high percentage of females (24%). When we broke the salary average down by gender we found that women were actually higher paid (\$56,250) than their male peers (\$48,462).

## EDUCATION IN THE U.S.

### HIGHEST DEGREE OF EDUCATION ATTAINED BY U.S. DEVELOPERS BY DISCIPLINE

|                    | SOME COLLEGE OR ASSOCIATE'S | BACHELOR'S DEGREE | SOME GRADUATE | GRADUATE DEGREE |
|--------------------|-----------------------------|-------------------|---------------|-----------------|
| <b>PROGRAMMING</b> | 16%                         | 50%               | 9%            | 15%             |
| <b>ART</b>         | 32%                         | 55%               | 4%            | 6%              |
| <b>DESIGN</b>      | 28%                         | 49%               | 6%            | 10%             |
| <b>PRODUCTION</b>  | 22%                         | 51%               | 9%            | 11%             |
| <b>AUDIO</b>       | 31%                         | 45%               | 10%           | 6%              |
| <b>Q/A</b>         | 43%                         | 45%               | 3%            | 1%              |
| <b>BUSINESS</b>    | 25%                         | 38%               | 6%            | 18%             |

### AVERAGE SALARIES BY EDUCATION LEVEL FOR U.S. DEVELOPERS BY DISCIPLINE

|                          | PROGRAMMING | ART      | DESIGN   | AUDIO    | PRODUCTION | Q/A      | BUSINESS  |
|--------------------------|-------------|----------|----------|----------|------------|----------|-----------|
| <b>ASSOC. DEGREE</b>     | \$79,375    | \$61,071 | \$53,500 | N/A      | \$68,587   | \$37,750 | \$85,250  |
| <b>SOME COLLEGE</b>      | \$87,147    | \$69,254 | \$63,289 | \$70,909 | \$84,881   | \$31,582 | \$85,743  |
| <b>BACHELOR'S DEGREE</b> | \$79,241    | \$66,715 | \$64,046 | \$71,944 | \$75,833   | \$43,500 | \$87,500  |
| <b>SOME GRADUATE</b>     | \$86,286    | \$82,045 | \$71,500 | \$63,000 | \$81,071   | \$49,500 | \$125,938 |
| <b>MASTER'S DEGREE</b>   | \$90,545    | \$70,403 | \$64,929 | N/A      | \$87,803   | \$47,500 | \$97,375  |

**FOR THE SECOND YEAR RUNNING, WE'VE** asked salary survey respondents to tell us their highest level of education received. About half of those surveyed had a bachelor's degree and a significant percentage in the programming and business fields held graduate degrees.

Our survey showed that, for a high technology industry, video games are remarkably open to those without formal, four year educations. Across all disciplines, there were many who reported only some college experience or associate's degrees.

When we compared level of education with average salary there was a clear correlation between holding a bachelor's or graduate

degree and earning a higher salary.

However, those with only some college experience frequently reported making almost as much as those who had invested in a four year degree. With the exception of programmers, those holding associate's degrees typically made less than bachelor's degree holders

Game development has its origins in the garage and it is sustained by an entrepreneurial, DIY culture. While a formal education can certainly boost a person's career, talent and creativity will always be the most valuable currency in the industry. ✖

## INTERNATIONAL DATA

Average salaries in Canada, Europe, and the U.S. across all levels of experience and titles within disciplines (all reported in U.S. dollars)

|                    | U.S.     | CANADA   | EUROPE   |
|--------------------|----------|----------|----------|
| <b>ART</b>         | \$66,594 | \$57,703 | \$45,904 |
| <b>PROGRAMMING</b> | \$83,383 | \$70,167 | \$53,146 |
| <b>DESIGN</b>      | \$63,649 | \$57,435 | \$46,959 |
| <b>AUDIO</b>       | \$73,409 | \$56,750 | \$62,000 |
| <b>PRODUCTION</b>  | \$78,716 | \$71,786 | \$59,792 |
| <b>Q/A</b>         | \$39,063 | \$37,500 | \$36,000 |
| <b>BUSINESS</b>    | \$92,774 | \$82,083 | \$65,694 |

Most European respondents were from the United Kingdom (32.2%), France (10.7%), Germany (9.6%), Spain (8.3%), and Sweden (6.2%). Most Canadian respondents were from British Columbia (40.2%), Quebec (37.5%), and Ontario (13%).

Average Canadian salaries in top 4 reporting provinces

| <b>ALBERTA</b>          | \$68,500 |
|-------------------------|----------|
| <b>BRITISH COLUMBIA</b> | \$71,227 |
| <b>ONTARIO</b>          | \$59,615 |
| <b>QUEBEC</b>           | \$56,867 |

An extended version of the "Game Developer Salary Survey," including detailed data for year-over-year results from 2004, 2005, 2006, and 2007 will be made available for purchase through the CMP Game Group Game Developer's Research division: visit [www.gdmag.com/research](http://www.gdmag.com/research). This detailed report, "The Game Developer Salary Report: 2004-2007" will be available in early April.



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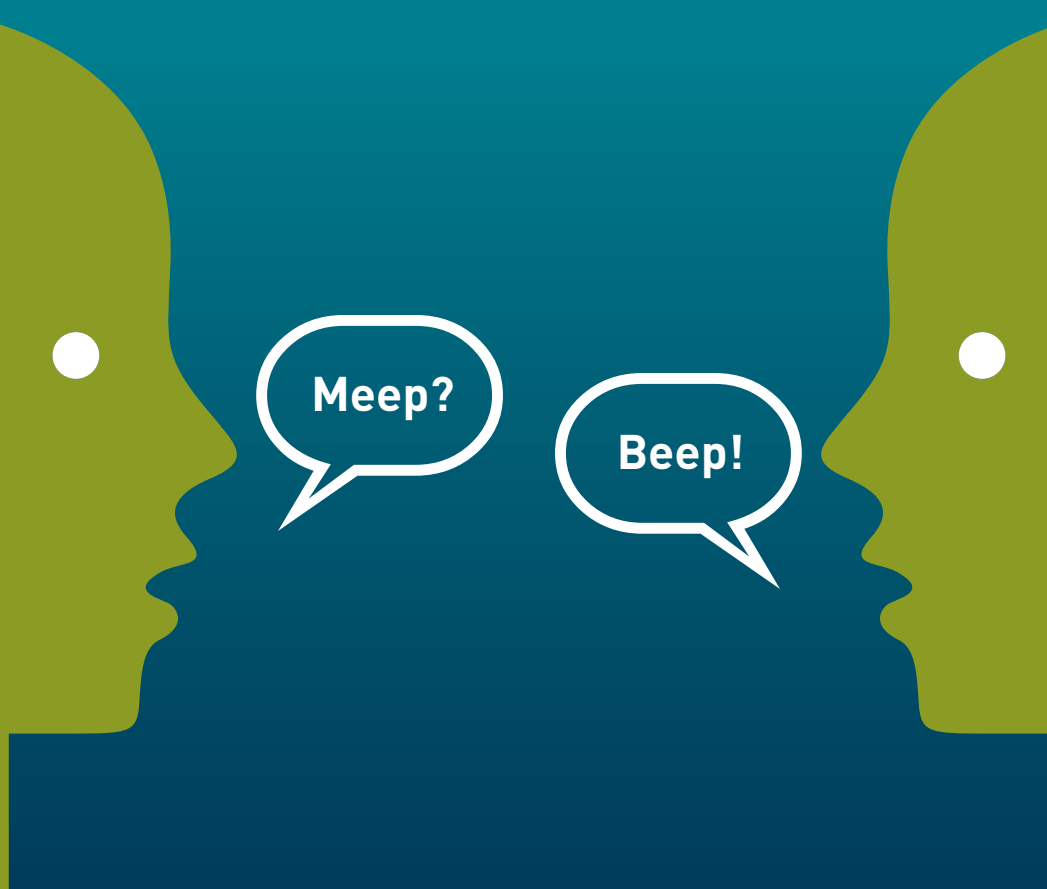
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# ODE TO SHORT DIALOG

## RECONSIDERING THE SOUND BITE

▶▶ I'M HERE TO SING THE PRAISES OF SHORT DIALOG IN VIDEO games. The quip. The utterance. The sound bite. Call it what you will, I fear that short speech may be under-appreciated. Not to get polemical, mind you—longer dialog is not the root of all evil. Short dialog will not heal burns or mend broken hearts. But very short dialog (which I'm defining as two seconds on average, and no more than six) can do things in games that longer speech simply cannot.

Short dialog is fully digestible in the moment. It can function as ambient audio, in the background—or out loud, in the foreground. When ambient, short dialog can be repeated, with variation, until the player happens to take notice. When in the foreground, it can deliver critical information without unduly interrupting or bogging

down gameplay. Information conveyed via very short dialog can be reacted to immediately.

Put another way, sound bites can be made to function as a feedback or game information element, similar to UI events, sound effects, and particle effects. And whether it's a crowd cheering, "Chicken-chaser!" or a hero announcing that he's "here to kick ass and chew bubble gum," short lines are memorable. They are writing boiled down to the essentials. Don't mistake cutting down for a bad thing. Condensed writing can result in subtler accents and richer flavor.

The idea that editing down makes writing stronger is one of those tricky writers' maxims that are extremely useful so long as they aren't applied with too much blind zeal. Ezra Pound famously

---

**Ben Schneider** was a senior writer / designer at the now-defunct Iron Lore Entertainment. His more than six years of industry experience include work on role-playing and strategy games. It is the potential of story-telling in games that drew him to game design and it is of story-telling that he dreams at night. Email him at [bschneider@gdmag.com](mailto:bschneider@gdmag.com).

# ODE TO SHORT DIALOG

wrote a poem titled "In a Station of the Metro," that began as 30 lines of verse. He rewrote it at half the length, then further condensed it to two short lines, almost a haiku:

The apparition of these faces in  
the crowd;  
Petals on a wet black bough.

Nowadays we speak  
condescendingly of the sound bite,  
but really we should give credit where it  
is due. It might lack in nuance and carry no  
more than a crumb of information, but the sound  
bite has the power to catch your attention and light up  
your imagination, all in the brief pulse of an instant. Good luck  
doing that with long-winded facts. In other words, the sound bite



is more poetry than prose—and poetry is  
a powerful thing.

## A HARD DAY'S QUOTE

I've been thinking a lot about short dialog recently. For most of 2007, we at Iron Lore were working on *DAWN OF WAR: SOULSTORM*, the third expansion to Relic's superb strategy series. When it came time for me to write the unit voice-over it was first necessary to stop and admire the standard set for my task by the folks at Relic. I was an instant fan of lines such as "Just as Falcon brought Anaris to Eldanesh...", which deftly and poetically evokes the labyrinthine mythology of the ancient Eldar, not to mention, "Ere ta fix yer gubbinz!"—capturing perfectly all the comic braggadocio of an Ork warboss.

The nature of those unit voice-over lines highlights a major difference between dialog in games and other sorts of dialog. Take three steps into the world of screenwriting, and you're likely to come across the term "on the nose." [A good treatment of it can be found in David Freeman's *Creating Emotion in Games*.] Being on the nose is a bad thing; it means the writing has come at its subject too directly and feels flat. It is the hallmark of juvenile, clumsy writing—or worse yet, a script written by marketing execs. And it's true: People almost never talk directly at a point. They don't state the obvious, they don't spell everything out. In fact, they almost always beat around the bush and whatever does come out of their mouths is colored heavily by their own personality and their relationship with whomever they're speaking to.

In other words, in real life and in well-written drama, when people speak, they speak in context. And the more context with which a writer can imbue a line of dialog, the better it will be. An elite operative in a dangerous situation is better off saying, "Sergeant Malloy. James! Please!" than they are coming out with a full, "James Malloy, I know the death of your partner of 10 years has shaken you up, but for crying out loud stop acting like an idiot or you'll get us all killed." If the circumstances surrounding that line are well constructed, the audience gets the second line out of the first, with the major difference being that it goes to their gut, without bouncing off any raised eyebrows.



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Meep?

# ODE TO SHORT DIALOG

CONTINUED FROM PG 18

In video games, the concept of “on the nose” hits a hitch. Dialog—especially short dialog—almost always has another job to do, which is conveying direct, unambiguous information to the player. In *DAWN OF WAR* for instance, every infantry unit can have over a dozen different types of confirmation audio, acknowledging your orders and alerting you to events on the battlefield. Each type of confirmation gets between two and ten lines for variation. You naturally want these lines to convey as much character and flavor as possible, but what you absolutely need is for each to communicate its purpose without a shadow of a doubt. The player needs to instantly grok when a line signifies squad selection, point capture, morale loss, and so forth. Almost all of these lines essentially must be on the nose. You can’t come at the subject indirectly.

While not all game dialog has such strict parameters, the point holds. You won’t find a lot of speech in games that doesn’t directly relate to the

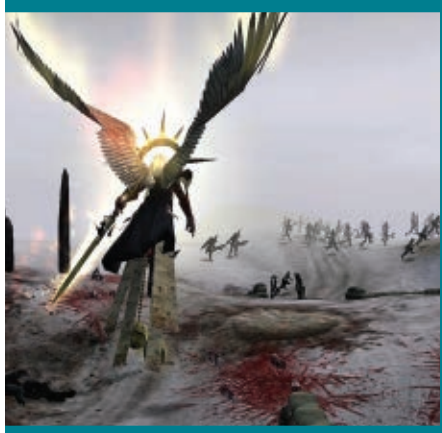


In *ASSASSIN’S CREED* passersby comment on the player’s actions with short bits of dialog.

re-derived. Keeping dialog strictly indirect might not be possible, but here’s the thing: That rule is just an easy-to-spot result of dialog that’s in character and in context. Even lines that are brutally direct don’t need to be without personality or context. I’ll look at some of the point capture lines in *DAWN OF WAR*, by way of example. When you tell a squad to take a point, they spend some time raising a flag over it, then they need to tell you they’ve finished. The trained and orderly Space Marines get by with “Objective achieved!” The more macabre and poetical Dark Eldar prefer, “Our flag flies proudly here,” which is more than twice as long, but still under two seconds. Ditto for “It now belongs to da Orks!” On the nose and plenty of character there. “In context and in character” (ICIC) is longer than “on the nose,” but it’s also less than two seconds—and it might just work.

## THE ART OF PUBLIC SPEAKING

Writing dialog in games comes with its own challenges. Very short dialog has the ability to work itself into the fabric (or gearwork, if you prefer) of the game, to become an aspect of the environment and player experience where longer dialog generally does not fit well. At its most powerful, very short dialog has to balance a number of factors. It conveys game-related information in an easily recognizable, aerodynamic formulation that somehow, despite its brevity, remains in context and in character.



central focus of action. It wants to keep pertinent to—and at the tempo of—the game itself.<sup>1</sup>

## SNUBBING THE NOSE

Well, on the nose or off it, what’s it going to be? Trying to transcribe the concept wholesale into video games doesn’t really get us anywhere. Translation is required; the formula needs to be

1. Writing off the nose is additionally difficult because diagesis is fundamentally different in games. Rather than being air-tight and made of glass, the fourth wall is covered in the apertures and interfaces of the game UI. It’s as if a portion of the audio and visuals come from this gray area, the intersection of the game world and the player’s world.

Beep!

It doesn't stick out, jar, or bore the player, and it takes a front- or back-stage position as needed.

ASSASSIN'S CREED is worth considering for its dialog. On the street, passersby and guards comment on what you're doing in muttered reactions. Scaling a wall or jumping around will earn you a "What is he doing?" while outright murder results in gasps, yells, and shouts. By and large, the dialog works well. It is to the point, short enough to respond to, and is "ICIC." In BIOSHOCK, likewise, the dialog you hear from the splicers, little sisters, and other characters is mostly short, and more importantly, written to be overheard in short snippets. It melds beautifully into the tapestry of the game's remarkable soundscape. Interestingly, both of these games also feature excellent use of longer dialog, such as in the conversations with AI Mualim, the bureau chiefs, and your assassination targets in ASSASSIN'S CREED, and the voice tapes in BIOSHOCK. Note that in neither case are you required to listen to this dialog during intense

conversations. I would argue that this approach is simply less successful. Those full conversations are, first of all, a bit "uncanny valley," since in reality the speakers would stop talking or turn to



ROCK BAND employs quick dialog in its tutorial to get players up to speed.

you as soon as they noticed you just standing there ... awkwardly listening in. (And ASSASSIN'S CREED does in fact feature that sort of reaction!) Worse yet, they come while you're in the middle of gameplay (exploring, questing, or shopping), and they force an awkward decision on the player—whether to stop and passively listen for a minute, or walk away feeling like you missed something. Neither option is great. This is verisimilitude versus realism in a nutshell: Full conversation dialog might be more accurate, but carefully tailored sound bites capture the essence of overheard speech far better.

On the flip side, those lines in ASSASSIN'S CREED suffer, as the game does across the board, from some serious lack of variation. Achieving a satisfying level of randomized variation in short, repeated dialog is a big challenge in games. More lines and more voices are expensive, but the payoff—not annoying the player or jarring them out of immersion—is pretty big. In DAWN OF WAR, getting six or more versions for common confirmation lines made all the difference. As far as writing variants goes, I am surprised every time at how subtle the difference can actually be, and work well. Even getting two unique good takes of the



A scene from Relic's DAWN OF WAR: SOULSTORM.

gameplay. In fact, both games are generally designed to let you listen to them as a breather between bouts of action. Compare the overheard speech in these games to that in OBLIVION and MASS EFFECT. In both of these games you can listen in on full-length public

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## ODE TO SHORT DIALOG

same line can be effective in avoiding the sense of repetition.

### KNOW WHEN TO FOLD 'EM

The key, of course, is to keep dialog short where it counts. And the hard part is in knowing when that is. Dialog that's in the environment, tied to gameplay mechanics, or that plays during game action really needs to stay short, clear, and direct. But that is never an excuse for lower standards of writing. Very short dialog (under six seconds, averaging two) is critical for information that needs to be digested instantaneously. Merely short dialog (let's say as long as 15 seconds, but averaging closer to eight) has the flexibility of carrying a lot more information and character, but can't reliably be used



Overheard dialog in MASS EFFECT makes players choose between listening and playing.

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while the player is fully engaged in intense, focused play. Obviously, the pressure is off when you've got the player's attention and they are largely passive, such as in cinematics, dialog trees, and when they can safely listen to narration over their current task—that is, for untimed puzzles and nonverbal, visually centered challenges (as in *PORTAL*, for example). Still—I would argue that there are precious few cases where a single line of dialog should run over 20 or so seconds.

Here, then, is my list of cases for which short dialog should be used: unsolicited dialog, as heard in crowds, through peepholes, over the radio, from merchants, from comrades as you pass them by, and in the midst of combat; confirmation audio for player-issued commands; introduction and tutorial sequences of gameplay; and finally, I would argue, for brief midgame cut-scenes and plot-driven custom events. Now out of that list, the tutorial is the one item that is not often all that short-winded. You could certainly argue that there have been plenty of successful, long-winded tutorials. However, a quick look at the tutorials in *FABLE*, *ASSASSIN'S CREED*, *PSYCHONAUTS* (granted, it's spammed rapid-fire), and *ROCK BAND* show how well concise jots of dialog work for the purpose.

Determining when dialog and text in general should be short or long may be more important in video games than in many other types of writing. The player is not an audience—they are not passive—and we shouldn't be trying to verbally upstage them when it's not our turn. I hope that, in singing its praises, I have done short dialog proper justice. It should be deft, on the nose if need be, full of character, and dutifully to the point. It should echo gently in the background when called for and give an ear-ringing shout when its turn comes around. Short dialog should be there to call the shots in the heat of the action, and then step aside with a bare, curt nod when the letterbox descends and its longer cousin clears its throat and begins to speak. ❖



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POSTMORTEM  
POSTMORTEM

# NAUGHTY DOG'S UNCHARTED DRAKE'S FORTUNE

**AT THE END OF 2004, SOME OF THE DEVELOPERS** at Naughty Dog (JAK AND DAXTER, CRASH BANDICOOT), began work on the studio's first-ever game for the PlayStation 3. Cryptically assigned the working title *Big*, the project would prove to be Naughty Dog's biggest and most complex game yet. This postmortem discusses some of the things that we Dogs struggled with, some of our successes and failures, and what we plan to do differently next time.

## WHAT WENT RIGHT

**1** STRONG UP-FRONT DESIGN—THAT WE CAN DITCH WHEN WE NEED TO. As we began to build our new PS3 technology, we also started to formulate a design and direction for what would eventually become UNCHARTED: DRAKE'S FORTUNE. Once we'd agreed on the game's general scope, we defined the tone—a light,

cheerful, humorous one, similar to that of our pulp adventure inspirations—and what the core mechanics for the game would be. However, one of our strengths at Naughty Dog is prototyping early and knowing when it's time to deviate from our design documents.

A great example of this is our aiming mechanic. We initially thought that UNCHARTED would use an automatic lock-on aiming mechanic for its gunplay. We spent several months trying different lock-on target selection mechanics, control schemes, and camera combinations; we even implemented several types of mini-games for executing special kills while using the lock-on.

Despite all of the planning and production time that we'd invested in the mechanic, the gameplay never gelled for us and we eventually decided to try a completely

*Neil Druckmann and Richard Lemarchand were game designers on UNCHARTED: DRAKE'S FORTUNE, and are the co-lead game designers of an unannounced Naughty Dog project. Their previous credits include JAK 3 and JAK X: COMBAT RACING. Email them at [rlemarchand@gdmag.com](mailto:rlemarchand@gdmag.com).*



# REFILED



## GAME DATA



### DEVELOPER

Naughty Dog

### PUBLISHER

Sony Computer Entertainment

### RELEASE DATE

North America: November 19th, 2007; Japan and Australia: December 6th, 2007; Europe: December 7th, 2007

### NUMBER OF FULL-TIME DEVELOPERS

Approximately 70 Naughty Dogs

### NUMBER OF CONTRACTORS

6

### LENGTH OF DEVELOPMENT

1 year preproduction, 2 years full production

### LINES OF CODE

Approximately two million

### DEVELOPMENT SOFTWARE USED

Autodesk Maya, Pixologic ZBrush, Autodesk Mudbox, Adobe Photoshop, Adobe Illustrator





different approach: free, manual aiming. Even with the free aiming in a rough form, the game instantly became more visceral and fun. Although this new direction meant months of new work, we'd made our decision just early enough to be practical—we had enough time to integrate and polish the new mechanic, and it was definitely the right choice to make for our game.

We use this kind of process a lot at Naughty Dog—having a well-defined idea on paper is great, but the best way to firm up a game design is by trial and error, and you have to know when an idea just isn't working and have the courage to ditch it in favor of a better plan.

**2** FOCUSED GAMEPLAY. Except for a few vehicle-based

sections, UNCHARTED's gameplay is tightly focused on a few core mechanics. This was quite a difference from the design approach of the JAK AND DAXTER series, where much of the fun was derived from the sheer variety of gameplay in the missions.

This focused approach, along with the realistic world we created for UNCHARTED, made game design on the project quite challenging. We couldn't just come up with some wacky idea and give it its own separate mission in order to make a section of the game more interesting.

This resulted in what we feel is a much more elegant design overall. We were forced to think about the game as a whole, and to make sure that our core mechanics were truly exceptional. Additionally, because we created things more systemically—like the player's mechanics and the AI—polishing the game in the final months of production became a little easier. For example, whenever we refined an aspect of the player's move set, almost every level became more fun because they almost all relied on that core move set.

**3** GREAT PERFORMANCES THROUGH SUBTLETY. We're happy to say that we've received a lot of praise for UNCHARTED's characters, and the performances we captured and created for them. However, we think that the success of the story, the tone of the game, and the characters

comes from a combination of elements that can be united under a banner of subtlety.

Because this was our first experience using motion capture, we had an open mind about how to do things, and our approach ended up owing more to the way a movie or theater production

is staged than the way most people in the games industry run their mocap shoots. For example, we chose to use the same actors for both the physical and vocal performances in our cut scenes, which is unusual for games.

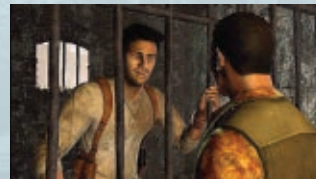
We did a lot of table-reads and blocking walk-throughs with the actors, so that the scenes were well thought-out when the time came to do the shoot. This also let our actors improvise with the motion-capture director and our game director, and many of our favorite moments in the game are a result of our actors' creativity.

Our choice to use the same actors to mocap both voice and physical performances paid off. We believed that on the PlayStation 3, the characters were going to be of high enough fidelity that the player would notice the nuances that a trained actor would bring to a mocapped performance.

The concepts for the main characters were always directed towards simplicity—Drake's outfit is really no more than a t-shirt and jeans. The reason for this, and for other choices like it, is that we wanted the characters' personalities to come through in the performances of the actors, rather than being expressed in accessories and trinkets attached to the character model.

We even took a minimalist approach with the story. We constantly applied the rule of "show, don't tell" during our writing sessions. If a line of dialog could be implied in a gesture or an expression, it was left out. Additionally, characters' lines almost always had two layers of meaning: what the character was apparently saying on the surface, and what they were really thinking (which, again, was conveyed by the physical performances).

There were times where we questioned ourselves and wondered whether this sort of depth in writing and performance would come off in the game—but our fears were quickly laid to rest as the cutscenes started coming together. The high-resolution characters that our artists created combined with the mocap data our talented animators finessed really brought the nuanced performances to life. As characters delivered lines that contained layers of subtext, their true emotional state could be read in their gestures and expressions—and it's this delicate combination and the resulting authenticity of character that we think is the key to the success of our story.



Naughty Dog used the same actors for both mocap and voice performances.



The actors did a blocking walk-through before hitting the mocap stage.

CONTINUED ON PG 28





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CONTINUED FROM PG 26

**4** ANIMATION AND AI. Animation and AI were very important for our project from the beginning. We'd been proud of the animation in our previous games, both in-game and in our cutscenes. We knew that in order to make our realistic characters' humanity and vulnerability as believable as they needed to be, we'd have to work extra hard. Excellent facial animation, in particular, would be key to depicting a relatable hero that you'd really want to root for.

Also, AI was really going to make or break the gameplay—both for the enemies in combat and the friendly characters that Drake would journey through the game with. So at the beginning of the project, we set out to create very complex animation and AI systems, which were planned to provide a general solution to the problems associated with believable human interactions within a game environment.

Ultimately, our initial directions for both systems proved to be too complex. We had gotten hung up on aesthetics, and forgot about just getting the game working and making it fun.



So instead we implemented simpler solutions, more focused on the kinds of activities and behaviors that you associate with the type of character-action game we had in mind.

We used layering and blending techniques to play back different full-body, partial, and additive animations on Drake's body and for the AI-driven characters, resulting in a huge

apparent variety of animations. Sometimes we'd be playing back up to 25 layered Drake animations at once! We also used some inverse kinematics techniques to help register Drake to the environment, and in the end, we were very happy with the results that we got.

**5** NEXT-GEN GRAPHICS. For our previous four projects, our studio worked exclusively on the PlayStation 2. That left us facing a big learning experience as far as developing modern graphics technologies—such as shaders—and UNCHARTED saw a tremendous amount of collaboration between programmers and artists in order to achieve the kinds of results we wanted.

As we'd done for previous Naughty Dog projects, we used multiple rendering engines at once, which we wrote specially to handle different parts of the game world. Two of the major systems rendered our geometry and a third did water, while other renderers took care of particles, decals, and the HUD. All of these were very heavily optimized for the PlayStation 3 hardware, using the console's SPUs in some cases to supercharge the RSX graphics processor.

Our water shader not only uses the same basic reflection and refraction techniques as other games, but uniquely models water flow effectively. Color is computed not from textures but by using optical and physical principles, some based on water depth, which helps give our water a very realistic look. We did all of our water effects—foam, water bubbles from churn, and silt—in the shader, which also helped our water "sell."

All in all, we were very happy that we not only caught up in terms of graphics technologies, but even helped raise the bar.

## WHAT WENT WRONG

**1** SLOW TO GET UP TO SPEED. When we first started developing ideas for UNCHARTED, we explored a lot of different directions. Although we always knew that we wanted to make a third-person character-action game set in a load-free world, the rest of the gameplay, story, and settings changed a lot in our early discussions.

For a variety of reasons, it took us a while to settle on the final concept of the game. And, because we were very focused on creating technology in the early part of the project—the engine, the rendering pipeline, and tools—we didn't have the programming support to prototype our gameplay ideas. This slow start put a dent in the team's morale, but once we focused the design, communicated it to the team, and began implementing against it, everyone's spirits lifted and we began to move forward with great speed.

For our next project we're making sure to keep the team well informed as the game's story ideas firm up, and to get people working on the realization of those ideas as quickly as we can.

**2** TOOLS RETHINK AT THE HALFWAY MARK. Partly driven by a desire to share technology, we developed all-new tools for UNCHARTED, including a new asset-management system, our





first GUI build tool, and a shader and material editor. But in June of 2006, about halfway through the game's development cycle, the team faced a big crisis. Creating our first E3 teaser trailer exposed numerous problems with our new tools, and people were very frustrated.

We realized that we'd bitten off too much with our tools approach—we'd tried to be too clever, coming up with convoluted approaches that were intended to solve



every last problem that anyone had ever had with each kind of tool. To make it worse, we'd gotten distracted by our lofty aspirations, and had left it very late to implement a build pipeline that let people actually run and play levels.

To solve these problems we moved back toward our familiar JAK AND DAXTER method of doing things for many of the tools. From then on things got better and better, and we began to get really good traction on building out the game.

The moral that we took away was that even though it's good to aim high with your tools, you should choose

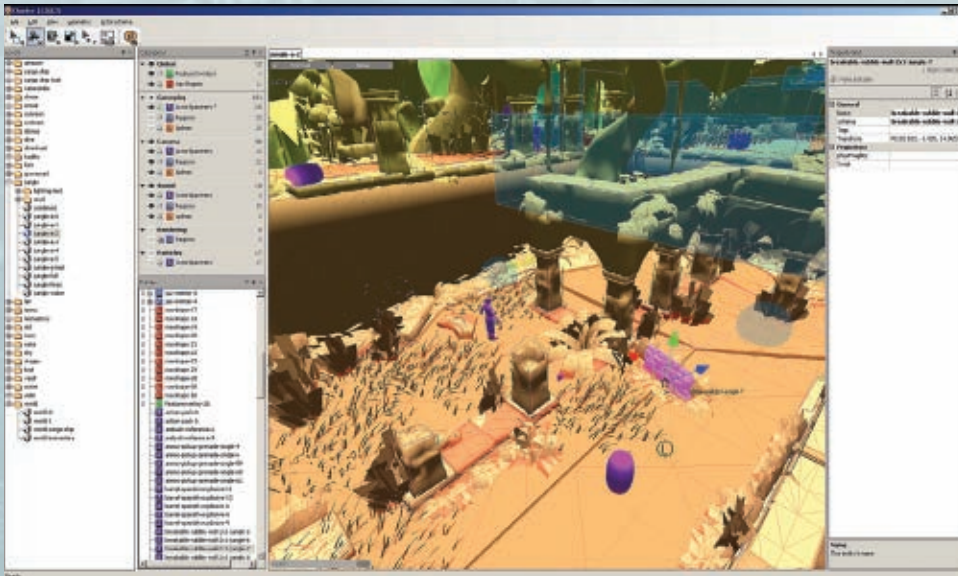
your battles, and shouldn't try to solve every last tools issue that your team faces. In some cases, simple workarounds are better and free up more time to work on the game itself.

**3 DELAYED BUILDING OUT THE GAME.** Having held ourselves up by not getting a good build pipeline in place early on, we were then playing catch-up throughout the project. A recurring theme in our postmortem discussions for UNCHARTED has been that, in many cases, we wished that we'd started building out the game with the simple tools that became available early on, rather than waiting for the technologies or gameplay code we thought we needed to support our sometimes overly complex design or production ideas.

This problem has some similarity to the tools problems we faced—we set our goals too high, and had to bring ourselves down to earth in order to be able to move forward. For example, we had wanted to use a system of interchangeable body and clothing parts for our enemies in order to get a huge apparent variety of enemies and reinforce the reality of the world. We wanted the player to have the feeling that each enemy character was unique.

The problem was that this held up our whole enemy implementation process. We couldn't start finalizing the enemies until we finally realized we didn't have time to create our parts system, and simply got on with making the enemies that are in the shipped game.

This ties in with one of our prevailing development philosophies at Naughty Dog, which is that getting on with making the game is the best way to make it. It's



UNCHARTED's level designer.



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important to do enough planning, but don't over-plan. You make so many discoveries during implementation that will change the design that it's best to begin implementation as early as possible, to the extent that your tools allow, on any given day.

**4** REALISM IN GAMEPLAY IS HARD. Although we took a lot of the right steps in our approach to developing a realistic story and character, we seriously underestimated the impact that realism would have on our game design. A major example of this was the difficulty we faced while we were tuning the health of the enemies.

We initially set up the enemies to take a bunch of hits before dying, so that each enemy felt like a formidable opponent.

However, we soon started getting feedback from players that it seemed incredibly unrealistic for the enemies to take more than a couple of shots before going down. This meant that we had to constantly retune our setups and spawn additional enemy waves to compensate for the change. At the last minute we also implemented an injured state for the enemies which changed their animation when they were hurt, so that they could react to getting shot in the arm or the leg.

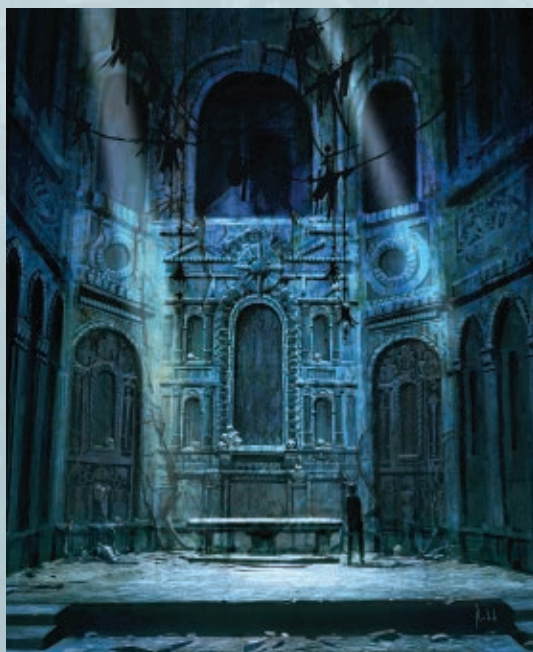
A different kind of struggle between reality and game design happened when we tried to visually differentiate between the different enemy classes. We initially approached their character designs with the same subtle approach that we applied to the main characters, but because the enemies are usually some distance away from the camera on the screen, and hence are quite small, these subtle differences weren't noticeable by the player.

We kept tweaking the enemy designs as we developed the game, and stylized them a bit with some success. In the end we felt that we could have pushed their visual design even more, as some players still had trouble distinguishing between some of the different classes, and we'll continue to explore this issue on our next project.

**5** NOT ENOUGH ITERATION OF LEVEL LAYOUT. We had a very mixed-media approach to level layout for UNCHARTED. Basically, whatever worked well for the designer of the level was okay with us. Some designers started with plan-view pencil sketches or detailed layouts on squared paper. Most of us used

Adobe Illustrator and simple prototype geometry built in Maya, which let us iterate on our level designs more easily. Sometimes we would move back and forth between both applications, annotating screen captures of Maya geometry in Illustrator, and then making more changes to it.

If we hadn't been so pressed for time, we would have iterated each level many more times before we moved on to the stage of creating finished environment art. We found that the more we could polish a level while it was still simple from an art point of view, the less time we wasted redoing work on the environments later on. This stage is also a great time for designers, concept artists, and background artists to share their ideas and find ways to make them work together in harmony, so that the level both looks amazing and plays really well.







## DRAKE'S FORTUNE: NOW CHARTED

There's no doubt about it: UNCHARTED: DRAKE'S FORTUNE was a tough game to make. Getting up to speed on the PlayStation 3 and creating a character-action experience from an untested game idea was a very challenging task. We sweated, we cried, we laughed, and eventually, we conquered. We looked at the mountain of problems we'd overcome and, in the words of Nathan Drake, said, "Adios, asshole."

At the end, we had created a terrific thrill-ride of an action-adventure game that captured the essential flavor of the stories we loved as kids, but that felt new and contemporary at the same time. We are really proud of UNCHARTED: DRAKE'S FORTUNE and the whole of our team agrees that this is the best game we've ever made. Now it's time to get back on the road, and see if we can't better it. ❖



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## GAME DEVELOPERS CONFERENCE 2008 PRODUCT ROUNDUP

BY JEFFREY FLEMING

### ALLEGORITHMIC'S SUBSTANCE

[www.allegorithmic.com](http://www.allegorithmic.com)

Allegorithmic revealed Substance, its new procedural texture middleware at this year's GDC. Although the technology is based on the procedural texture generating concepts used in the company's MapZone and ProFX tools, Substance has been built from the ground up to generate vast amounts of texture data in real time. While Substance will certainly be useful for reducing file sizes, its ability to stream texture data during run time without burdening the CPU or even touching the GPU promises to give designers the freedom to create large game worlds filled with dynamic, continuously variable environments. Substance's node-based authoring tool also has the potential to accelerate content creation by allowing artists to design more complex textures and at faster rate than traditional texture painting methods. Optimized for Intel SSE4-enabled processors, Substance will be available this spring for PC, PlayStation 3, Xbox 360, and mobile.

### DAZ 3D AND MOGWARE'S MOGBOX

[www.daz3d.com](http://www.daz3d.com)

DAZ 3D has cultivated a loyal consumer following around its 3D modeling software and extensive library of inter-compatible content (most notably, the Victoria 4 human figure). However, game developers have been slow to utilize the company's 3D models, which come pre-rigged, with UVs, maps, and morphs. DAZ 3D hopes to change that by partnering with Mogware to create the MOGbox tool, which will enable developers to quickly and easily integrate DAZ 3D models into their production pipelines. MOGbox will be available this spring as a stand-alone tool as well as a component in DAZ 3D's line of 3D applications.

### HAVOK'S DESTRUCTION AND CLOTH

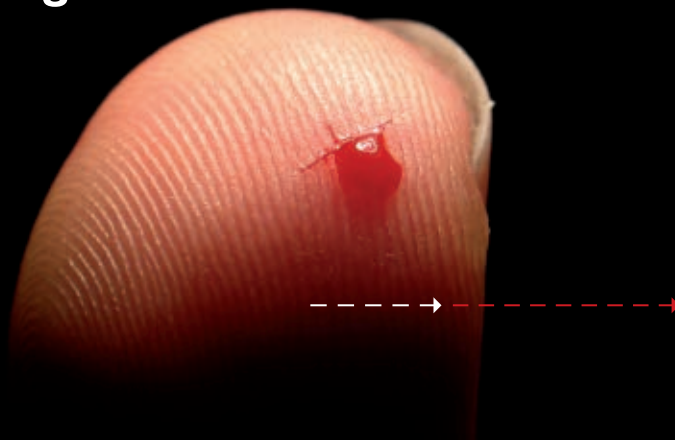
[www.havok.com](http://www.havok.com)

Havok's Destruction, which is scheduled for a summer 2008 release, allows artists to create solid objects in Max, Maya, or XSI and then export them with Havok Content Tool. Once the object is placed in game it can be broken, shattered, or splintered by the

physics engine. As the object fractures and breaks apart, its fragments are dynamically modeled by Destruction without the artist having to do extra work. The software also models metal deformation, allowing players to realistically crunch the front end of their digital sports cars. "We're a company that is grounded in run-time technology. Even though this is largely a tool time technology, we've written run-time components so you can actually put this stuff in the run time," Andrew Bond, Havok's technical director told us.

Also heading for a summer release is Havok's Cloth, which enables animators to simulate a range of flexible materials such as leather, silk, canvas, or hair. Designers can also add environmental cloth such as flags or banners to their games. Cloth utilizes a level of detail system that blends between 3D meshes so that large numbers of animated cloth objects can be used in a scene without overburdening the processor, Havok claims. "Cloth will ship as a stand alone product. It doesn't depend on physics,

**A minor issue in the beginning.**



it's a layer on top, but all Havok products integrate properly together," Bond said.

## IMAGE METRICS FACIAL ANIMATION

[www.image-metrics.com](http://www.image-metrics.com)

Reliable motion-capture systems for human figures abound but the fine details of facial performance still require time-consuming clean up and animation by hand. Image Metrics aims to make facial animation easier by enabling facial performances that are captured on video to be converted to animation data without the need for markers or special paint. The company employs an in-house proprietary machine learning system based on utilizing prior knowledge of what a human face looks like combined with a probability model to extrapolate animation data from the video.

While currently focused on the motion capture market, Image Metrics hopes to bring its technology to run time applications. Speaking with *Game Developer*, Image Metric's vice president of business development Nick Perrett said, "On the R&D side, what we're working on at the moment is the idea of synthetic animation for dynamically responsive characters in a game. Like NaturalMotion's in-game engine for synthesized body reactions, but for faces."

## KYNOGON'S KYNAPSE 5

[www.kynogon.com](http://www.kynogon.com)

AI middleware provider Kynogon announced Kynapse 5 software at GDC. The new release features dynamic path finding that enables AI-controlled characters to navigate complex, destructible environments. Future game designs will need path finding AI to react to changes in the landscape on the fly, so that if a stray rocket-propelled grenade hits a bell tower during a heated FPS match, players can expect to see AI controlled enemies successfully navigate through the resulting rubble. To alleviate the intense demands that complex decision-making AI puts on processors, Kynapse 5 takes advantage of multi-core and multi-threaded architectures to offload path finding to secondary threads, processors, and SPUs.

With the release of Kynapse 5 also came news that Autodesk would be acquiring Kynogon. According to Jacques Gaubil, co-founder and COO of Kynogon, the company's post-acquisition plans will include the integration of Autodesk's HumanIK run time animation tool. Kynogon will also draw from Autodesk's asset creation experience to create new development tools that incorporate animation, AI, and physics. "We are not

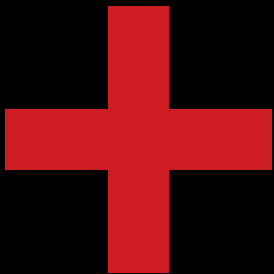
doing plug-ins. We are entering the run-time market," Gaubil said. "Of course we can take advantage of the fact that we have unique access to 3ds Max and Maya. I'm already thinking of some tools that could be integrated into Max or Maya that would give game designers access to our tools directly via the interface they know," he added.

Looking to the future, Gaubil explained how games that employed run time technologies could move away from static, scripted presentations, and become dynamic, unique experiences. "We don't believe that the future will be more polygons. Of course there will be more polygons but the main challenges for the industry will be to provide open terrain, destructible terrain, with a lot of interactivity," he said. "The problem we have is—it's not a technical problem—the problem we have is; are we able to imagine game design that will support that. It's an open story. It can't be linear," he told us.

## NATURALMOTION'S EUPHORIA AND MORPHEME

[www.naturalmotion.com](http://www.naturalmotion.com)

NaturalMotion's Dynamic Motion Synthesis (DMS) technology evolved from university research that utilized adaptive AI to create realistic 3D animation. The



Launching an MMO is a complex process. It requires skill and great fortitude, sprinkled with optimism. Each decision is dependent on the next. Before your MMO hits the crowd, the work begins to make sure your big idea is both well designed and well coded. It also has to be technically capable of coping with several thousands of concurrent players – if not, something that appears to be a minor technical issue in the beginning, can lead to a catastrophe once your game is launched.

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idea was to use AI behaviors to control the muscles of a body, essentially simulating the somatic nervous system to enable more natural movements such as walking, stumbling, or falling than traditional hand animation could provide. Initially this was built in to NaturalMotion's endorphin product and allowed 3D animators to incorporate motion synthesis into their favorite modeling software.

However, the exponential growth in processor power now allows motion synthesis to operate in real-time game environments. "The dream with our product has always been to take it run-time," Torsten Reil, CEO of NaturalMotion told us. "It moves everything onto the CPU, essentially. It uses the computing power of modern hardware to simulate humans." With the release of the company's euphoria: core animation engine, DMS is being used in a number of games, including STAR WARS: THE FORCE UNLEASHED and GRAND THEFT AUTO IV. The technology will also be featured in NaturalMotion's internally developed football game BACKBREAKER.

The engine generates animation on the fly, enabling complex and realistic physical interactions between characters and their environment, the company claims. "It's not something you would

get out of a canned animation. Because it's a fully simulated approach, you don't have to rely on animation that's stored on a hard disk and played back at exactly the same time. You actually have complete interactivity. You can have truly surprising moments in the game. Every time you play it, something different is going to happen," Reil said.

The latest version of morpheme features animation sets that allow the creation of multiple characters or levels of detail as well as inverse kinematics (IK) nodes for a range of common tasks. "The new version has a number of different IK modes. It's not just restricted to blending pre-canned animations. You can also add any kind of procedural animation system into morpheme," Simon Mack, NaturalMotion's head of technology explained. "You can also attach this application to your running game and be able to debug all of your animation system at run time," he told us. Morpheme also features automatic constraint matching for detection of events such as footsteps, a fully scripted user interface, and Unreal Engine 3 integration.

#### NEWTEK'S LIGHTWAVE 3D

[www.newtek.com](http://www.newtek.com)

Although NewTek's 3D tools are known primarily for their use in film and

television, the company has been making inroads with game production as well. Responding to the complex work environment that developers face, NewTek's LightWave 3D package has been updated to include COLLADA, and OBJ I/O format support. Its open SDK also enables developers to write



NaturalMotion's BACKBREAKER will make extensive use of dynamic motion synthesis.

their own importers and bring assets from LightWave directly into their game engines. Those working with mo-cap data can utilize LightWave's FBX scene import and export. Now available in version 9, LightWave 3D version 9.5 is scheduled for an open beta in March.

**A minor issue can turn into a serious nightmare in the end.**



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MICK WEST

## » THE INNER PRODUCT

# INTELLIGENT MISTAKES

## How to incorporate stupidity into your AI code without actually looking stupid

**TWENTY YEARS AGO, I WAS WORKING ON** my first commercial game: STEVE DAVIS WORLD SNOOKER, one of the first snooker/pool games to have an AI opponent. The AI I created was very simple. The computer just picked the highest value ball that could be potted, and then potted it. Since it knew the precise positions of all the balls, it was very easy for it to pot the ball every time. This was fine for the highest level of difficulty, but for easy mode I simply gave the AI a random angular deviation to the shot.

Toward the end of the project, we got some feedback from the client that the AI was "too good." I was puzzled by this and assumed the person wanted the expert mode to be slightly less accurate. So I changed that. But then I heard complaints about the decreased accuracy, and again that the AI was still too good.

Eventually the clients paid a visit to our offices and tried to demonstrate in person what they meant. It gradually came out that they thought the problem was actually with the "easy" mode. They liked that the computer missed a lot of shots, but they thought that the positional play was too good. The computer always seemed to be leaving the white ball in a

convenient position after its shot, either playing for safety or lining up another ball. They wanted that changed.

The problem was, there was no positional play! The eventual position of the white ball was actually completely random. The AI only calculated where the cue ball should hit the object ball in order to make that object ball go into a pocket. It then blindly shot the cue ball toward that point with a speed proportional to the distance needed to travel, scaled by

“AI needs to be more intelligent in order to appear less intelligent.”

the angle, plus some fudge factor. Where the white ball went afterward was never calculated, and it quite often ended up in a pocket.

So why was it a problem? Why did they think the AI was "too good" when it was actually random?

Humans have a tendency to anthropomorphize AI opponents. We think the computer is going through a thought process just like a human would do in a similar situation. When we see the ball end up in an advantageous position, we think the computer must have intended that to happen.

The effect is magnified here by the computer's ability to pot a ball from any position, so for the computer, all positions are equally advantageous. Hence, it can pot ball after ball, without having to worry about positional play. Because sinking a ball on every single shot would be impossible for a human, the player assumes that the computer is using positional play.

### DESIGN OR CODE?

Is this a design problem or a code problem? To a certain extent it depends on the type of game, and to what extent the AI-controlled opponents are intended to directly represent a human in the same situation as the player.

In a head-to-head game such as pool, chess, or poker, the AI decisions are very much determined at a pure code level. In a one-versus-many game, such as an FPS, there is some expectation that your

opponents are generally weaker than you are. After all, you are generally placed in a situation of being one person against countless hordes of bad guys. Other game genres, particularly

racing games, pit you against a field of equal opponents. Here the expectation of realistic AI is somewhere between that of chess and the FPS examples.

The more the computer AI has to mimic the idiosyncrasies of a human player, the more the task falls to the programmer. The vast majority of the AI work in a chess game is handled by programmers. Game designers would focus more on the presentation. In an FPS, the underlying code is generally vastly simpler than chess AI. There is path finding, some state transitions, some goals, and some basic behaviors. The majority of the behavioral content is supplied via the game designers, generally with some form of scripting. The designers will also be responsible for coding in actions, goals, and responses that emulate the idiosyncrasies of human behavior.

### HEADS UP!

In some heads-up games, such as chess and pool, the computer has a huge advantage over the player. Modern

**MICK WEST** was a co-founder of Neversoft Entertainment. He's been in the game industry for 19 years and currently works as a technical consultant. Email him at [mwest@gdmag.com](mailto:mwest@gdmag.com).



chess programs such as FRITZ are vastly stronger than nearly all human players. In pool and snooker games, the computer can be programmed to never miss a shot. However, people want to play against an opponent that is well matched to their skills, and so there are generally levels of AI in the game that the player can choose from.

The simplest way to introduce stupidity into AI is to reduce the amount of computation that it's allowed to perform. Chess AI generally performs billions of calculations when deciding what move to make. The more calculations that are made (and the more time taken), then (generally) the better the computer will play. If you reduce the amount of calculations performed, the computer will be a worse player.

The problem with this approach is that it decreases the realism of the AI player. When you reduce the amount of computation, the AI will begin to make incredibly stupid mistakes—mistakes that are so stupid, no human would ever make them. The artificial nature of the game will then become apparent, which destroys the illusion of playing against a real opponent.

Remember what we are trying to accomplish: We want people to have an enjoyable experience. No matter what the game, we want the players to feel challenged so that when they win, they feel a sense of accomplishment. We want them to feel that they were playing against an opponent who was really trying to beat them.

By reducing the amount of computation, we create an AI opponent that is trying to win, but has been crippled in a way that leads to unrealistic gameplay. But does the player actually care about what is going on under the hood? What if we don't cripple our AI, but instead let it play at full strength, but have the AI deliberately throw the game?

### THROWING THE GAME

In sports, "throwing the game" means one side makes a series of intentional

mistakes that look natural, but result in losing the game. This behavior is rightly vilified by players and fans, as the agreement is that there be a contest between two equal opponents, or at least, two opponents who are trying equally hard to win.

But in computer games, it's impossible to have an equal match. It's humans versus machines. One side has an advantage of being able to perform a billion calculations per second, and the other has the massively parallel human brain. Any parity here is an illusion, and it's that illusion that we seek to improve and maintain via the introduction of intelligent mistakes and artificial stupidity.

The computer has to throw the game in order to make it fun. When you beat the computer, it's an illusion. The computer let you win. We just want it to let you win in a way that feels good.

AI programmers need to get used to this idea. We are manipulating the game, creating artificial stupidity, fake stupidity. But we are not predetermining the outcome of the game. We don't set our AI with the intent to lose the game, but rather to give the human player a reasonable chance of winning. If the human plays poorly, the AI will still win, but the player will at least feel like she came close to beating a strong opponent, and thus feel like playing one more game.

### HIDDEN HANDICAPPING

Computer chess expert Steven Lopez (see Resources) describes how in human versus human chess, it's acceptable for a high-ranking player to give a much lower ranking player an advantage at the start of the game by removing some of his pieces from the board before the game begins. When the game starts, the master player and the novice player are still playing to the height of their abilities, and yet the game is more evenly balanced. The master player does not have to play "stupid" in order to give the novice player a chance.

However, humans playing against a computer do not like to be given an

advantage in this way, and prefer to play the full board against an AI opponent of approximately their skill level.

The programmers of FRITZ hit upon a solution that involved the AI deliberately setting up situations that the human player could exploit (with some thought) that would allow the human to gain a



FRITZ 11 from ChessBase.

positional or piece advantage. Once the human player gained the advantage, the AI would resume trying to win.

At no point here is the AI actually dumbed down. If anything, there is actually quite a bit more computation going on, and certainly more complexity. The goal of the AI has shifted from "win the game" to "act like you are trying to win the game, but allow the human to gain a one-pawn advantage, and then try to win." The AI needs to be more intelligent in order to appear less intelligent.

### POKER AI

When I programmed the AI for Left Field's WORLD SERIES OF POKER, the AI computation was basically the same for each difficulty level. The computer would calculate the odds of winning based on the known cards, and an estimate of the opponent's hand strength based on betting history. The odds would then be used to calculate a rate of return, which

would be used to decide if they would fold, call, or raise.

There were many special case rules and exceptions, but that's the basics. The AI players would all make the same extensive computations, running tens of thousands of simulated hands through an evaluator to calculate the rate of return. After these calculations were performed, only then would the differentiation be performed. At that point, the best players would play their best move, and the weak AI players would make intelligent mistakes.

For weak poker AI, an intelligent mistake consists of figuring out what you should do, and then not doing it, so long as not doing it does not make you look stupid. For example, if the human player just put in a big raise, yet you know there's a 75 percent chance your hand is the best, then an intelligent mistake would be to fold. The odds are the AI would win, yet we are simulating a weak human player, and weak human players often fold to a large raise when they are unclear on their odds. Conversely, weak human players often call when their chances are weak. It's a natural thing to do and allows us to reduce the strength of the AI player, without it looking artificially stupid.

These intelligent mistakes were implemented in a probabilistic manner. The fake-stupid AI would not always fold when the human player seemed to be bluffing—it was just more likely to. This worked very well in the highly random game of poker, because the player could never tell in any individual situation if the AI was actually making a mistake. Since the AI was still performing its full set of millions of calculations, it never made mistakes that were inhumanly stupid, but the layer of artificial stupidity brought on by increased recklessness was enough to even the playing field

and give the weak and average human players an enjoyable game.

### ARTIFICIAL INACCURACY

In pool and in shooters, the computer AI is blessed with an omniscient accuracy. The shooter AI knows down to the billionth of an inch exactly where you are, and could shoot your hat off your head from five miles away. Similarly in pool, the AI knows the position of every ball and can calculate where every ball will end up before it takes a shot.

When I implemented my snooker AI, it could perfectly pot any ball off two cushions, and would almost always get a perfect break of 147 every time it

“To provide an exciting and dynamic game, the AI needs to manipulate the gameplay to create situations that the player can exploit.”

played (except when it potted the white due to its lack of positional play). It was obviously not a fun opponent to play against, so even at the highest levels, the accuracy had to be reduced, and the cushion shots had to be restricted to getting out of snookers.

Simply reducing the accuracy of the AI is not always the best way to improve gameplay. As I found with the “positional play” in snooker, random outcomes that happen to favor the computer are perceived as being intentional. If the ball ends up in a good place, or the poker AI makes a lucky call and wins on the river, it can be perceived as unfair or even cheating.

So instead of reducing the accuracy, I'd suggest, as in chess, we increase the accuracy. In order to provide an exciting and dynamic game, the AI needs to manipulate the gameplay to create situations that the player can exploit. In pool this could mean, instead of blindly taking a shot and not caring

where the cue ball ends up, the AI should deliberately fail to pot the ball and ensure that the cue ball ends up in a place where the player can make a good shot. In a shooter, the enemy aliens should not simply randomly break from cover—they should sometimes break from cover when the player is close to them and panning toward them. They should “accidentally” throw themselves into the line of fire to make the game more interesting.

### LUCK OF THE DRAW

Playing against a perfect opponent is no fun. But playing against a crippled opponent is no fun either. To create more interesting gameplay, we have

to introduce the concepts of artificial stupidity and intelligent mistakes. Intelligent mistakes seem like failings on the part of the AI, but are actually carefully calculated ways of throwing the game that make it more entertaining

for the player. This does not remove the challenge, as the player still has to have a certain level of skill.

For the programmer, adding intelligent mistakes is much more complex than simply reducing the accuracy of the AI, but provides a much more rewarding experience for the player. ❖

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STEVE THEODORE

## PIXEL PUSHER

# THE PLAYER'S HANDBOOK

## Picking your role in *The Games Industry*™

**CONGRATULATIONS! BY PURCHASING** *The Games Industry*™, you've entered a universe of fantastic adventure!

Players in *The Games Industry*™ collaborate to create exciting new worlds, a form of collaborative storytelling that combines the ancient arts of the bards with the most up-to-date developments in rules complexity, arcane technicalities, and perverse randomness. Hopefully, your new purchase will keep you occupied for many years, growing in power, battling monsters, and accumulating treasure. You are guaranteed many a sleepless night in the company of your fellow players. Welcome!

### CREATE YOUR CHARACTER

The first step for new players in *The Games Industry*™ is to create a character. In *The Games Industry*™, your character represents you; he or she forms your alter ego. Some players choose a character exactly like themselves, while others prefer to play a very different role than their real-life selves. Whichever path you choose, be aware that picking a character is of the utmost importance to your "career" in *The Games Industry*™. Other players and the many monsters you encounter in the game will react to you based on which character you

play, or which one they believe you are playing. Be sure to choose one that works well with your instincts and goals.

It's critical to be aware of the strengths and limitations of the different types of characters you encounter if you want to succeed in the game.

New players create a character by choosing from one of several archetypes.



The choice of archetype, in turn helps drive certain career paths. For example, a player who wants to specialize in Game Design might choose to begin his career as an Obsessive Nintendo Fanboy, a choice that would make it difficult to meet members of the opposite sex but which gives him great advantages in areas like the pharmacological uses of mushrooms or reminiscing endlessly about *GOLDENEYE*.

To show you how the choice of archetype can affect your career, take a look at some of the options available to the player who wants to pursue a career in the arts. In *The Games Industry*™, artistic characters have a variety of magical powers, which can be used to enchant players, monsters, and reviewers. Although an artist character can come from any race, gender, or ethnic background, they tend to conform

to one of the following archetypal character-design patterns:

### THE PERFECTIONIST

Perfectionists are a subclass of artists devoted first and foremost to the pursuit of their craft. In *The Games Industry*™ you will often find them toiling away in the wee hours on details that are all but invisible to the average passerby. Though each pixel or polygon seems to be pure overkill, the cumulative effect is one of tremendous magical power. The creations of a true Perfectionist compel the most cynical monsters—even hardened Producers and inscrutable Marketroids—to admiration and awe.

#### STRENGTHS:

*Dedication.* Perfectionists gain +5 for all rolls against artistic skill thanks to their selfless devotion to craft. To gain these bonuses, they practice obsessively even when not being paid. You'll find them thronging the halls of your local art school with greasy sheaves of charcoal drawings tucked under their arms, or worshipfully studying at the feet of the local Animation Mentor. Perfectionists earn double XP for works in traditional media.

*Mystic charm.* At higher levels, the true Perfectionist can hypnotize members of other classes, such as Programmers, into stunned admiration. This power works better when the Perfectionist cultivates an otherworldly air and acts as if every decision were an inspiration from on high instead of a deliberate choice. When the Mystic Charm is active, the Perfectionist can operate with enormous creative freedom. However, if the power is negated (by a Programmer using the Graphics Budget power, for example), Perfectionists may find themselves in a tricky spot. It's also important to

**STEVE THEODORE** has been pushing pixels for more than a dozen years. His credits include *MECH COMMANDER*, *HALF-LIFE*, *TEAM FORTRESS*, and *COUNTER-STRIKE*. He's been a modeler, animator, and technical artist, as well as a frequent speaker at industry conferences. He's currently content-side technical director at Bungie Studios. Email him at [stheodore@gdmag.com](mailto:stheodore@gdmag.com).



remember that other artists are partially immune to this power, and they'll be quick to complain if it's overused.

**WEAKNESSES:**

*Speed.* The heavy armor of dedication that most Perfectionists wear tends to reduce their agility. Without careful attention, the

Perfectionist can easily slide past the point of diminishing returns into an endless cycle of revisions and tweaks that are invisible to others. Players

nearing a milestone must roll a 12 or higher to break the cycle, or suffer 1D6 worth of delays.

*Agility.* The single-minded focus that gives the Perfectionist power can also lead to tunnel vision. Unless carefully played, Perfectionists can endanger themselves by ignoring promising new spells, potions, and magic items later in the game. Perfectionist players must cope with a -2 adjustment for learning new technologies and techniques. If you're playing as a Perfectionist, be sure to guard against this weakness with careful attention to new techniques as well as old standbys.

**STRATEGY:**

Playing a Perfectionist is a difficult game. The dedication that defines this class can get in the way of mundane tasks like scheduling and budgeting, so Perfectionists often find it hard to learn management as leads. Perfectionists can thrive when they are recognized for their talents, either as specialized craftspeople or creative visionaries. In parties where the route to power runs through spreadsheets and meetings, Perfectionists are often unhappy. Perfectionist players need to plan ahead with their colleagues to build a secure and rewarding creative niche.

**THE TINKERER**

Where the Perfectionist character pursues the most exalted forms of art, the Tinkerer archetype enjoys mixing the nitty-gritty of technology with the solemnities of aesthetics. What the Perfectionist hopes to achieve by sheer dedication and relentless practice,

“Tinkerers refuse to accept the status quo. No underused engine feature, no obscure corner of an art package, is too esoteric for the Tinkerer to play with.”

the Tinkerer strives to accomplish by mastering every trick and tool the game allows. Tinkerers are a hybrid class, sharing some characteristics with both Artists and Programmers. This can make for a powerful combination in the hand of a skilled player—or an awkward compromise if played unwisely.

**STRENGTHS:**

*Inventiveness.* Tinkerers refuse to accept the status quo. No underused engine feature, no obscure corner of an art package, is too esoteric for the Tinkerer to play with. Tinkerers gain extensive bonuses for any situation in which a recalcitrant game engine or art tool needs to be manhandled into a job it wasn't intended for. For example, if your party is trying to simulate cloth using only skeletal animations, you'll need a Tinkerer on hand.

*Buffing.* Tinkerers are extremely valuable to the other members of their party when they learn to share the fruits of their curiosity. They give nearby Artists a +1 to Productivity by sharing their technical knowledge. They can also perform spells ranging from simple charms like *Bobo's Magical ScriptSpot* to advanced magic, like homebrewed level editors.

**WEAKNESSES:**

*Hypnotism.* Like monkeys and some kinds of birds, Tinkerers are easily fascinated by shiny objects. When confronted with a new piece of technology, a Tinkerer must roll a saving throw against Focus or lose 1–20 hours of productivity to fiddling around.

*Split loyalties.* As Tinkerers level-up, it becomes harder for them to maintain their dual identities. Above a level 10, the benefits of specializing either on the “artistic” or “technical” sides of the

archetype become much clearer. If you're planning a Tinkerer character, you should think several steps ahead to be sure you end up playing the role you really want—otherwise you may end up as a “Jack of All Trades, Master of None.” Level 10 Tinkerers and above must make a saving roll against Charisma or risk turning into Programmers once and for all.

**THE FOOTSOLDIER**

The stalwart Footsoldier can't always generate the glamour of the Perfectionist or the wizardry of the Tinkerer. Nevertheless, this archetype is the backbone of almost every grouping. No victories can be won without their phenomenal powers of endurance and will to win. Don't make the mistake of defining the Footsoldiers in your group by negatives. They may not be aesthetic or technical superstars, but it is their steadfast dedication to getting things done that turns the tide of many a dire battle. Where the other archetypes define themselves by their skills, Footsoldiers regard discipline as the highest virtue. Give them a mission, and they'll see it through on time and to spec.

**STRENGTHS:**

*Endurance.* Footsoldiers start with a bonus of +6 Endurance. As hardened

veterans, they excel at pacing themselves. They know when to burn the midnight oil and when to save themselves for tomorrow's struggles. However, players should beware of party leaders who use this bonus as an excuse for skimping on support. A Footsoldier may be willing to put in tedious hours of repetitive work to help the team, but that's no excuse for not providing the magic items that would make handling the grunt work easier and letting them focus on the more artistic tasks they love.

*Leadership.* The experience that Footsoldiers accumulate on the front lines gives them important leadership

bonuses as they rise in level. A ruthless commitment to finishing the job means that it's often the Footsoldiers who are tapped for commanding roles later in the game. Other classes count on Footsoldiers to keep Tinkerers and Perfectionists focused on the enemy and train new recruits in the hard ways of discipline. Footsoldiers gain +1 on rolls for Promotions for every two levels they earn.

“ Without careful attention, the Perfectionist can easily slide past the point of diminishing returns into an endless cycle of revisions and tweaks that are invisible to others. ”

**WEAKNESSES:**

*(Minimal.)* The Footsoldier is well balanced. Lacking some of the flashy powers sported by other characters, they lack many of their weaknesses as well. Apart from a small -1 deduction for Charisma, the Footsoldier is well defended on all sides.

**STRATEGY:**

The biggest risk the Footsoldier runs is that of being under-appreciated. Although they are the indispensable vanguard of any artistic clan, they are sometimes slighted when it's time to pass out the booty. Magic items, like the +5 *Killer Portfolio* or *Schlieffer's Amazing Rig* tend to wind up with the more attention-grabbing members of the party. The loyal Footsoldiers who do much of the actual work are sometimes forgotten. Footsoldier players need to remind their leaders exactly how much value they bring to the party and to establish reputations as the indispensable and reliable pillars of the team that they are if they want to compete with their flashier brethren.

The most recent edition of *The Games Industry™* rule set introduces another important challenge for the Footsoldier. With the new expansion pack, *Games Industry: Foreign Lands*, many teams have tried to replace their Footsoldiers

with non-player characters (NPCs) in order to keep more of the treasure and XP for themselves. If you're playing a Footsoldier, you'll need to find roles

that are safe from NPC takeover. You can't always count on loyalty from your leaders in *The Games Industry™*, so look out for yourself! As you'll never be as cheap as an NPC, your best defense is to concentrate on making yourself more valuable to your teammates instead.

**ADDITIONAL NOTES FOR PLAYERS**

The complexity of the rules of this game reflect the many play styles you'll encounter in *The Games Industry™*. Once you've entered the rich fantasy life of *The Games Industry™*, you'll find it hard to go back to real life. Particularly in the six months or so before shipping.

*Disclaimer:* New players should note this set does not include everything you need to play. You'll also need the following: A copy of Photoshop, proof of citizenship or an H-1 B visa, the *Employees Handbook (second edition rules)*, Red Bull Energy Drink, a free Nvidia t-shirt, and internet access. *The Games Industry™* features an ever-expanding list of accessories and expansion kits. See your local game store for details. ❖

In Memoriam, E. Gary Gygax (1938–2008)





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SOREN JOHNSON

## DESIGN OF THE TIMES

# SEVEN DEADLY STRATEGY SINS

### AMONGST COMPUTER GAMES, THE

strategy genre is one of the oldest and proudest, with a strong tradition running from M.U.L.E., to CIVILIZATION, to STARCRAFT, and beyond. Nonetheless, certain design mistakes are made over and over again. Here are seven of the most common:

#### 1. TOO MUCH SCRIPTING

Strategy games have a direct lineage from board games, and the fun of playing the latter comes from understanding the rules and mechanics of the game world and then making decisions that have consequence within that world. Computerized strategy games allow a single player to experience this same world on his or her own. At some point, however, strategy developers began to create lengthy, scripted scenarios as the single-player portion of their games. [Contrarily, the recent WORLD IN CONFLICT shipped without a single-player skirmish mode altogether.] These scenarios have a peculiar feeling—they use some of the same rules as the core game while often violating others.

The AI takes action depending not on its own development rate or strategic priorities but on whether the human has hit certain triggers. In many scenarios the human cannot even lose because when defeat approaches, the script will freeze the AI and starting pumping in free units for the player. Further, these scenarios are often built around specific objectives to achieve, such as destroying a specific structure or capturing a single

point. This artificial environment takes decision-making away from the player. Not only is there only one path to victory, but the player's performance along that path may not even matter. Games without interesting decisions get boring quickly.

Fortunately, some recent strategy games, such as SINS OF A SOLAR EMPIRE and ARMAGEDDON EMPIRES, have returned to open-world, random-map gameplay—without pre-set objectives or artificial triggers—and are reminding us of the joy of cohesive and consistent strategy games.

#### 2. BLACK BOX MECHANICS

Sometime during the late-90's, around when BLACK & WHITE was being developed, the concept of an interface-less game came into vogue. The idea was that interfaces were holding games back from larger, more mainstream audiences. Ever since then, I have noticed a discernible trend to hide game mechanics from the player. AGE OF KINGS shipped in 1999 with an incredible reference card listing every cost, value, and modifier in the game. For a modern RTS, however, it's unusual if the manual actually contains numbers.

I want to emphasize that the answer here is not to bathe the players in complicated mathematics in the name of transparency. Instead, designers should think of their interfaces as having two levels: a teaching level and a reference level. The teaching level focuses on first-time players who need to know the basics, like how to build a tank and go kill the bad guys. The reference level should answer any question the player can think of about how a game mechanic works. It is perfectly fine, by the way, to put this info inside of a separate in-game resource, like the *Civilopedia* in the CIVILIZATION series.

RISE OF LEGENDS implemented an interesting version of this two-interface idea. Most of the popup help in the game had an "advanced" mode that you could

unlock by holding down a key, giving you significantly more details about the game's underlying mechanics.

#### 3. TOO MUCH STUFF

The temptation to pile extra units and buildings and whatnot onto to an already complete design is strong. I have seen many developers describe games as simply a collection of stuff ("18 Weapons! 68 Monsters! 29 Levels!"). This approach is wrong-headed. A game design is a collection of interesting decisions, and the "stuff" in the game is there not just to fill space but to let you execute decisions. Games can provide too few options for the player but—more commonly—games provide too many.

How many is just right? Obviously, there is no magic number, but it is possible to come up with a good rule-of-thumb for how many different options a player can keep in his or her mind before everything turns to mush. Blizzard uses the number 12 to make sure their RTS games don't get too complex. STARCRAFT averaged 12 units per side. So did WARCRAFT 3 (not counting HEROES). And you can bet that STARCRAFT 2 is going to be in that neighborhood as well. In fact, Blizzard has already announced that for STARCRAFT 2, the developers will be removing some of the old units to make room for the new ones. Players must be able to mentally track their in-game options at one time, and putting too many choices on the table makes it impossible to understand the possibility space.

#### 4. LIMITED PLAY VARIETY

No matter how good your game is, it is going to get stale after awhile. It's unfortunate when a great game doesn't take the few steps necessary so that players can change the settings to create alternate play experiences. COMPANY OF HEROES is an incredible tactical RTS; a watershed moment for the genre—but the game allows neither Axis vs. Axis battles nor matches of more than two

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teams. This design choice may fit the universe of WWII, but it significantly reduced the game's play variety.

An example of an RTS that got this right is the AGE OF EMPIRES series. Not only could you mix-and-match any combination of civilizations and players and teams, but you could also design your own map scripts. I remember one interesting AGE OF KINGS map that had almost no wood but tons of stone and gold, which turned the game's economy upside down. The game even allowed multiple players to control a single civilization (one could control the military, the other the economy, for example).

Thus, I've played 2-vs-3 games of AOK where the side with two civilizations was actually controlled by four players (and, in fact, handily won the game!). These simple variations probably doubled the life-span of AOK among my group of friends. Significantly, these options should be orthogonal to the game's core mechanics—they need to add variety without adding complexity.

## 5. LOCKED CODE/DATA

Protecting your code and data is a very natural instinct—after all, you may have spent years working on the project, developing unique features, pushing the boundaries of the genre. Giving away the innards of your game is a hard step for many developers, especially executives, to take.

Nonetheless, we released the game/AI source code for CIVILIZATION 4 shortly after shipping, and—so far—the results have been fantastic. Three fan-made mods were included in the game's second expansion pack, BEYOND THE SWORD—Derek Paxton's FALL FROM HEAVEN: AGE OF ICE, Gabriele Trovato's RHYE'S AND FALL OF CIVILIZATION, and Dale Kent's WWII: THE ROAD TO WAR—and so far, these scenarios have been heralded as one of the pack's strongest features. These mods would have been nowhere near as deep or compelling (or even possible) if we had not released our source code.

I should specify that for many PC developers, I'm preaching to the choir, so I'd like to reiterate that I am calling out strategy games. For whatever reason (perhaps the lack of a pioneering developer like id Software?), strategy

developers have been much more closed off to modding than their shooter and RPG brethren. There are exceptions, like Blizzard's fantastic scenario editor for WARCRAFT 3, but by and large, strategy modders do not have many places to turn, which was one reason we felt compelled to focus on modding for CIVILIZATION 4. Giving stuff away can feel good. It should also feel smart.

## 6. ANTI-PIRACY PARANOIA

The damage that piracy does to our industry is impossible to calculate but also impossible to ignore. Few company heads can be as brave as Stardock's Brad Wardell, who chose to leave out copy protection altogether for the GALACTIC CIVILIZATION series. (The company encourages paying customers by providing online updates to players with legitimate serial numbers.)

Having some sort of mechanism to stop casual piracy is a given in the industry, but what is not a given are the hoops companies will make their customers jump through just to be able to start the game. The most important question to ask is "will this added security layer actually increase our sales?" A good place to be lenient, for example, is with local multiplayer games—in other words, can players without the CD join a multiplayer game hosted by a legitimate copy?

STARCRAFT let you "spawn" extra copies of the game that could only join local multiplayer games. Allowing unlimited LAN play was our unofficial policy for CIVILIZATION 4 as well. The game does a disk check when opening the executable but not when you actually launch the game; thus, a group of four friends could just pass one disk around for local multiplayer games.

We do not believe players are willing to buy extra discs just for LAN parties, which are rare events. However, we would love for new players to be introduced to the game in these environments, encouraged by their friends who are already fans. At some point, they are going to want to try single-player—in which case, it is time for a trip down to the local retailer to buy their own copy.

## 7. PUTTING STORY IN THE WRONG PLACES

Story and games have a checkered history. Too many have suffered from boring cut scenes, stereotyped characters, and plots that take control away from the player. Especially problematic are games that don't let the



Blizzard's upcoming STARCRAFT 2—will it stick to magic number 12?

player fast-forward through cringe-worthy dialogue. The worst offense is when a story gets stuck somewhere it really doesn't belong, like in a strategy game.

After all, strategy games are the original games. Humans first discovered gameplay with backgammon and chess and go; it's a noble tradition. The "story" in a strategy game is the game itself. Picking a specific example, how much better of a game would RISE OF LEGENDS have been if Big Huge Games had given up on creating a story-based campaign and instead iterated on the excellent turn-based "Conquer the World" strategy layer from RISE OF NATIONS?

Ironically, the campaign mode was my favorite way to play ROL. I loved that you could only acquire technologies and advanced units on the strategic map between missions, which helped simplify the core RTS game. I enjoyed the campaign in spite of the story, not because of it.

The key point here is that, for the sake of chasing a story, Big Huge Games missed a big opportunity to match a great core RTS game with a simple, overarching strategy layer that could be infinitely replayable. Big Huge Games is not alone; almost every other RTS developer seems to be falling into the same trap, and it is time for this trend to stop. ❖



JESSE HARLIN

## » AURAL FIXATION

# TOOLS OF THE TRADE

## The Imperial Palette

**FEW FRANCHISES IN THE WORLDS OF** film and games have sounds more iconic than those of *Star Wars*. Ben Burtt's sound design for the original films relied heavily on his portable Nagra recorder, an ARP 2600 synthesizer, and creatively processing myriad human and animal vocalizations. Thirty-one years on, this galaxy far, far away is still vibrant with new stories, new characters, and new locations—all of which need new sounds.

In 2008, analog tape is a thing of the past, and analog synthesizers have been replaced by soft synth plug-ins. In order to get a sense of what is at the core of the *Star Wars* sound palette today, I asked my coworkers in the audio team behind *STAR*

*WARS: THE FORCE UNLEASHED*—audio lead David Collins and sound designers Brian Tibbetts and Tom Bible—to share with me some of their favorite tools used to score Jedi, Jawas, and the Junk Titans of Raxus Prime.

### A NEW DIGITAL HOPE

With an ever-expanding galaxy demanding sonic attention, the sound designers of *STAR WARS: THE FORCE UNLEASHED* have fully embraced the tools of the digital age. Most of these tools are software-centric. Besides mainstays like Pro Tools, Peak, and Sound Forge, the team also uses a variety of other digital audio workstations. David Collins likes to use Logic Pro because of the EXS-24 Software Sampler bundled with Logic out of the box. "I use the EXS-24 like Ben Burtt used a Synclavier," says Collins. For the jungle-dwelling Felucian

warriors, Collins "designed dozens of vocalizations, loaded them all into the EXS-24, and literally played the sounds back like sentences."

Tom Bible, on the other hand, is a big fan of Sony Vegas. "I do most of my sound design in Vegas these days," reveals Bible. "I can edit nondestructively. So if I need more variations on a sound I've already designed, I can go back to the session and create new sounds using the same palette easily."

Many of the new sounds come from experimenting with combinations of soft synth plug-ins. Brian Tibbetts is a devoted fan of both U&I Software's Metasynth and the Access Virus Indigo TDM plug-in for Pro Tools. However, despite starting from a purely synthesized sound source, there's a fine aesthetic line to which the designers adhere. "It's all about keeping the sci-fi weirdness under control," says Tibbetts. "We strive to keep it subtle, especially for assets the player will hear frequently. Too *Star Trek*- or *Doctor Who*-sounding is always a bad thing in the world of *Star Wars*."

### RETURN OF THE HYPERCARDIOID

Much like Ben Burtt's work, there is still a hefty amount of design work that comes from manipulating source recordings. From hand-cutting individual droid servo motors into cutscenes to fleshing out a palette of destructive Force power sounds, sound design elements come from a wide variety of sources and go through a wide variety of processes before they end up in-game. For David Collins, one of the most valuable tools in his arsenal is Serato's Pitch 'n Time Pro. According to Collins, "Pitch 'n Time is a fantastic plug-in for pitch shifting, crazy pitch bends over time, and time stretching. It's all about chasing the sound that I'm imagining in my head, and this is a valuable tool for sculpting how a sound plays back."

Capturing source sounds is a different matter entirely. Many of the assets from

the original *Star Wars* films are saturated with analog tape hiss, audible edit points, and occasional distortion. All of the new assets designed by THE FORCE UNLEASHED audio team, on the other hand, are being recorded, manipulated, and mixed digitally.

As the name implies, the game is focused on the destructive potential of The Force. As such, Tom Bible has spent much of his design work infusing force powers with jet fly-bys, explosions, and thunder. "In order for a sound to fit into a sci-fi or fantasy world, it needs to have some sort of 'realness' to it in a way that synthesized sounds don't," explains Bible. "I find that elements of these types of sounds, when combined with the less realistic synth sounds, add realism and size to the new sound." It was this need for realistic source material that led Bible and sound assistant Jason Clark out onto the roof of LucasArts' San Francisco campus in late August to record close proximity pass-bys of the US Navy's Blue Angel stunt pilots as they rehearsed for a Labor Day air show. Accompanying Bible and Clark was the audio department's Fostex FR-2 field recorder and a Sennheiser MKH418-S shotgun microphone and windscreen.

When speaking of microphones, Collins reminds me that "great microphones capture great sounds in the studio," a rule the audio designers adhered to in all situations. Throughout the project, the team used a suite of Neumann U 87s, M 149s, and TLM 170s in order to record everything from Tibetan prayer bowls, to droid body falls, to the performances of the game's actors.

While the tools have changed, the principles behind designing sound for a space opera remain the same. By approaching modern audio technology from the same mindset Ben Burtt used to score the original films, the current designers of *Star Wars* audio are ensuring that their new work can fit comfortably alongside a canon of 30-year-old laser blasts and droid chirps. ❖



STAR WARS: THE FORCE UNLEASHED.

JESSE HARLIN has been composing music for games since 1999. He is currently the staff composer for LucasArts. You can email him at [jharlin@gdmag.com](mailto:jharlin@gdmag.com).



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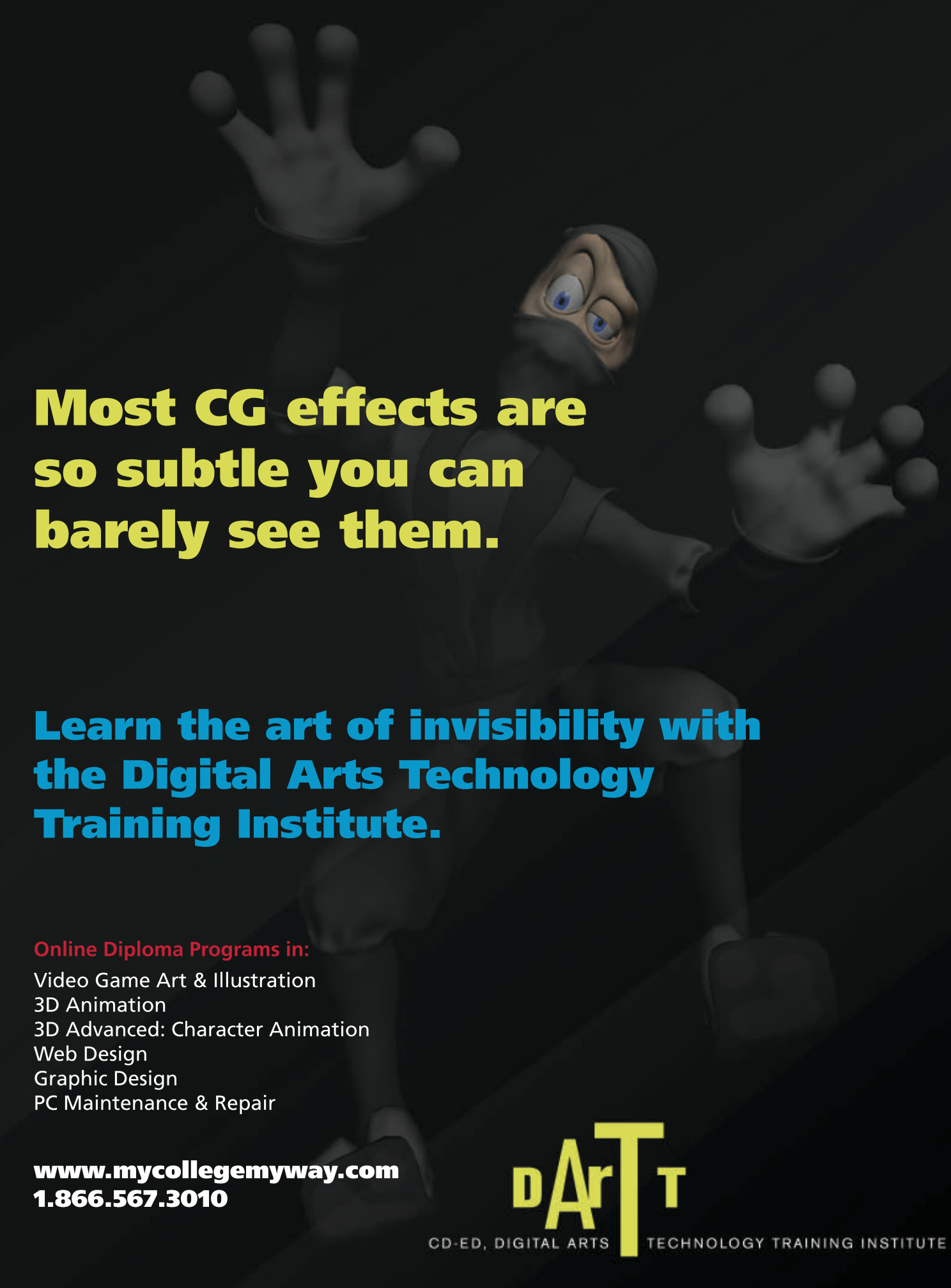
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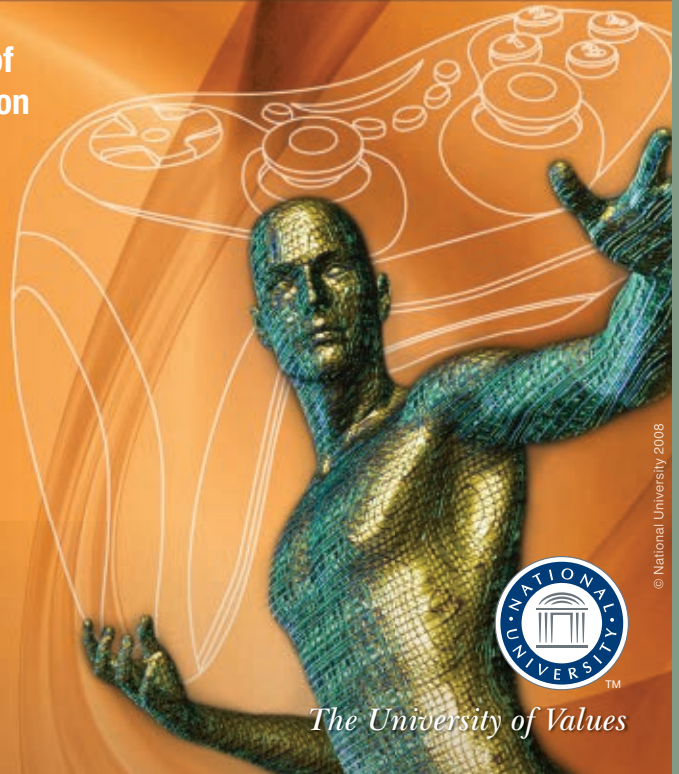
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MORRIS OLMSTED

❖ BROADSIDE

# A CALL FOR STANDARDIZED JOB TITLES

## Interviewing for a job as a "technical artist?"

**WHY DOES THE VIDEO GAME INDUSTRY** have so much trouble with job titles? I mean titles like lead, director, and technical artist. It seems that every time I find my friends or myself in a job search, we have to drudge through the tangled web of X company calling this set of responsibilities this title while Y company calls the same job something else. It's a scary enough problem to job hunt, but to also know how to present yourself to the new company is downright impossible.

What is it about the video game industry that makes it so hard to standardize titles and responsibilities? To make matters worse, as some companies begin to inherit the titles and staff from the movie industry, we are also seeing the introduction of movie and other entertainment industry titles to boot. While this would normally be a good thing, in the current "do it anyway you want" industry that is games, this simply adds to the confusion.

For instance, a technical artist (TA) in one studio is called a technical director (TD) in another. And to add insult to

injury within that field, there are major differences in the expected abilities and responsibilities of a person.

This non-standardization seems to be rampant on all levels of gaming positions. This makes it more important than ever to have a contact at a desired studio or a helpful recruiting manager or headhunter to present you with the job that best fits you and how you should apply for it.

### ROLE CALL

Some studios only call someone a TA if they can set-up character rigs and assist in animation. Still others want the addition of also being able to edit and manufacture shaders. Others want you to be able to be a part of an art team and still others think you fall under different departments. Multiple studios that I contacted refused to talk unless I presented a demo reel.

While I don't disagree with their thinking, as I have interviewed plenty of potential TAs myself, it is hard when you haven't done any art since you became a TA. Had they asked me for a demo reel showing my tools in a working production environment I would understand, but since I was applying as a TA, which is technically under the art department, I had to present an art demo reel. Yet none of these requirements are wrong because each studio, and game for that matter, has unique needs and has a unique team that a TA would fit into.

### TOO BIG FOR ITS BRITCHES

I believe that some of this confusion is due to simple growing pains of our industry. These are made more evident by the lack of standardization that

frustrates job searchers and employers alike. It's about time for the game industry to band together and enforce standard job titles similar to what you see in the film industry.

I am not saying that other industries don't have a similar set of issues with job titles—only that this could be done better in ours. Just think how nice it would be to have conversations with other studios about a job position knowing that if you're applying for a technical animator position, the job would have the same responsibilities at any number of studios you may apply to. You would know what you needed to prepare, and how to present it.

For this to work, all game studios and the community as a whole would have to embrace this decision. This will not work in any way if some companies adopt this while others don't. If you look at the jobs section at Gamasutra.com, you will find that most companies are already approaching standard naming for game job positions. But while many studios do, the rest of the industry has yet to adopt a standard.

### STANDARDIZE TO MODERNIZE

In the end, it really is up to each studio to do what is best for them and their situation. This cannot change or we lose the individuality that drives innovation and uniqueness of games. However, just like in the movie industry, if efforts are made to standardize job titles, it will become easier for companies to hire the right people, and for potential employees to properly present themselves. In the end, isn't that what both parties want? ❖

**MORRIS OLMSTED** is a senior technical artist at *BottleRocket Entertainment*. Previously, he was a lead technical artist at *Concrete Games*, and a technical artist at *Rockstar San Diego*. Email him at [molmsted@dmag.com](mailto:molmsted@dmag.com).

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