

## Immune Attack

Using a 3<sup>rd</sup> Person Shooter to Teach Molecular Biology, and Other New Ways to Present Data and Build an Audience for It

**Melanie A. Stegman, Ph.D.**

Director,

Learning Technologies Program  
Federation of American Scientists

[FAS.org/blog/LearningTech](http://FAS.org/blog/LearningTech)  
[WWW.FAS.org/programs/LTP](http://WWW.FAS.org/programs/LTP)



National Institute of  
Allergy and Infectious Diseases

Immune Attack

...by the Federation of American Scientists

Watch our game trailer at [www.immuneattack.org](http://www.immuneattack.org)

## Outline

FAS, Immune Attack, and Learning Technology Policy

Digital Promise

Department of Education Technology Plan

STEM Video Game Challenge(s)

Games teach, games make us aware,  
games keep us on websites, interacting with data longer

Games for Change

Salubrious Nation

Immune Attack

How do I make a game to teach?

Get an expert on your team.

Plan for a long process.

Learn to speak game.

## FAS Report on Games in Learning

### 6 Roadmaps + Executive Summary

- Instructional Design
- Question Generation & Answering Systems
- Simulations and Exploration Environments
- Learning Modeling & Assessment
- Building & Maintaining Learning Systems
- Games for Learning

### Multi-disciplinary, multi-year effort

- Input from over 100 learning science and computer/information science researchers from academia, industry, Department of Defense...
- 3 multi-day workshops
- Numerous interviews
- Detailed description of research priorities, R&D chronology, and metrics

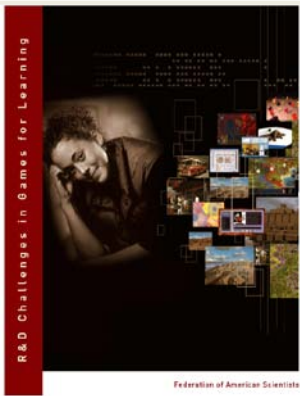
R&D Challenges in Games for Learning



Federation of American Scientists

## FAS Report on Games in Learning 2005

[http://www.fas.org/programs/ltp/policy\\_and\\_publications/summit/index.html](http://www.fas.org/programs/ltp/policy_and_publications/summit/index.html)



## National Academies of Science 2009

Learning Science Through Computer Games and Simulations

[http://www.nap.edu/catalog.php?record\\_id=13078](http://www.nap.edu/catalog.php?record_id=13078)

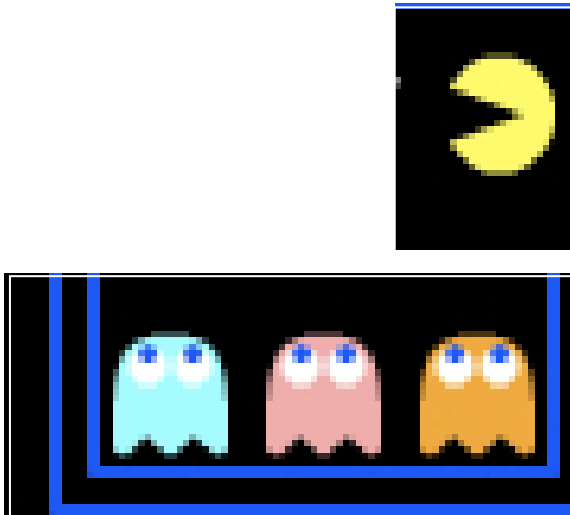


Michelle Obama, Healthy Apps for Kids, Barack Obama, STEM Game challenge,  
Department of Education, Education Technology Plan, DigitalPromise.org  
Games for Health, Global Game Jams, Serious Games Summit at GDC,  
Rice, MIT, NYU, GT, GMU and many other Learning Game Development Graduate Programs

<http://www.fas.org/blog/learningtech>

[MelanieAnnS on Twitter](#)

## How do games teach us?



You know these guys  
You know what they do  
You know how they relate to each other  
You know what regulates their interactions

...



*You know the answer to all these questions:*

- Which one is Pacman?
- What does Pacman do?
- How does he do it?
- Who are the ghosts?
- What do they do?
- What do they do to Pacman?
- What does Pacman do to them?
- Is their relationship static?
- What causes changes in their relationship?
- Does Pacman move randomly?
- Do the other guys move randomly?

*"The activities of the ghosts are regulated in a contact dependent manner by the big pellets and this changes the effect Pac-man has on the ghosts."*

In biochemical language.

You would not be intimidated if your teacher said class was about these guys, if you saw them in the newspaper, or at a museum...

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[games4change.org](http://games4change.org)

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Get an expert on your team.

Plan for a long process.

Learn to speak game.

Game format changes how people interact with data

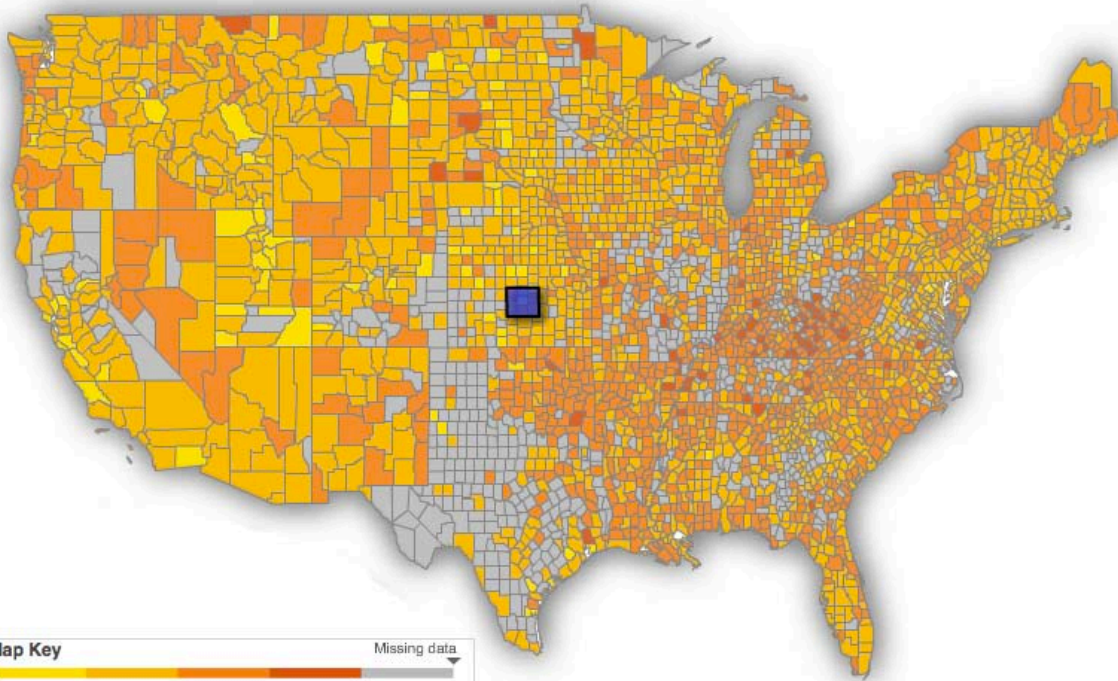
## Salubrious Nation: a game-y look at U.S. health ?

 **Level (1 / 8)**  
Adult Smoking  
(Percentage rate)

Guess the health parameters for **Ellsworth, KS**. Hover your mouse over a county for demographic hints.

Guess:

Your Score: 0  
High Score: 86



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Fellow, Postdoc  
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[www.nickdiakopoulos.com](http://www.nickdiakopoulos.com)

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## Outline: How do I make a game to teach?

Examples from Immune Attack production

**Get an expert on your team.**

A few hours with a “subject Matter Expert” is not enough

High a post doc:

Very successful post docs are underpaid with extremely poor (academic) job prospects

**Plan for a long process.**

“A game is never done, it is just shipped.”

Immune Attack 1 is a beta version. A few more cycles of iteration –just for user interface issues– would have made it 1000% more popular.

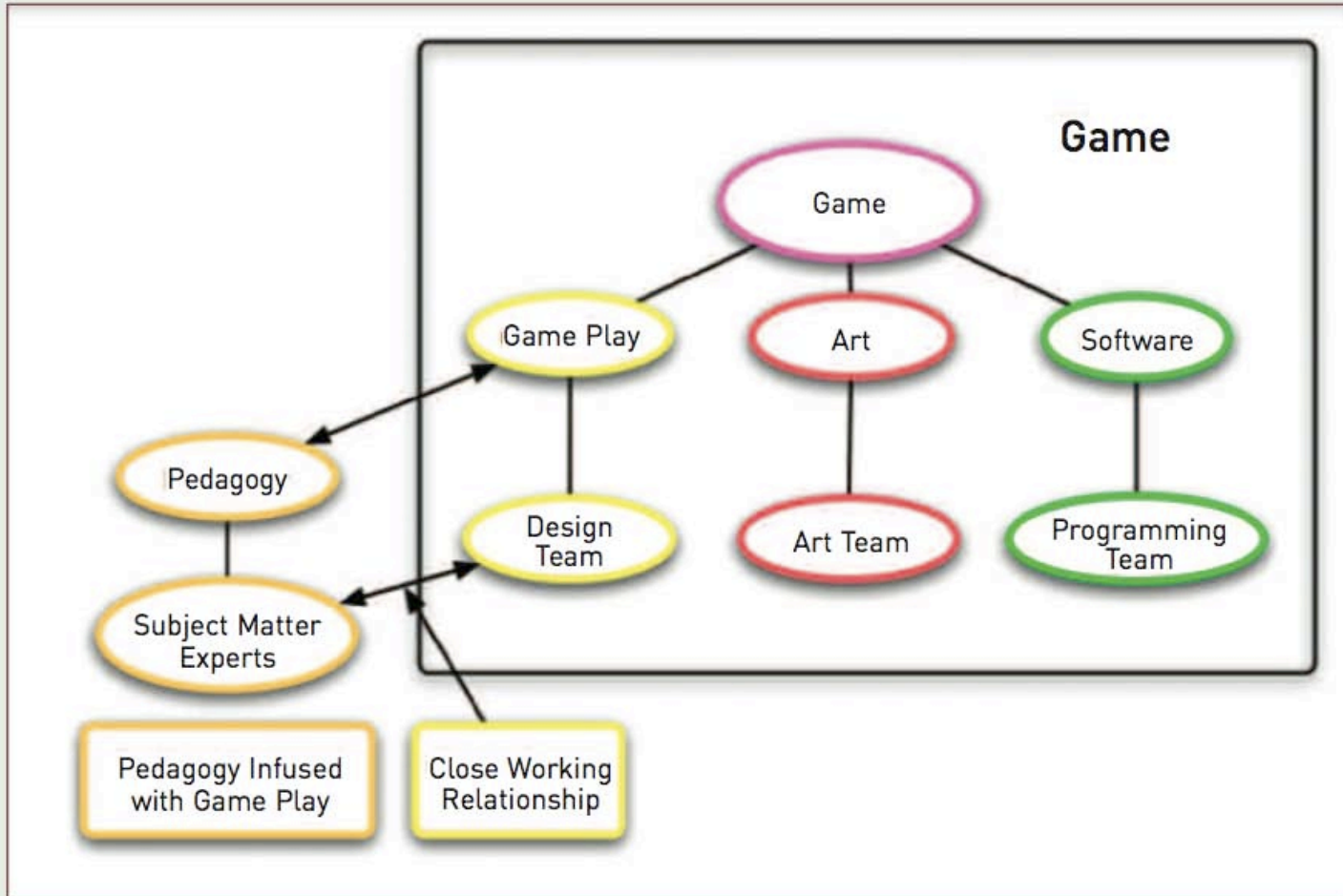
**Learn to speak game.**

FPS, 3PS, TD, RTS, RPC,

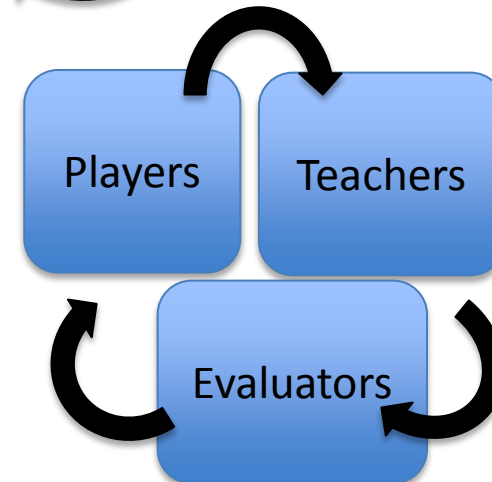
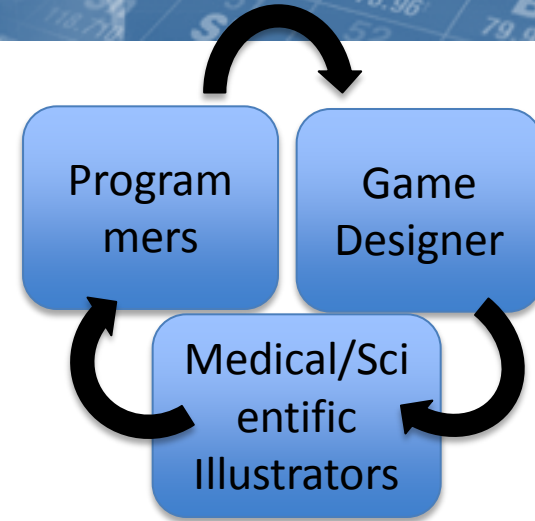
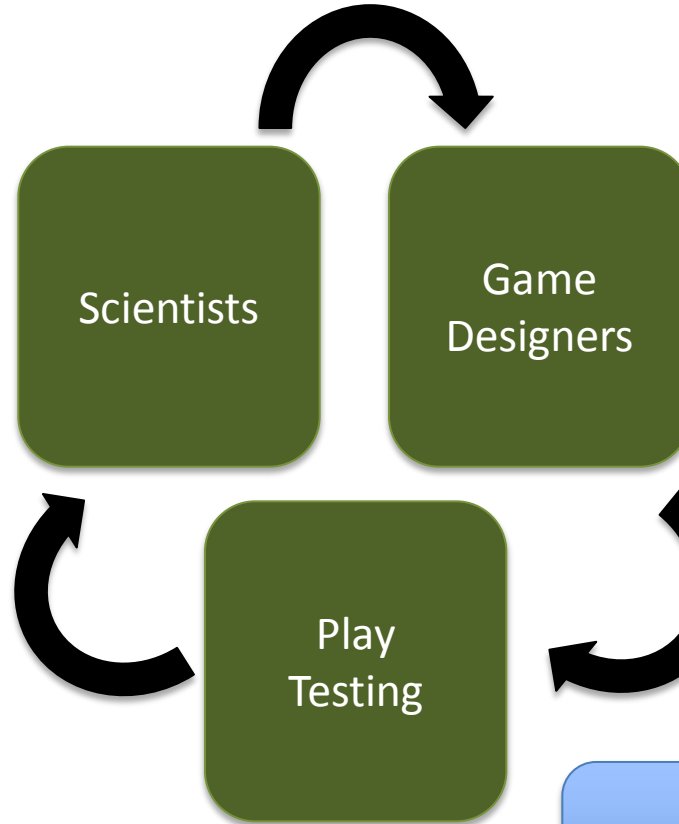
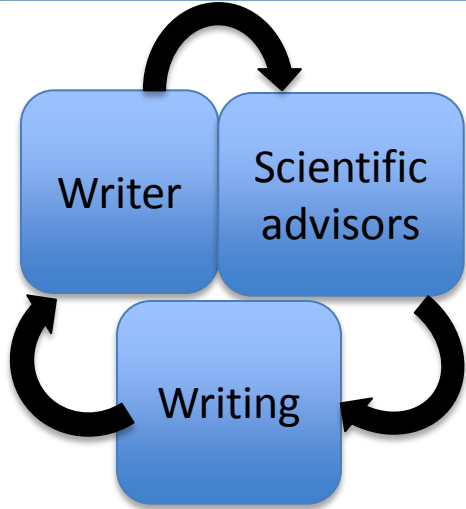
Make the game mechanic match your learning objectives

## Sample Educational Games Development Team

*(Courtesy of Michael Zyda, University of Southern California)*



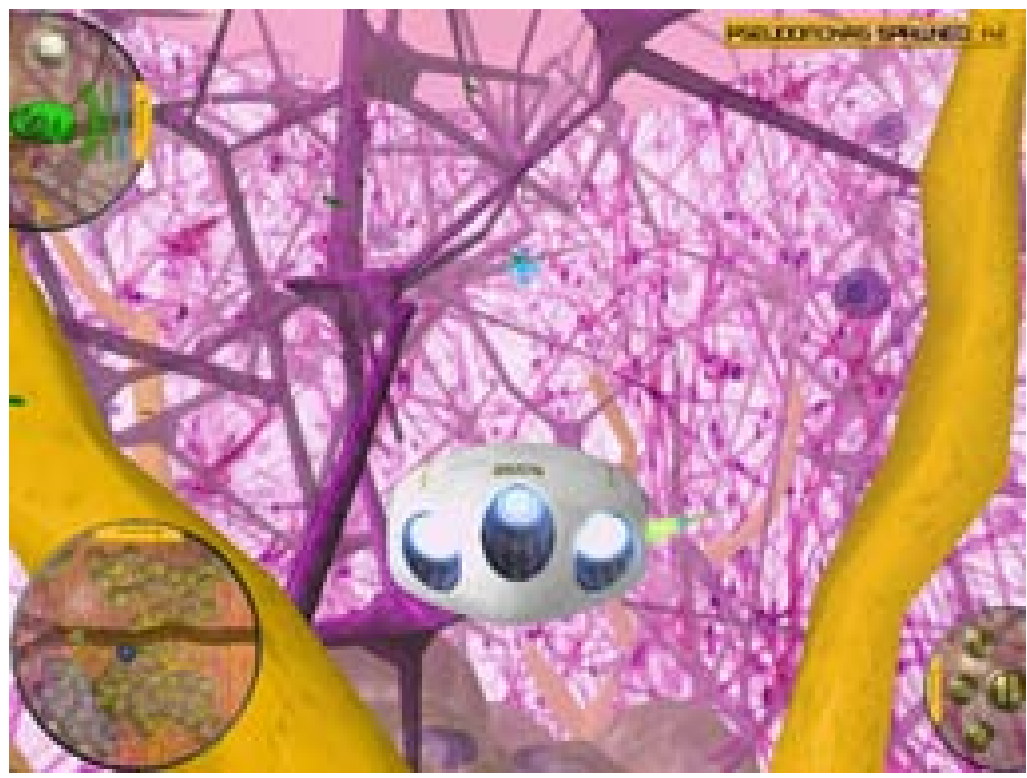
# FAS



Is it fun?  
Is it accurate?  
Does it teach what we intended it to teach?  
Is what we intend to teach useful to anyone?  
Who will pay for this?

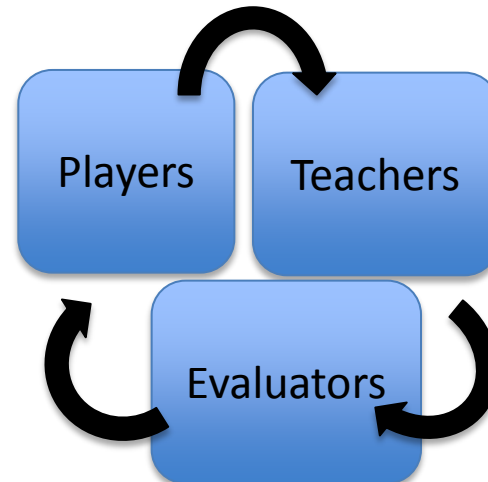
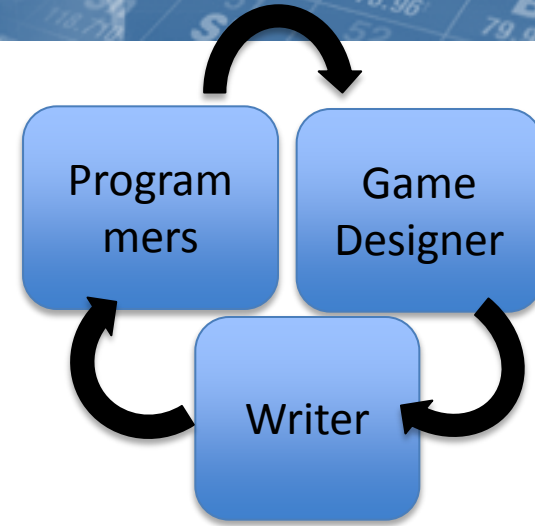
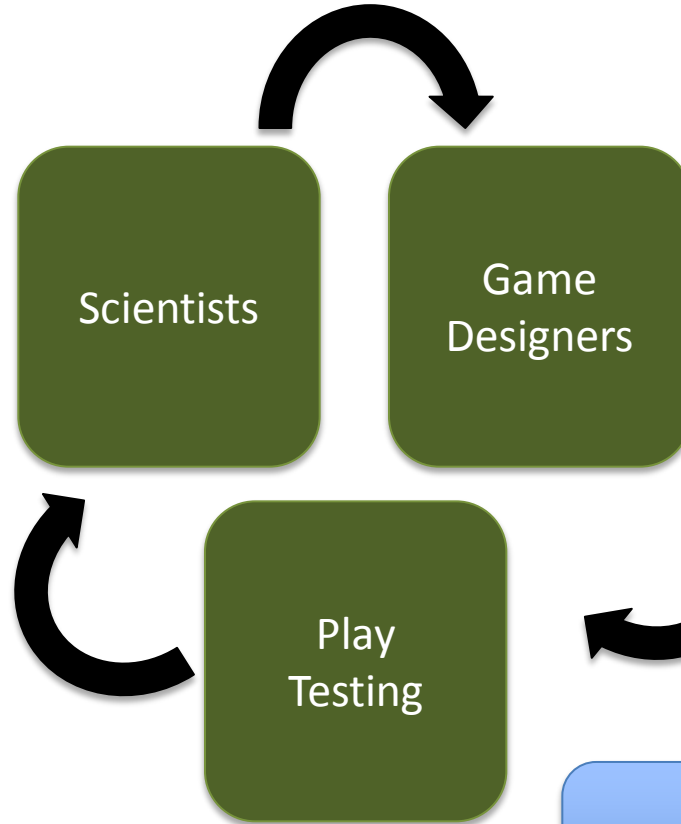
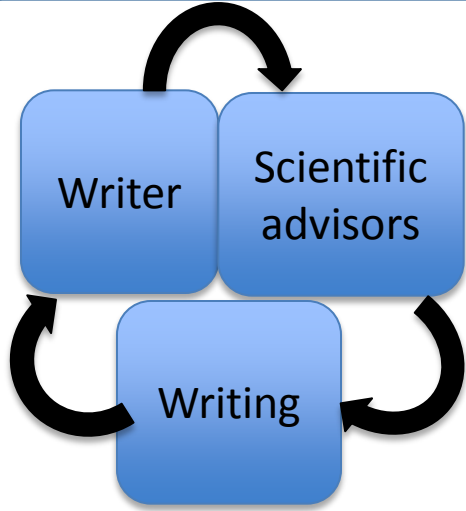


Play testing with target audience revealed that searching for bacteria in connective tissue was too hard



Resolving the issue requires scientists' input.... Or else you get bacteria that make noise. Close working relationship!

# FAS



What do we want to teach?  
How will we teach it?  
Create a draft = First Playable or paper version  
Is it fun?  
Is it accurate?  
Does it teach what we intended it to teach?  
Is what we intend to teach useful to anyone?  
Who will pay for this?

# Tower Defense Game: Fun, strategic, easy to start, challenging to finish



Desktop Tower Defense at Kongregate.com

## Castle Defense Game: Small but important differences from the TD



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