Using Games in Education: A Pragmatic Approach

Ruben R. Puentedura, Ph.D.

Social	Mobility	Visualization	Storytelling	Gaming
200,000 years	70,000 years	40,000 years	17,000 years	8,000 years

Ruben R. Puentedura, “Technology In Education: The First 200,000 Years” *The NMC Perspective Series: Ideas that Matter*. NMC Summer Conference, 2012.

Formal Definition of **Play** (Salen & Zimmerman)

"Play is free movement within a more rigid structure."

Katie Salen and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. The MIT Press, 2003.

Formal Definition of **Game** (Salen & Zimmerman)

"A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome."

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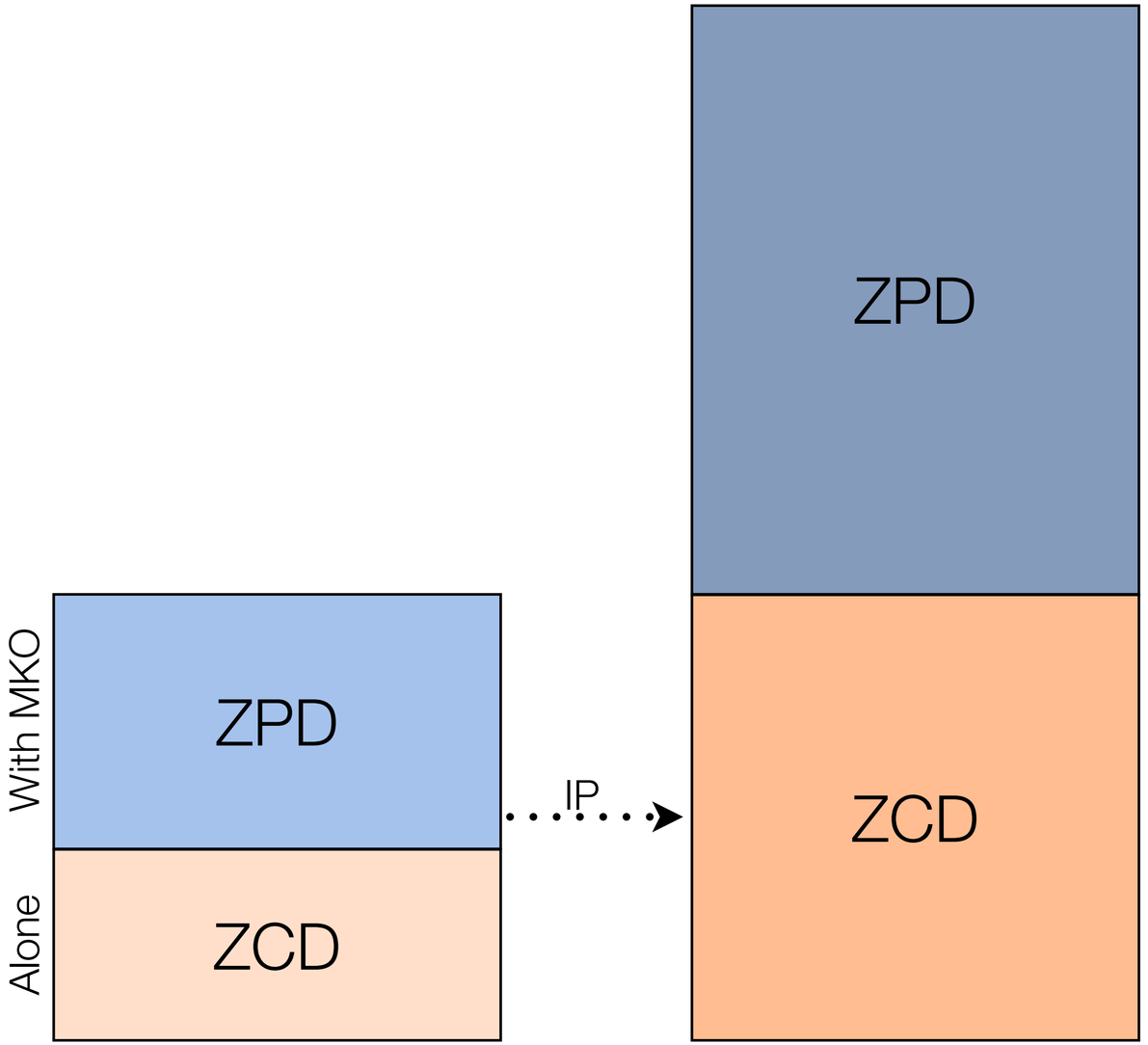
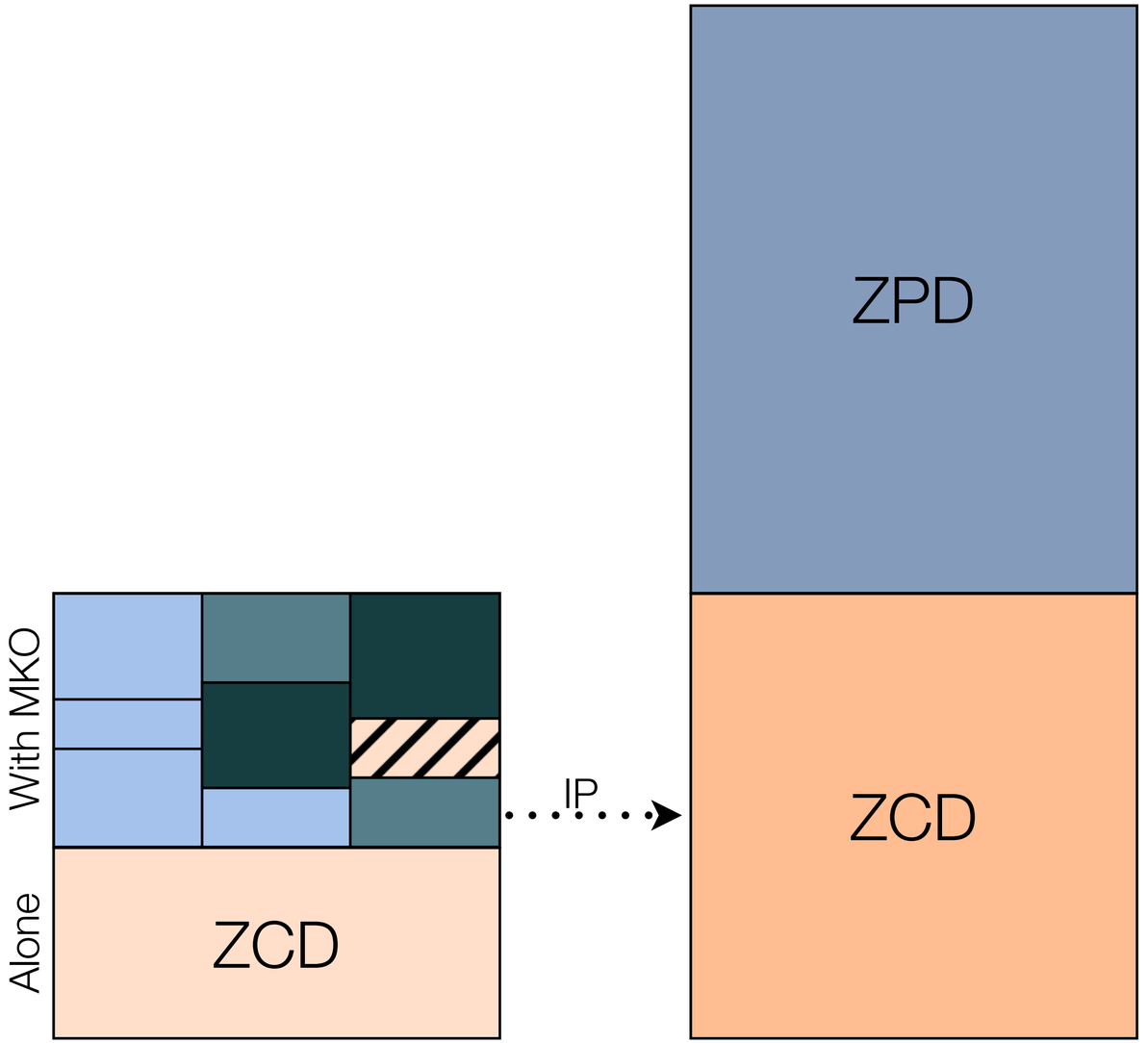
Working Definition of **Sandbox** (Puentedura)

"A sandbox is the result of relaxing one or more of the definitional aspects of a game."



Lev Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press. (1978)



Galperin, P.Ia. “Stage by Stage formation as a method of psychological investigation”. *Journal of Russian and East European Psychology, 30*(4), 61-80 (1992)
Van Geert, Paul. "Vygotsky’s dynamic systems." *Lev Vygotsky: Critical assessments* 4 (1997): 3-21.

The EdTech Quintet – Associated Practices	
Social	Communication, Collaboration, Sharing
Mobility	Anytime, Anyplace Learning and Creation
Visualization	Making Abstract Concepts Tangible
Storytelling	Knowledge Integration and Transmission
Gaming	Feedback Loops and Formative Assessment

The EdTech Quintet – Associated Practices	
Social	Provides diversity to the ZPD
Mobility	Creates the context for the process
Visualization	Aids in segmenting ZPD, bridging gaps
Storytelling	Aids in the integration of the ZPD
Gaming	Provides frameworks for independent practice

Clade X

CLADE X
A PANDEMIC EXERCISE

JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH | Center for Health Security

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CLADE X EXERCISE

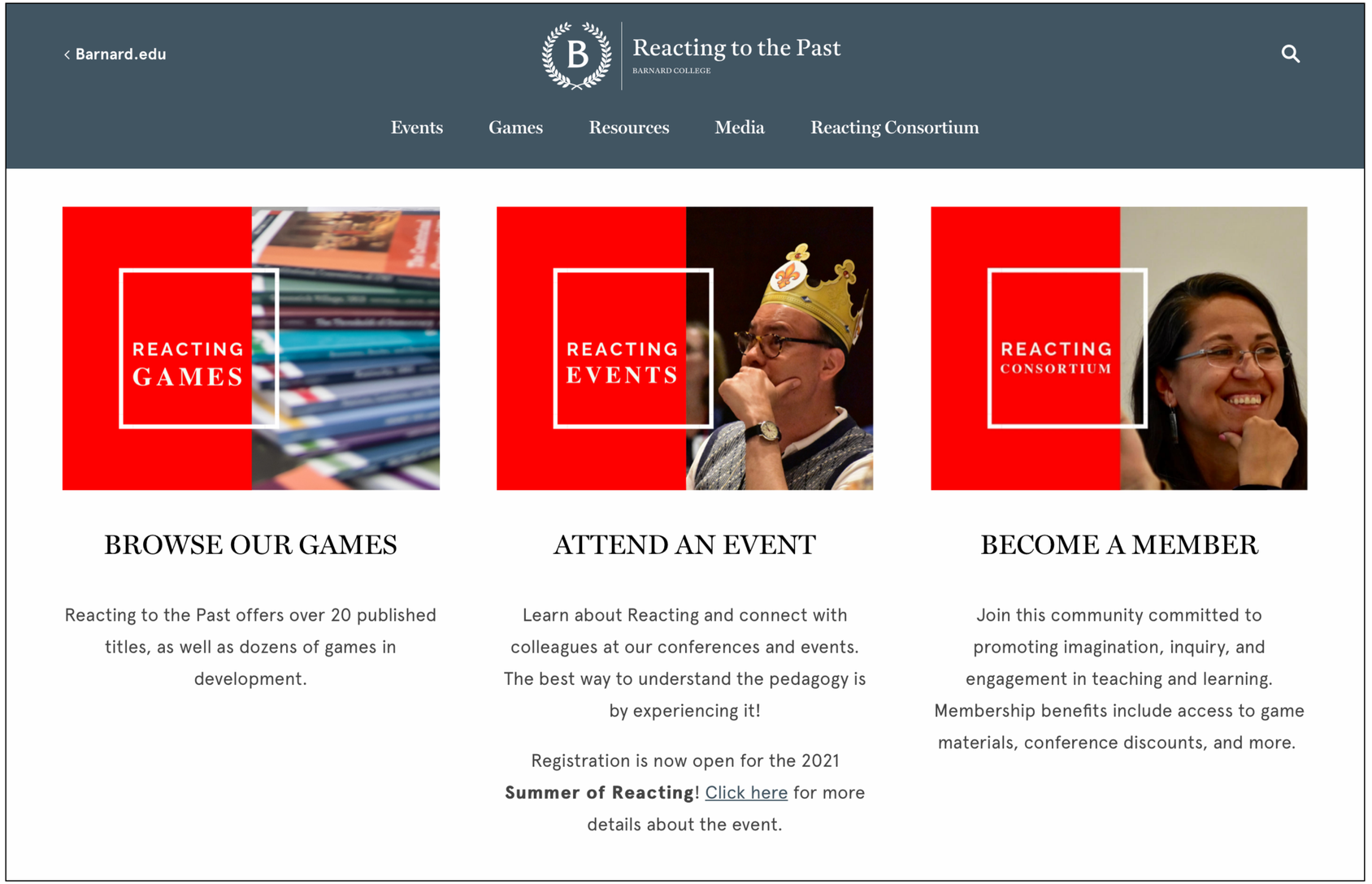
The Johns Hopkins Center for Health Security hosted the Clade X pandemic tabletop exercise on May 15, 2018, in Washington, DC. The purpose of the exercise was to illustrate high-level strategic decisions and policies that the United States and the world will need to pursue in order to prevent a pandemic or diminish its consequences should prevention fail.

Media

Center News
- May 15, 2018
- Apr. 16, 2018
- Nov. 16, 2017

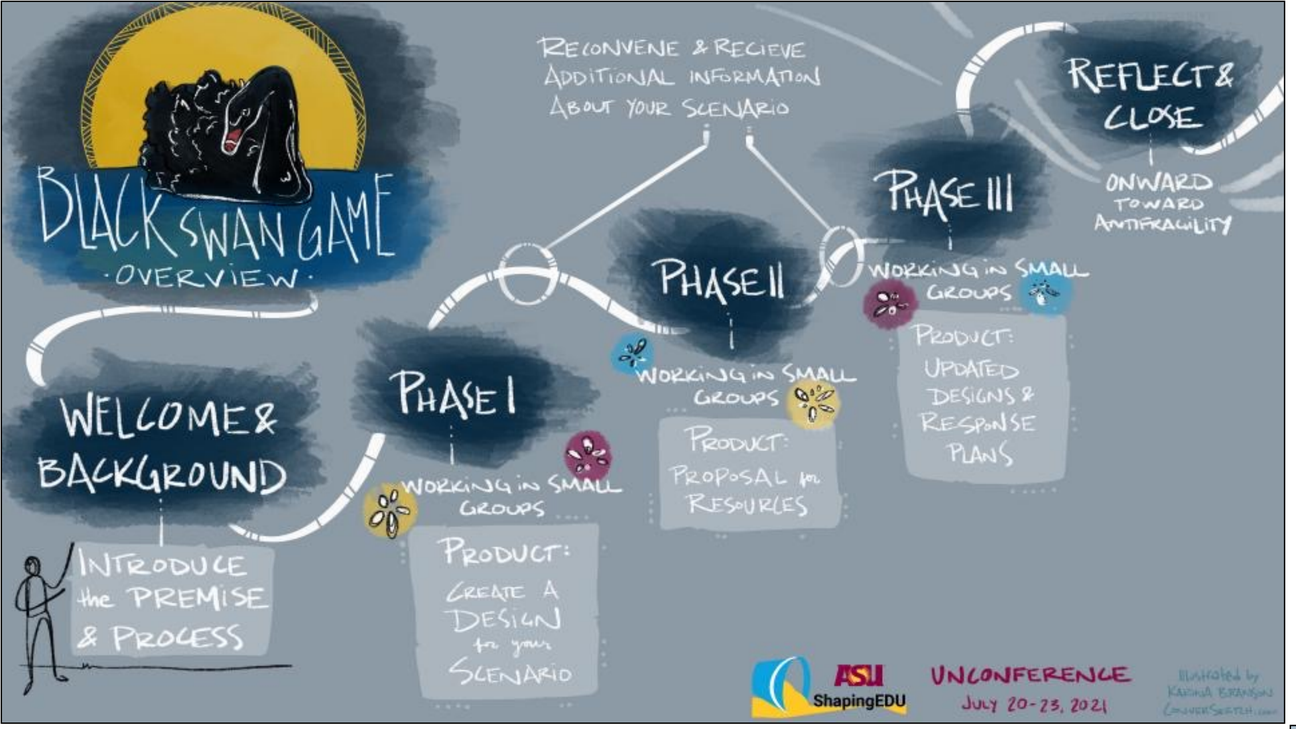
Media Coverage
#CladeX
Livestream (archived)
Photos

Reacting to the Past



The Alternative Universities Game - COVID-19 Edition

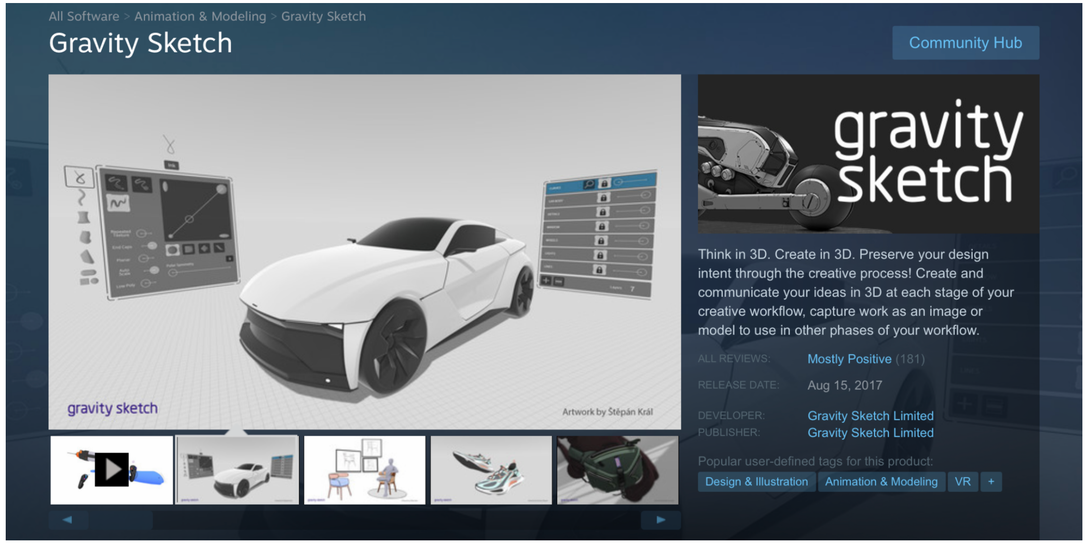
- **The components:**
  - 10 cards, each describing the key features of an “alternative university” from David Staley's *Alternative Universities: Speculative Design for Innovation in Higher Education*
- **The Rules:**
  1. Up to 5 teams can play the game.
  2. Each team draws two cards at random from the deck.
  3. After studying the cards, the team will choose to keep one as the basis for their university design, and return the other.
  4. The cards returned are shuffled, and each team draws a card - they will have to pick one of the two characteristics listed on the card to add to their design.
  5. The design that each team creates will have to be robust or antifragile against a sudden unexpected pandemic, i.e. it will have to retain its fundamental character in the face of quarantine, travel restrictions, etc.
  6. An unannounced Black Swan will fly in halfway through the design period, and need to be addressed by the design team.
  7. At the end of the design period, each team will have 3 minutes to present the key features of their design, including its robustness/antifragility features.
  8. Participants will vote on the design that they believe has best met the challenge, thus determining the winner(s).

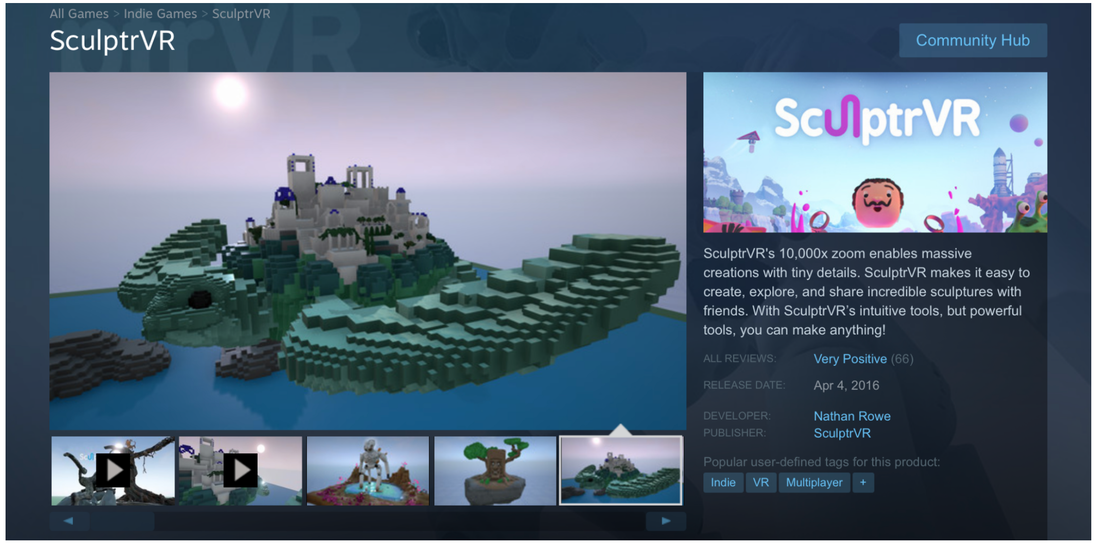


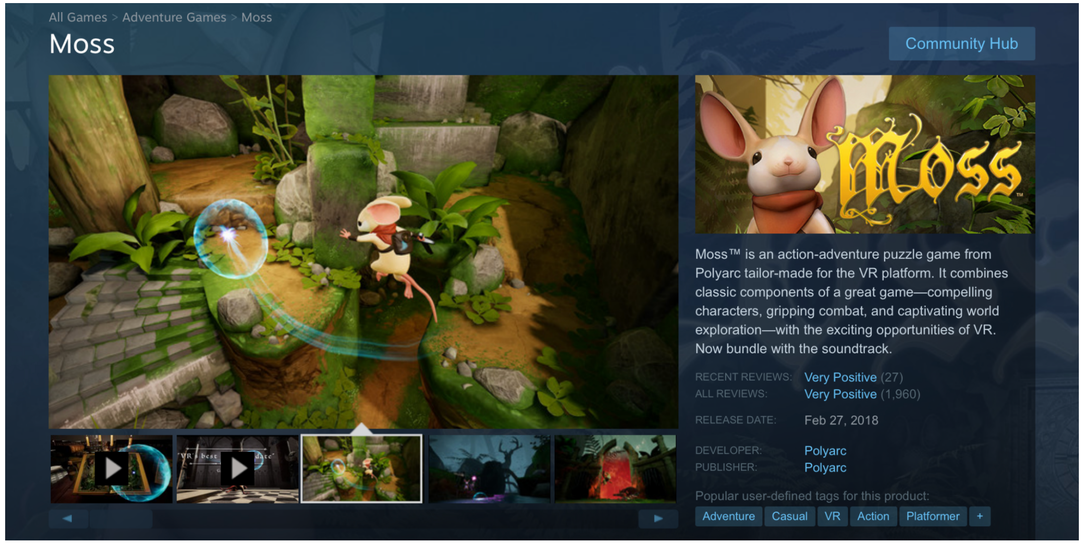
ConverSketches by Karina Branson

Puentedura, R.R. *The Educator's Game Machine*. (2010)

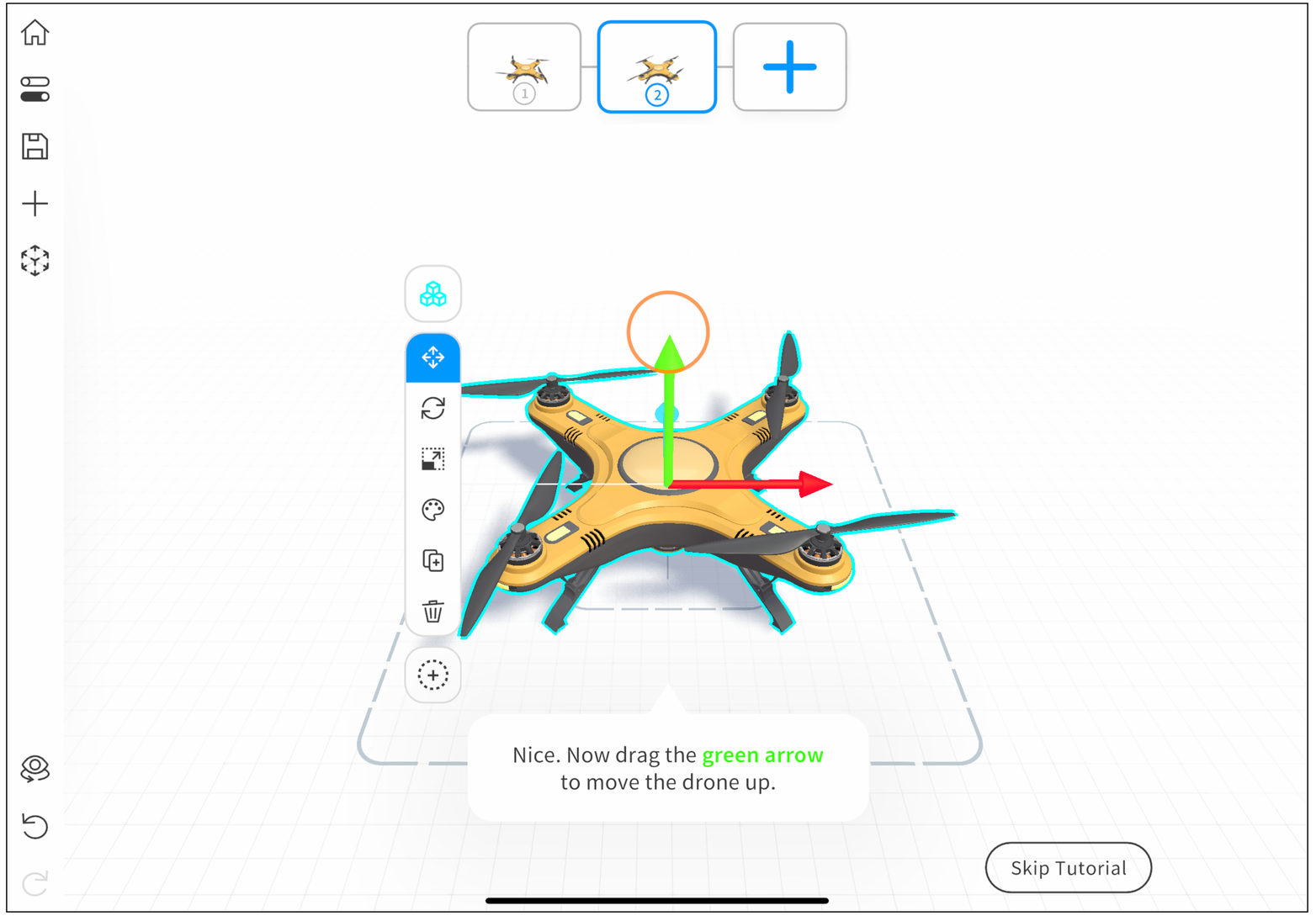
Exploring VR





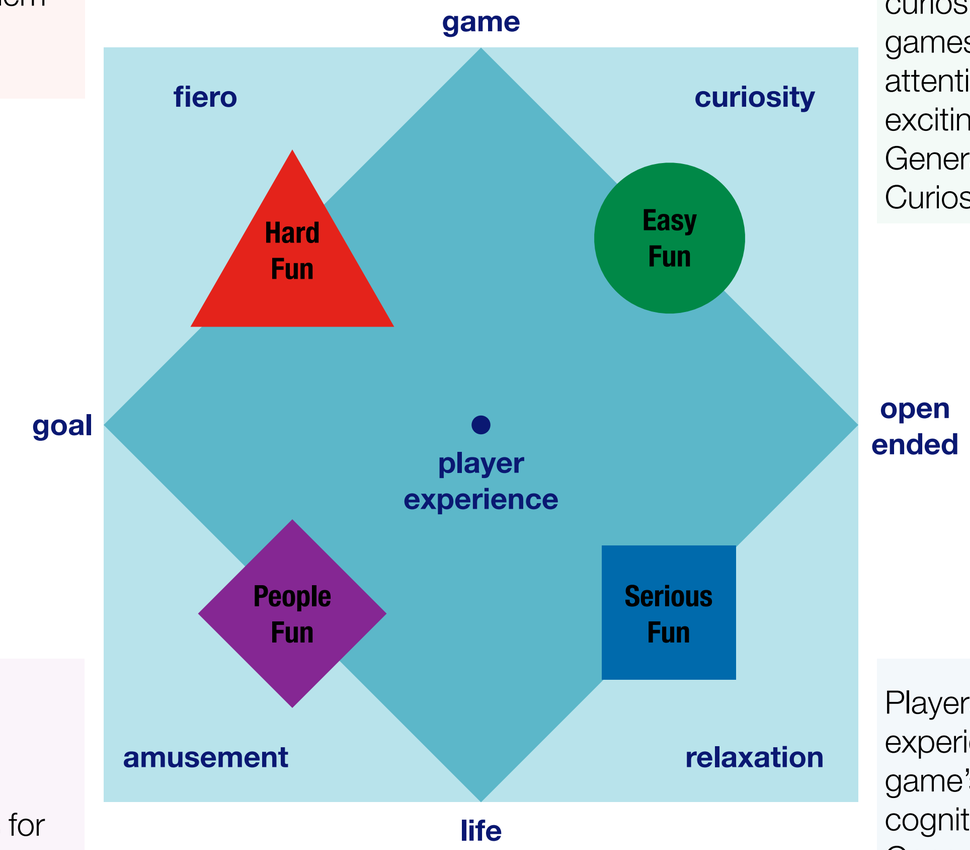


JigSpace


1
2
Nice. Now drag the green arrow
to move the drone up.
Skip Tutorial

Four Keys to Emotion in Games (Lazzaro)

Players like the opportunities for challenge, strategy and problem solving.
Generates Frustration, Fiero

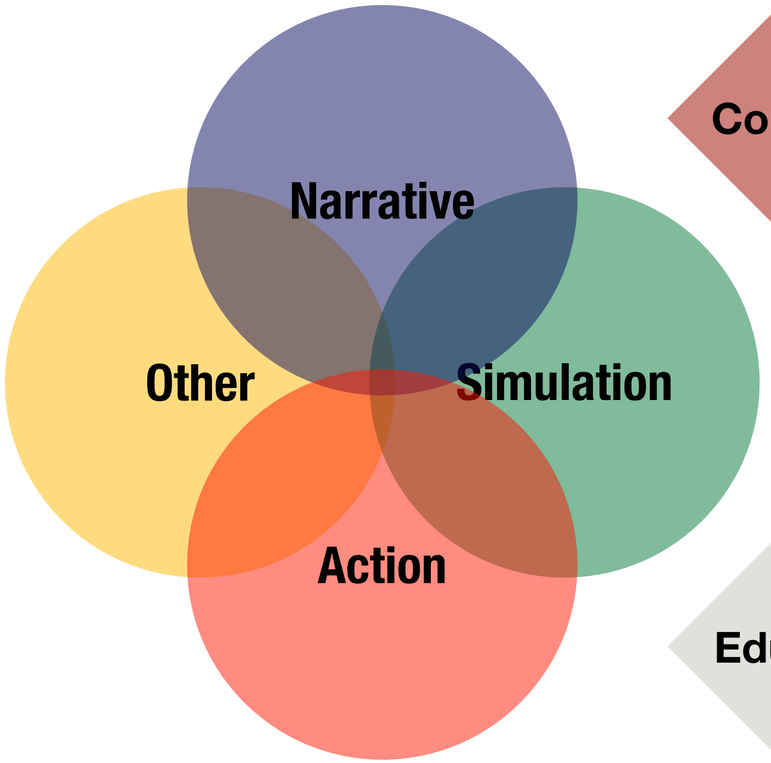


Players enjoy intrigue and curiosity, becoming immersed in games that absorb their complete attention or take them on an exciting adventure.
Generates Wonder, Awe, Curiosity, Mystery.

Players use games as mechanisms for social experiences of competition, teamwork, and opportunities for social bonding and personal recognition.
Generates Amusement, Schadenfreude, Naches.

Players enjoy the internal experiences in reaction to the game's visceral, behavioral, cognitive, and social properties.
Generates Excitement, Relaxation.

Lazzaro, N. *Why We Play Games: Four Keys to More Emotion Without Story.* (2004) Online at: http://www.xeodesign.com/research/



Commercial

Critical Gaming

- Provide domain-specific analytic and problem-solving approaches
- Enhance skill transfer to related tasks or domains
- Enhance general skills or cognitive processes

Educational

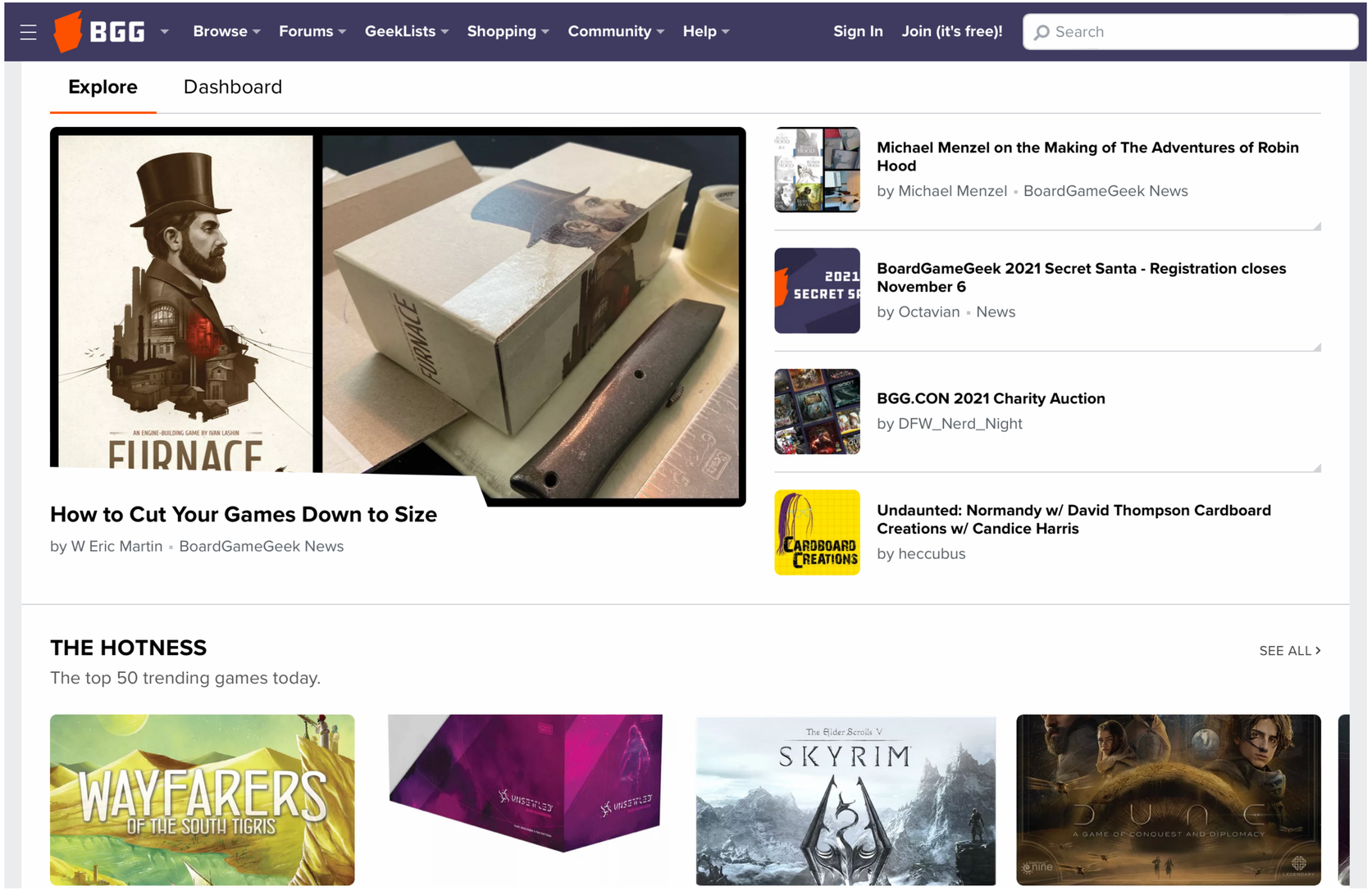
Instructor-Created

Student-Created

- Provide domain-specific content
- Provide domain-specific analytic and problem-solving approaches
- Enhance skill transfer to related tasks or domains
- Enhance general skills or cognitive processes
- Develop specific social structures
- Improve participant motivation

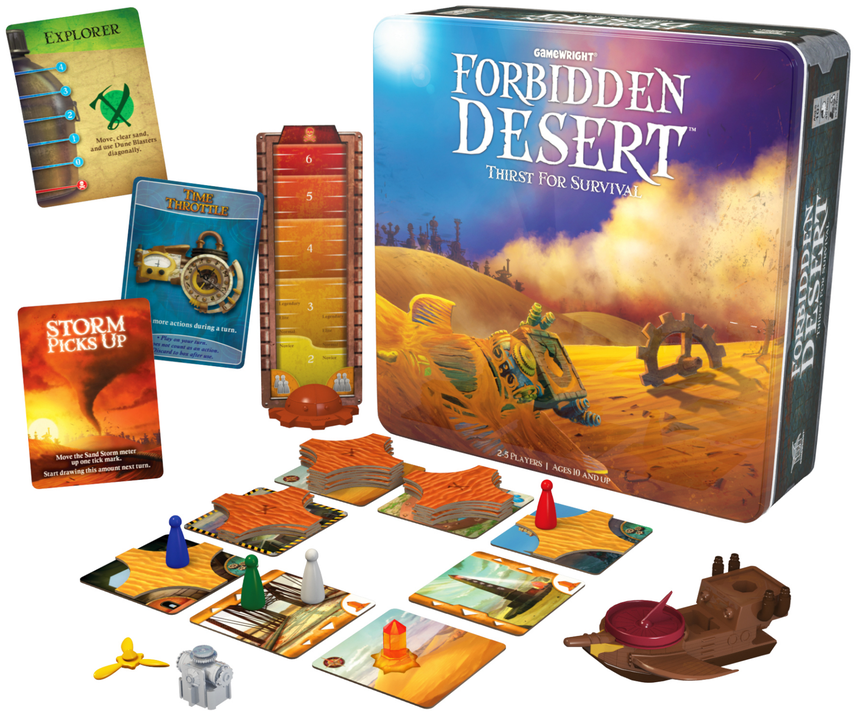
Puentedura, R.R. *Game and Learn: An Introduction to Educational Gaming*. (2009)

The Community: BoardGameGeek



Game Design - *8-Minute Empire*

Cooperative Gaming



Chris Engle - Matrix Games

- **Matrix Game Rules:**
  - Start with a problem.
  - Say what happens next.
  - There is no order of play.
  - Anyone can add to or alter what happens.
  - All players may ask a player to roll if they don't like what they said:
    - Roll 2d6:
      - *7+ – The action happens and cannot be altered.*
      - *6- – It does not happen and cannot happen in the game.*
  - The game ends when the problem is solved.

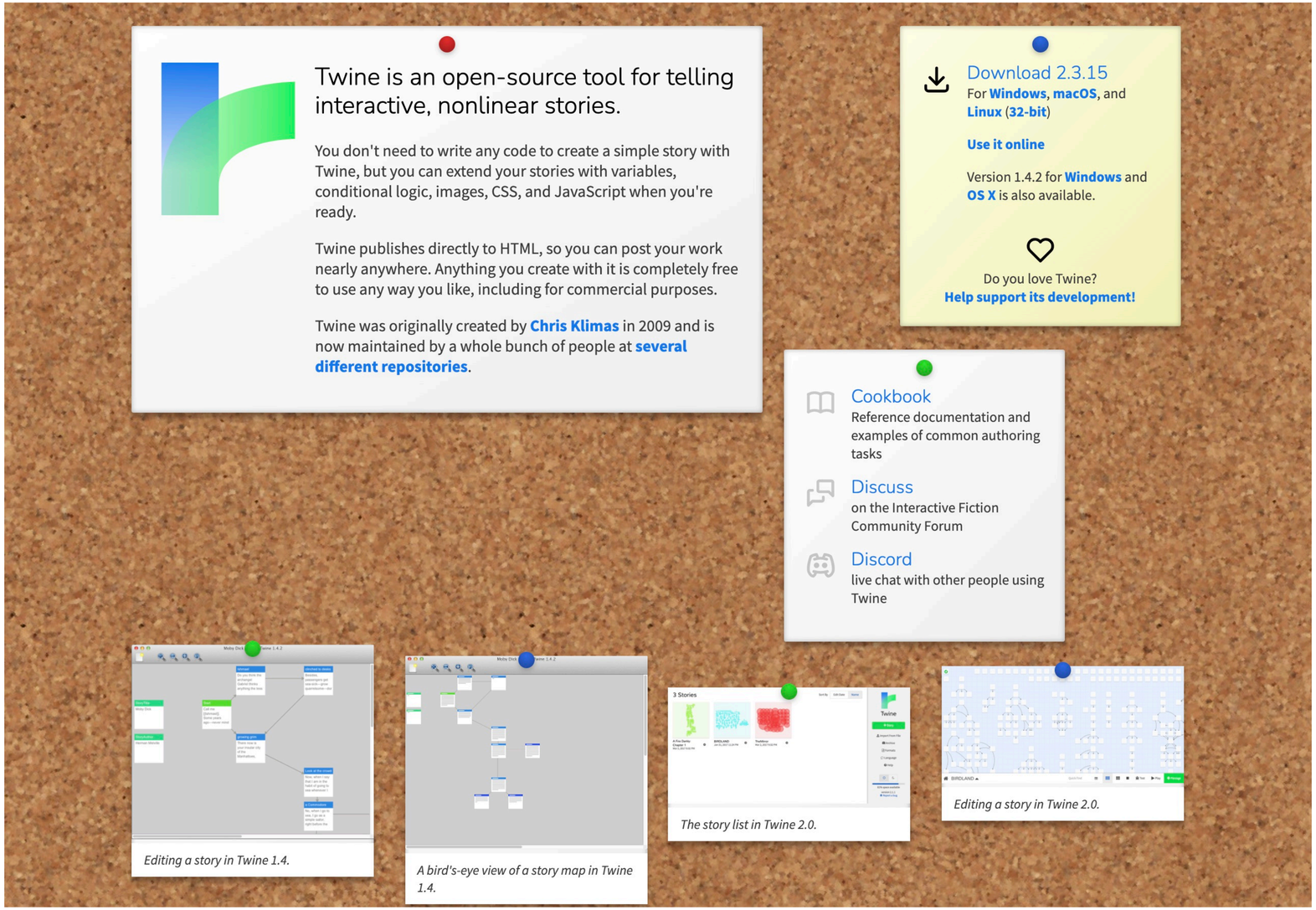
Chris Engle, *Matrix Games*. Online at: https://sites.google.com/view/free-engle-matrix-games/home

Matrix Games – Some Details

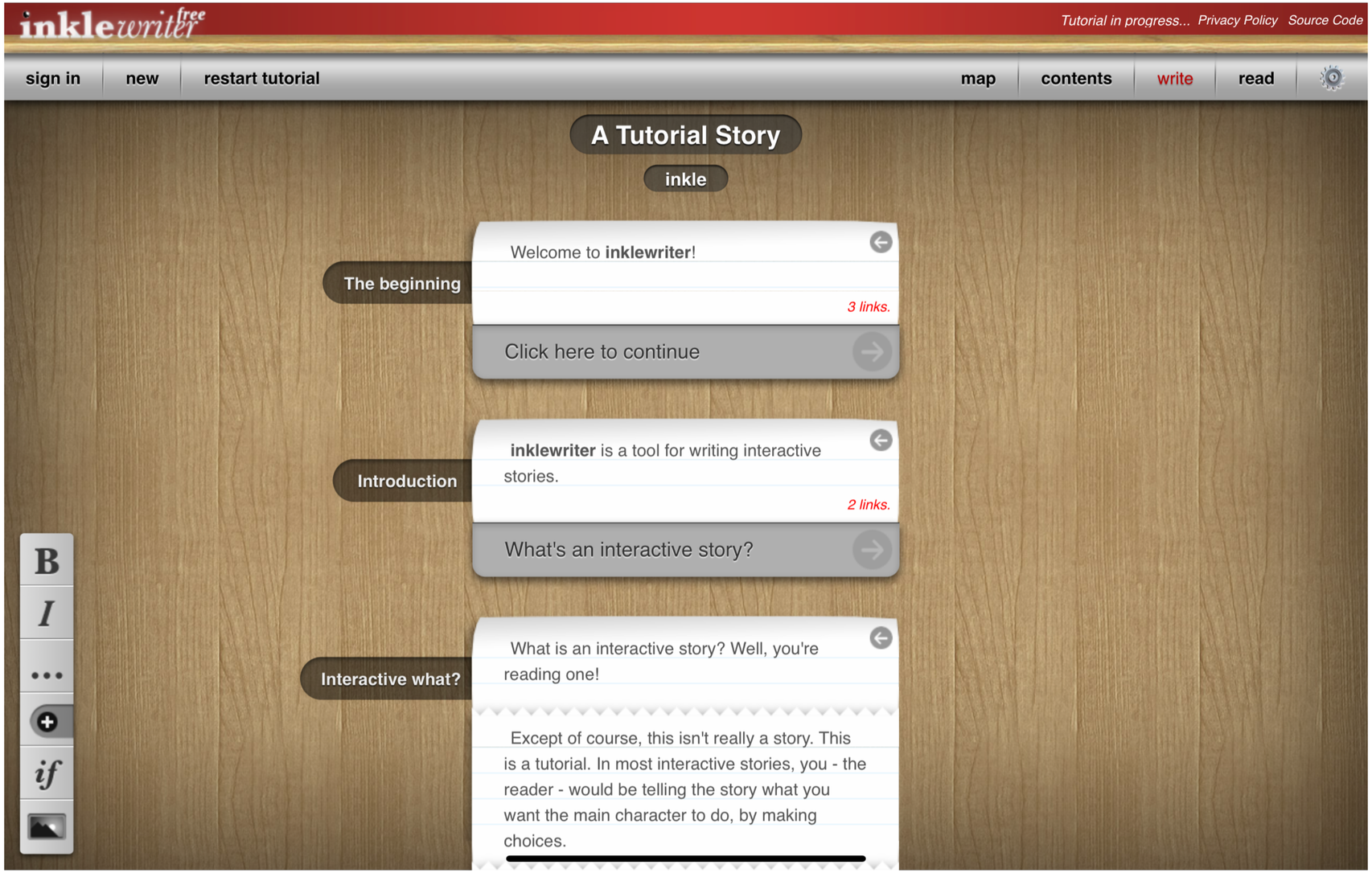
- For games to work, Matrix Games need a scenario. This is the “Matrix” of Matrix Games. A scenario lays out a matrix of information about the game world which key the players in on what they are to do. It may include maps, lists of characters, a central problem to be solved, lists of ideas and much more. The scenario doesn't say everything that can happen but gives a flavor of what might happen. The player's minds fill in the blanks to form a complete picture.

- One common form is for players to make arguments for what happens next. They say an action, a result from the action, and three reasons why it happens. A referee decides what they need to roll to succeed and other players may make counter-arguments for what they think happens instead. Players then roll to see which happens.

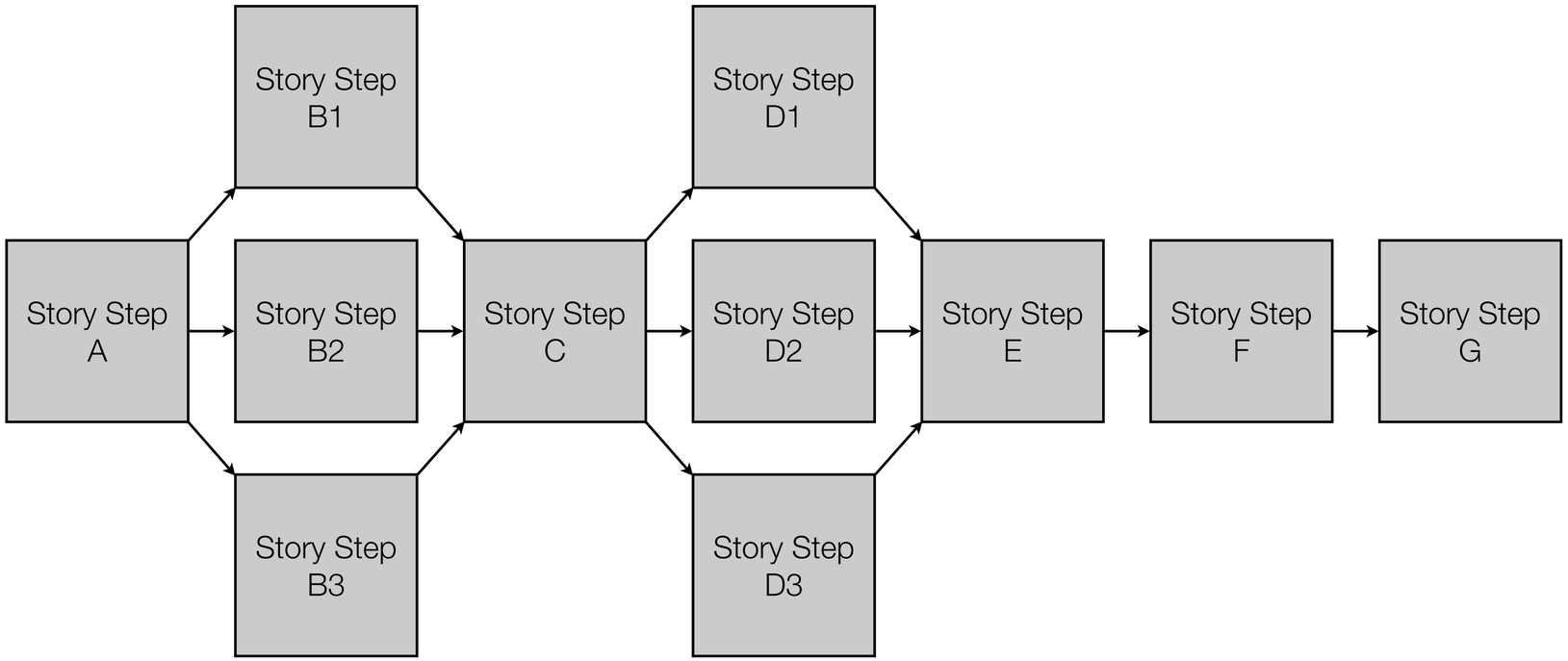
Twine – https://twinery.org



Inklewriter – https://www.inklewriter.com



Storytelling for Games (Sheldon) – Controlled Branching

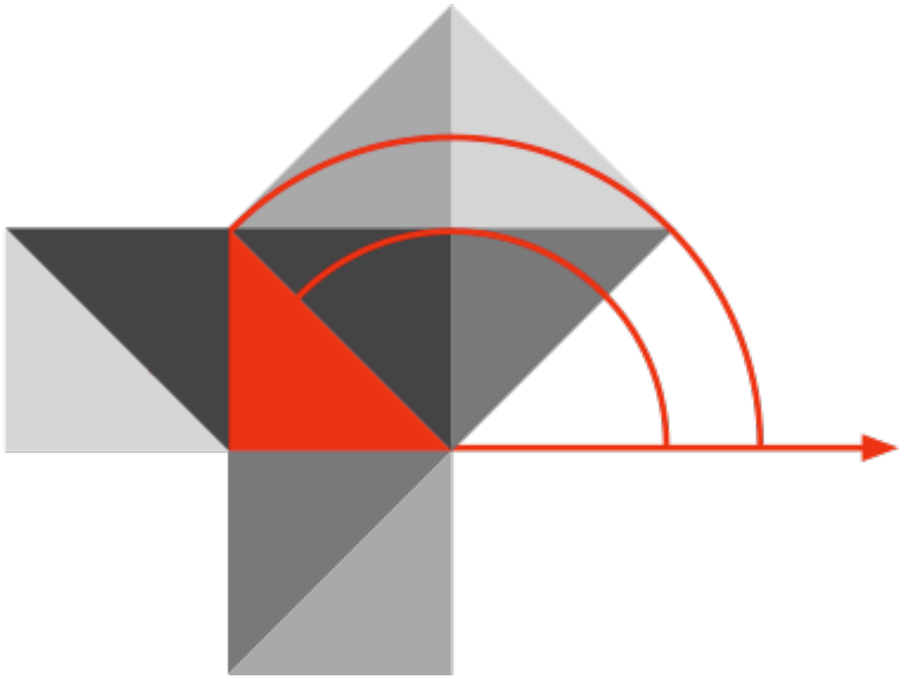


L. Sheldon, *Character Development and Storytelling for Games*. Thomson Course Technology PTR. (2004)

SAMR in Game Selection and Design — Some Examples

- **Substitution:**
  - Games that reiterate traditionally taught points (note: not via disguised multiple choice)
  - Games that exercise procedural mechanics in weakly related settings
- **Augmentation:**
  - Games that exercise procedural mechanics in strongly related settings
  - Games that provide for student discovery of semi-explicit rulesets
- **Modification:**
  - Games that allow for exploration of non-explicit underlying systems and rulesets
  - Games that allow for construction of social superstructures and activities on the game
- **Redefinition:**
  - Games that allow for development of previously unexplored student capabilities
  - Games that allow for exploration of previously inaccessible knowledge domains

Hippasus



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