PBS KIDS Kart Kingdom Project: Deepening Systems Thinking Learning

> " *So far in history, for most people, complex systems have not been the sorts of warm and fuzzy things with which most people could or wanted to sympathize, let alone empathize. But good games create a strong empathetic identification with the game world as a system.* (Gee, 2004, p. 2) "

What is Systems Thinking?

Systems thinking means understanding how systems are interconnected and understanding the relationships among the dynamic components within those systems. Applying systems thinking in the world involves imagining possibilities and determining which outcome is the most desirable. Then, systems thinkers determine which strategy is most effective for reaching the desired possibility. Systems thinking perspectives help scientists, policy makers, engineers, and designers, among others, understand complex issues.

Systems Thinking and Kart Kingdom

The educational goal of PBS KIDS Kart Kingdom is to allow kids to experiment with and develop systems thinking abilities as a way to unlock skills as the change agents of our future. The project is supported by the Center for Games & Impact at Arizona State University, which generated a framework for systems thinking education in video games. At the heart of this lies a context for systems thinking based around four types of mental activity:

- **Systems thinking:** Identifying how system components interact.
- **Futures thinking:** Imagining possible consequences of system interactions.
- **Values thinking:** Judging which interaction outcomes are most desirable.
- **Strategic thinking:** Generating a plan to achieve a desirable interaction outcome.

These types of thinking are simplified and restated as the following questions:

1. What are the interacting components of the system?
2. What are the possible system outcomes?
3. Which outcomes do I think are best?
4. What is the best way to reach this outcome?

Implicit in this is a purpose to the system.

The abilities of a good systems thinker include the capacity to:

- Identify the different elements of a system and how they interact.
- Determine what are the possible futures states of the system.
- Decide which system outcomes are most desirable.
- Make choices that optimize system functioning in relation to desired outcomes.

Systems Thinking and Game Design

The abilities listed above can be restated as core needs for a game designed to develop these abilities:

- The game must have elements.
- These elements must exhibit emergent behaviors.
- These behaviors are generated via relationships.
- These relationships may be optimized.

Games should present players with one or more systems, the elements of which are transparent in their relationships, and optimizable to generate an outcome pertinent to the player's values and needs.

The player's relationship to the systems thinking facets of The PBS KIDS Kart Kingdom relies upon their ability to: 1) change the system and 2) improve the outcome of these changes relative to the purpose of the system and their own particular goals.

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More information on the systems thinking curriculum of the PBS KIDS Kart Kingdom is available at http://kartkingdom.org