

Gaming for sustainable futures

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Walking the thin line
Between sacred and profane

Sustainable mindsets (?)

Sustainable mindsets: what are we after?

Engagement in sustainability

■ The components of engagement

■ Awareness

- Having knowledge

■ Comprehension

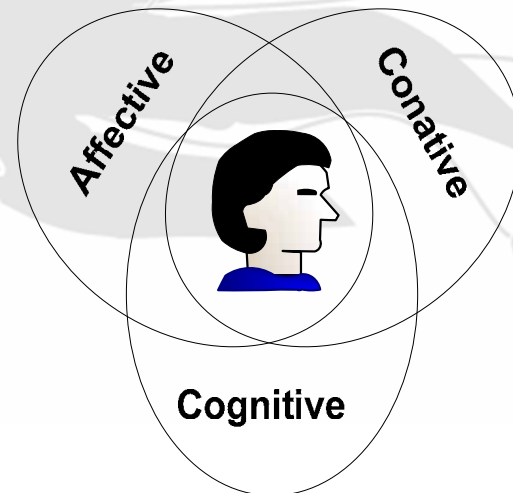
- Thorough understanding, projected in time and space

■ Caring

- Deep concern

■ Agency

- The ability of doing



Sustainable mindsets: what are we after?

The object of engagement

Emergence



Unpredictability



Complex Systems



Co-evolution

Self-organization



Sustainable mindsets: what are we after?

Portrait of a sustainable mindset

- **Domain-specific knowledge**
- **Critical thinking**
- **Systems thinking**
- **Ill-defined problem-solving**
- **Spirit of inquiry**
- **Dealing with uncertainty and change**
- **Adaptation and flexibility**
- **Emotional engagement and commitment to values**
- **Agency and hope**
- **Commons and sense of belonging**

Sustainable mindsets: what are we after?

Incubators for sustainable mindsets

■ Frameworks to develop sustainable mindsets

■ **Complex** contexts

- Emergence, unpredictability, co-evolution, self-organization

■ Affordances for **situated experience**

■ Support for both **individual and interpersonal dynamics**

■ **Feedback**, situated and just-in-time

■ Promote a **higher order change**

- Shift of consciousness; systemic, connective and collective intelligence

■ **Meaningfulness** for the learner, to foster engagement

Gaming for sustainability

Gaming for sustainability

Why games? The pervasiveness

- **“Everybody”** plays video games. In 2009 :
 - **Average age** of U.S. gamer is 34 (26% over 50, vs. 25% under 18)
 - **Gender** (US): 60% male, 40% female (33% females over 18 vs. 20% boys 17 or younger)
- **“Collectivities”** play video games
 - 64% of the US players play games with other gamers in person
 - December 2009, more than 271.6 million monthly active users in the top ten Facebook games
 - Massive multiplayer on-line gaming: 46 million U.S. MMO players in 2009

Not “Kids Stuff”

Not “Boys Stuff”

Not “Lonely Stuff”



Gaming for sustainability (Un)Defining games

- Play is an **activity**, a process carried on by one or more **agents**
 - Generates dynamics involving agents and components of their environment
 - Agents: **players**
 - Components: elements of the environment in which play happens (**“toys”**)
- **“Play” is not “game”**
- **Play: free, safe, intrinsically motivated**

Enhancer of learning and development!

Gaming for sustainability (Un)Defining games

- **Game:** a **system** comprising **agents** interacting with **artifacts**, based on specific **rules** and in order to achieve game **goals**



Gaming for sustainability (Un)Defining games

■ Games can be **complex systems**

■ **Emergence “by design”**

- Systemic aspects and behaviors **progressively unfolding**, scripted by design

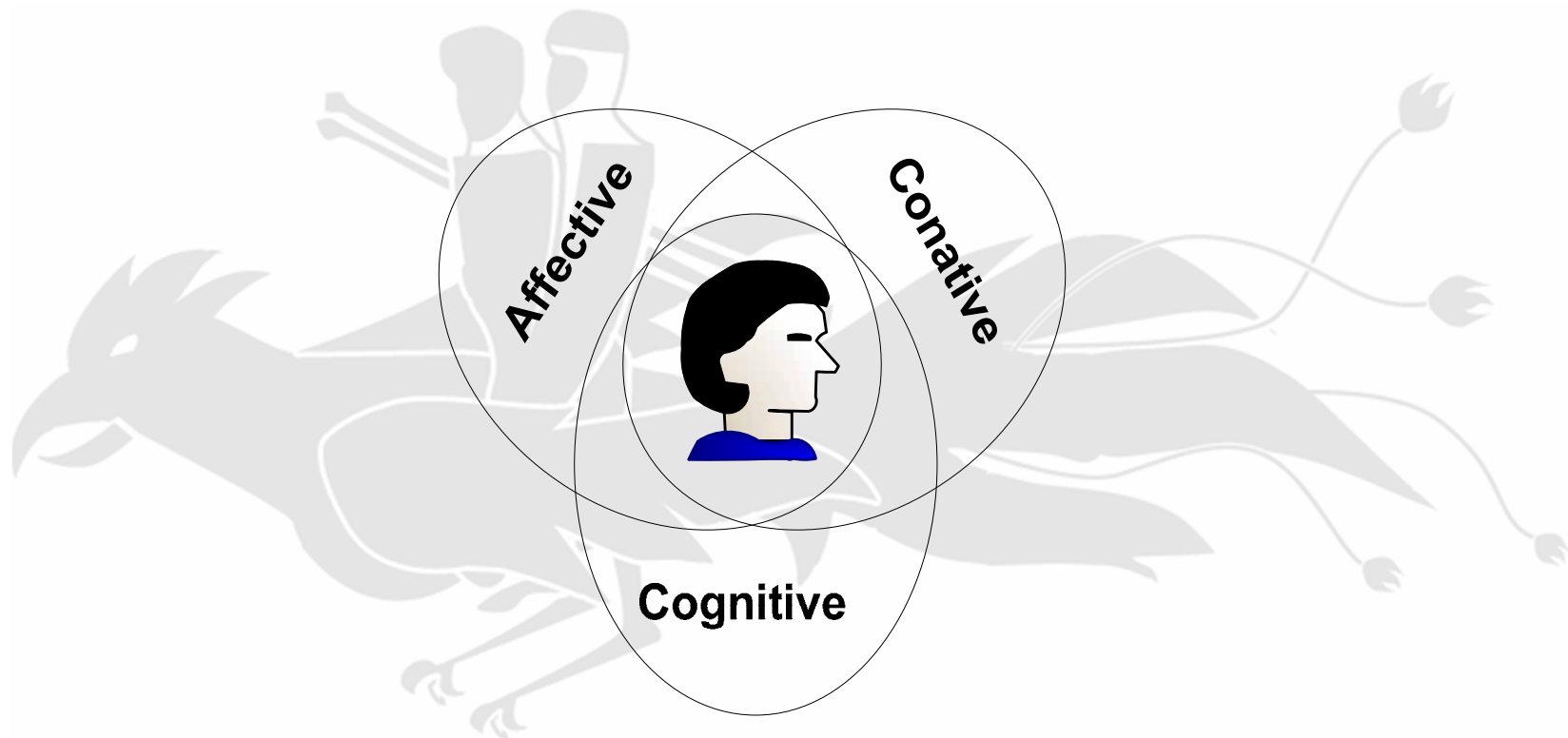
■ **Emergence “by complexity”**

- Systemic aspects and behaviors emerging from **self-adaptation** of the system
 - Spontaneous changes, consequence of **self-adaptive simulation models**
 - **Creative agency of players**

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Engagement in video games

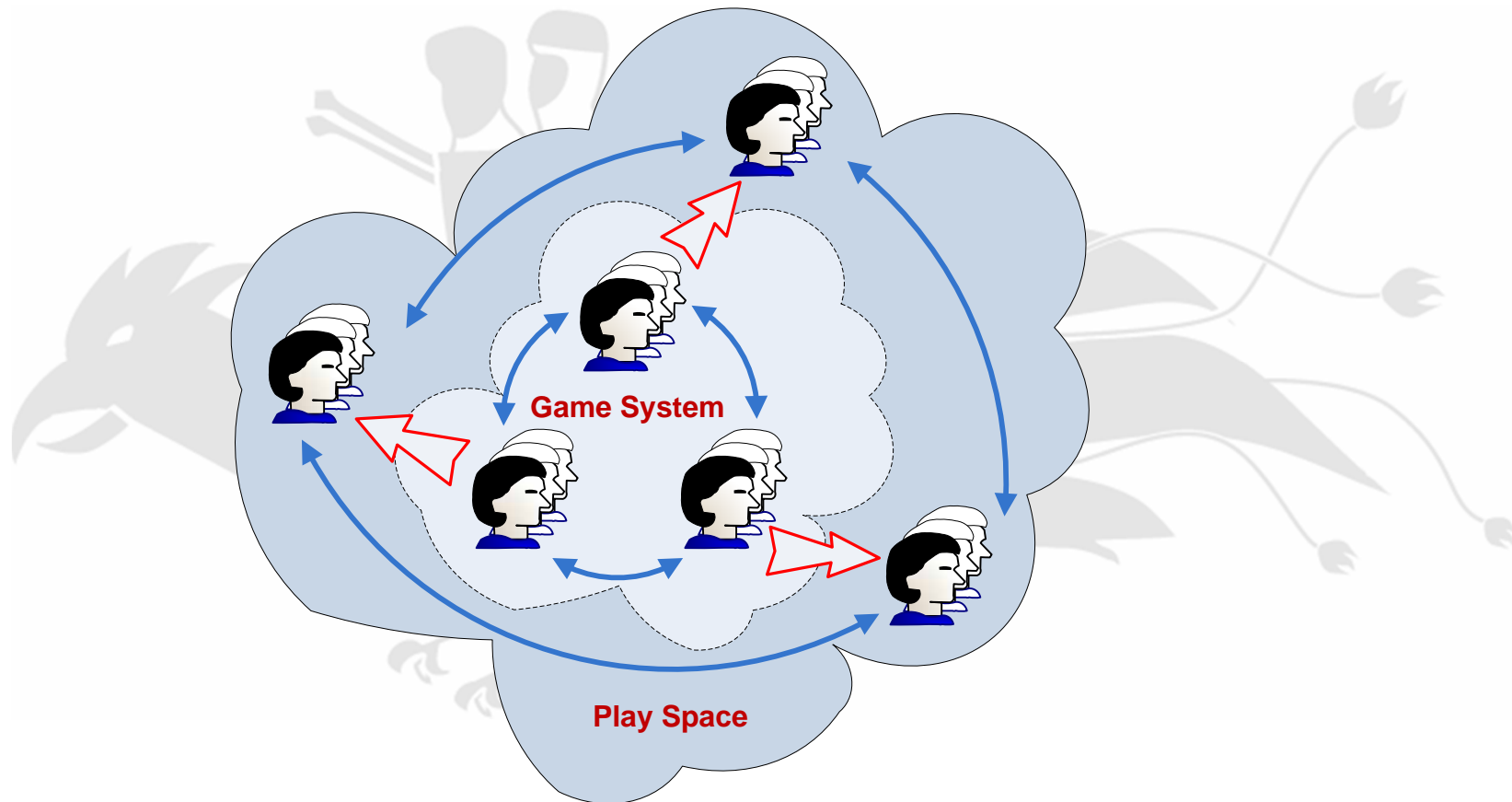
■ **Holistic individual engagement**



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Engagement in video games

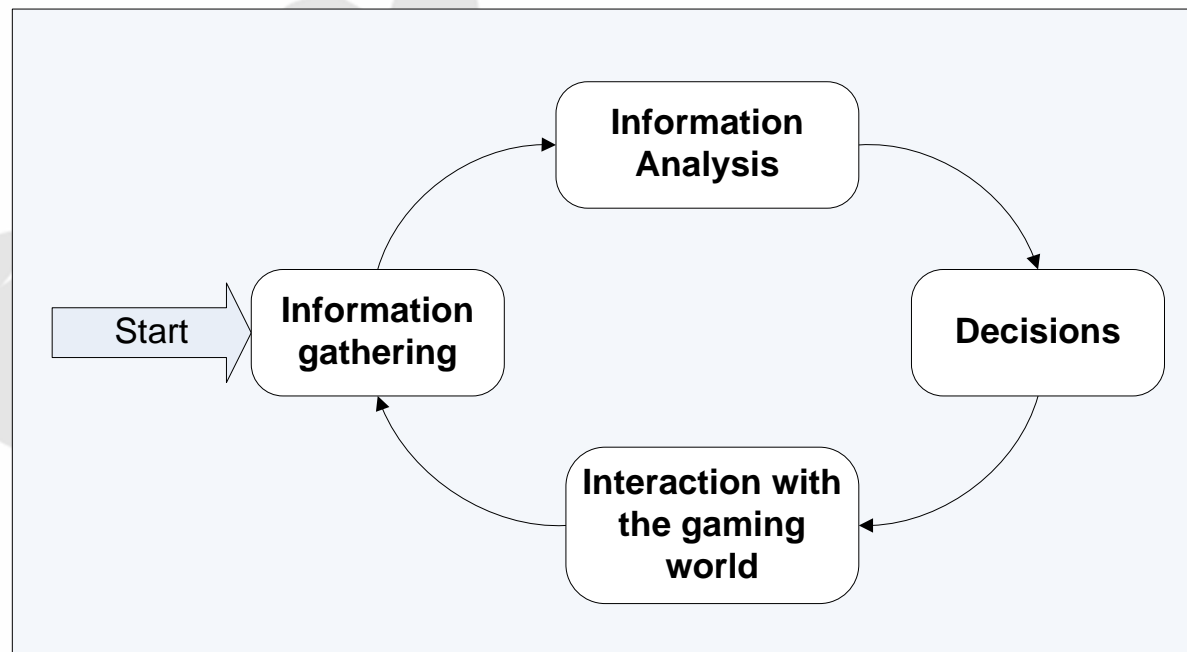
- Space of engagement: **game system**, gaming community and **play space**



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Engagement in video games

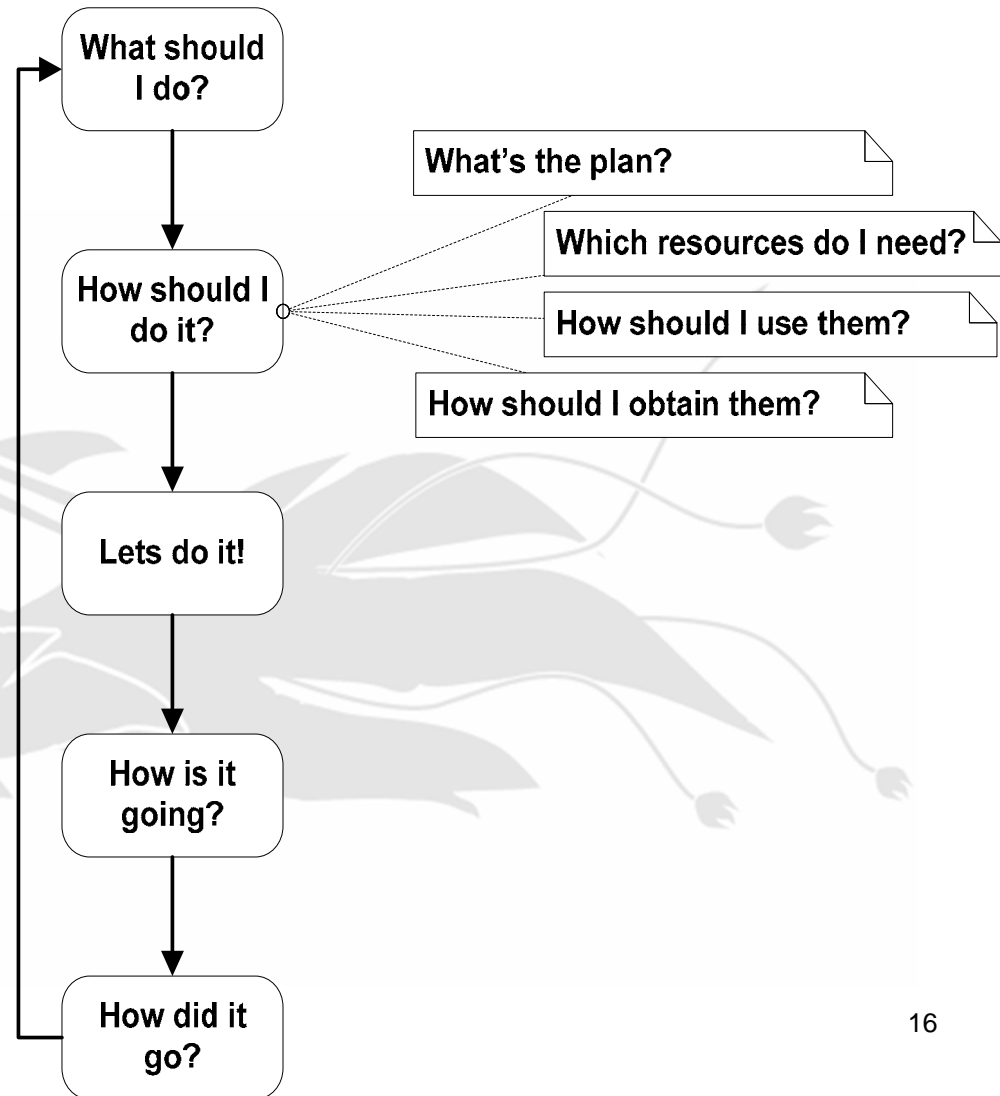
■ The game-playing cycle



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Engagement in video games

■ The thinking process



Gaming for sustainability

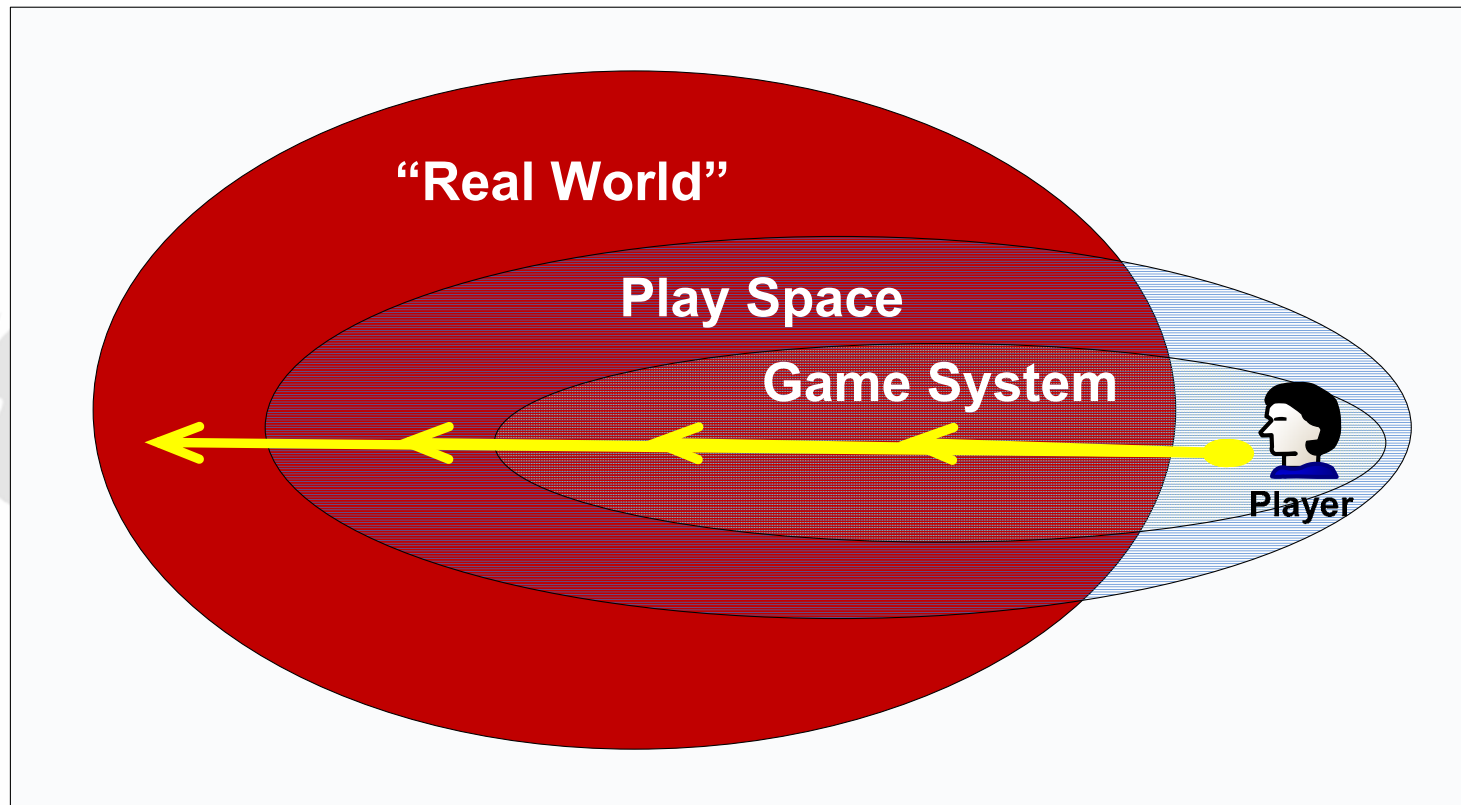
The nature of game-based learning

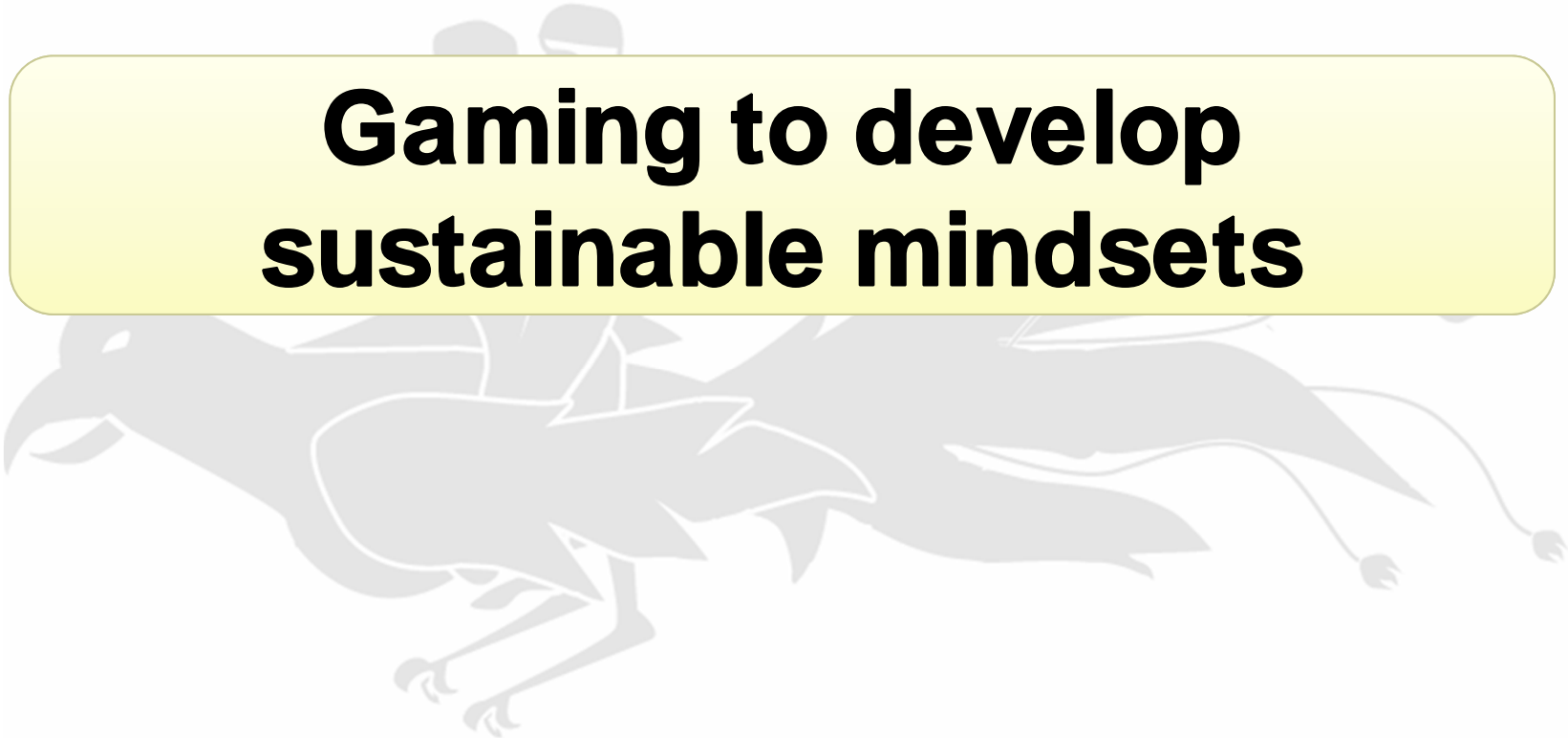
“Tell me, and I will forget.
Show me, and I may remember.
Involve me, and I will understand.”
(Confucius, 450 B.C.)

- **Experience-based learning: the soul of gaming**
- **Problem-solving: the paramount activity**
 - Varying degrees of problem definition, with ill-defined problems playing a key role
- **Intrinsically motivated learning!**

Gaming for sustainability

Transfer of game-based learning





Gaming to develop sustainable mindsets

Gaming to develop sustainable mindsets

Potentialities



Gaming to develop sustainable mindsets

Potentialities

■ **Farmville!**

■ **Theme: farming**

■ **Gameplay:**

- Use your avatar to create, maintain and develop your farm
 - Harvesting and cropping
 - Livestock
- Through the “farm market”, acquire/sell resources & produces paying/gaining virtual currency (“farm coins” & “farm cash”)
- “Experience points” to enhance access to resources
- Receive and give away resources as “gifts”
- Facebook supporting social interaction in the play space₂₁

Dominant: systemic understanding, collaboration and constructive competition

Gaming to develop sustainable mindsets

Potentialities



■ Impact

- Over **80M** active users
- **20M to 30M daily** active users

Gaming to develop sustainable mindsets

Sustainability games: state of the art

■ What is the **current situation**?

- How many?
- What kind of games?
- Which is the target public?
- What themes and topics ?
- How are they promoting social interactions?
- Are they “complex” games?

Gaming to develop sustainable mindsets

Sustainability games: state of the art

■ Research objective

- Gain an **overview** of the current state of the art regarding games and sustainability

■ Method

- **Google** search by keywords
- Selection of games appearing in the **first 5 pages**
- Only games in **English**

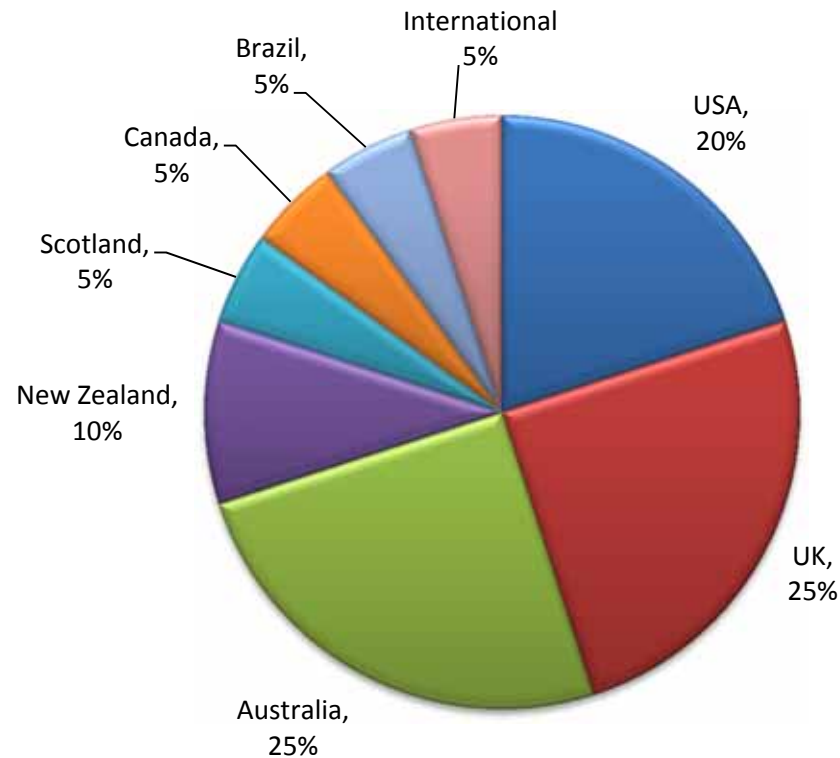
■ Sample

- 20 games were analyzed

Gaming to develop sustainable mindsets

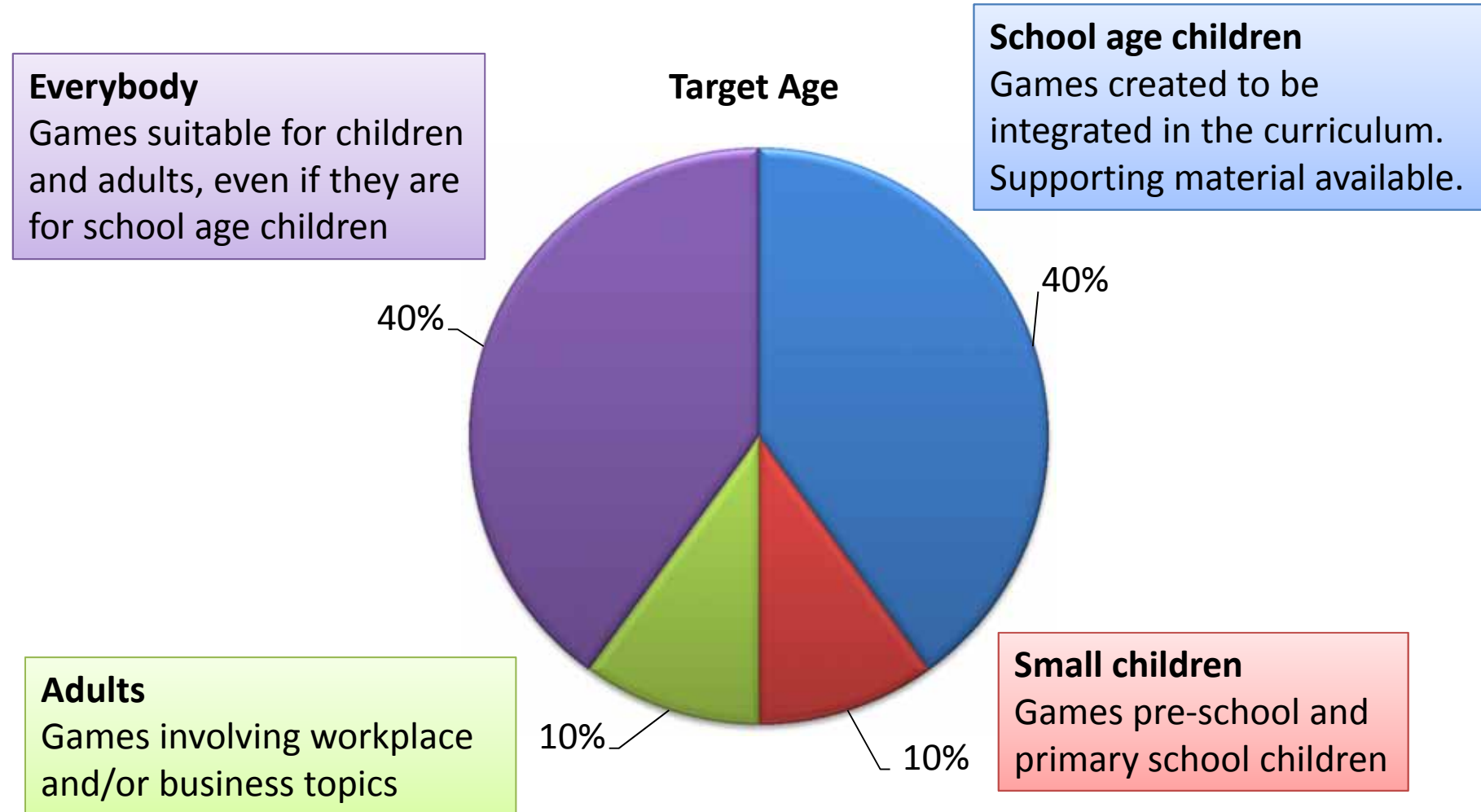
Sustainability games: state of the art

Games by Country



Gaming to develop sustainable mindsets

Sustainability games: state of the art



Conclusions

Conclusions

State of the art

- **Strong association**
 - Educating for sustainability= **educating children**
 - Educating for sustainability = **care for the environment**
 - **Using games** = educating children
- The **social pillar** of sustainability is almost **inexistent** in games
 - E.g. poverty reduction, equity
- Many “games” focusing on **Q&A dynamics**
 - Implicit assumption: sustainability = knowing about sustainability
- **Complexity** could be leveraged more
 - Some interesting ideas already in place
 - Large space for improvement

Conclusions Challenges

- **Language other than English**
- **Access: cost and infrastructure**
- **Accessibility**



Conclusions Approaches

- **Gaming for complexity: a trans-disciplinary design effort**
- **Leveraging commercial off-the-shelf games**

