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Gaming, HCI – January 06, 2020

Assessment of VR Game-based Outcomes: A Case Study

This work was completed at HCCG Lab, Dept. of Information Technology, NITK Surathkal, under the guidance of Prof. G Ram Mohana Reddy

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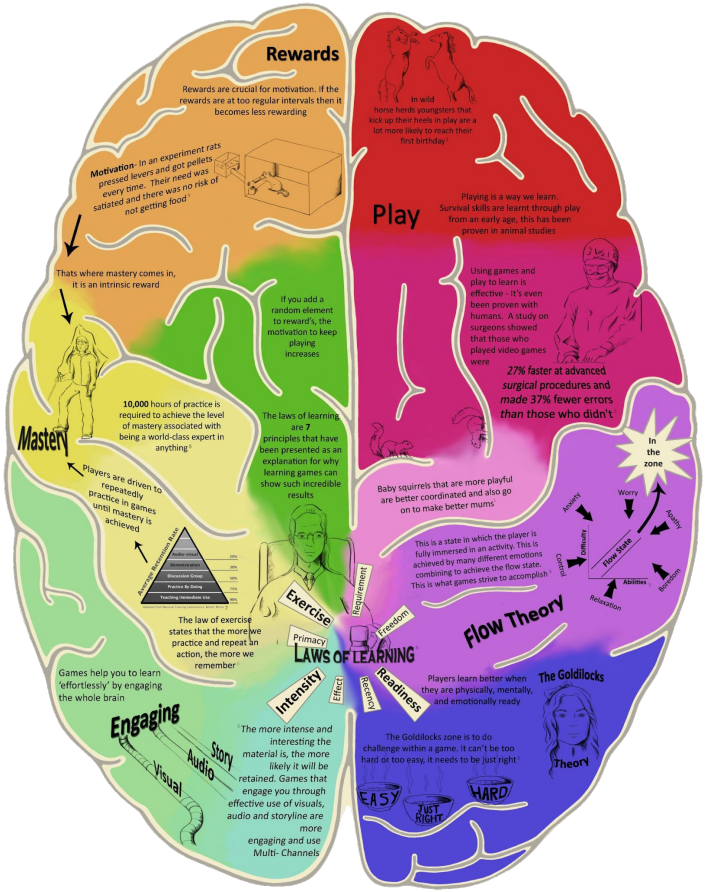
Agenda

1. Game Designing and Assessment
2. Game Designing Frameworks
3. Game Assessment Frameworks
4. Mobile-VR Case Study: Highlights
5. Conclusions and Future Directions

M Prensky. *The Games Generations: How Learners Have Changed.* Digital game-based learning, vol. 1. 2001.

Games as Learning Processes

- Human brain decodes the working of the system through **experimentation**!
  - Hands-on, active learning
  - **Game-based learning**
  - Reward (reinforcement) learning



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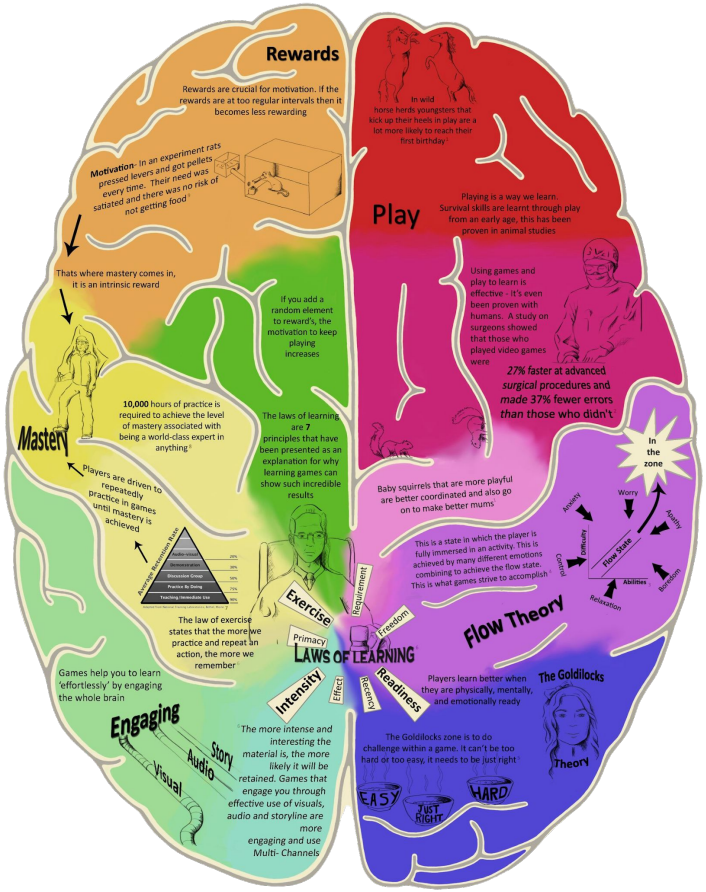
  - Working memory, motor performance, and strategic thinking



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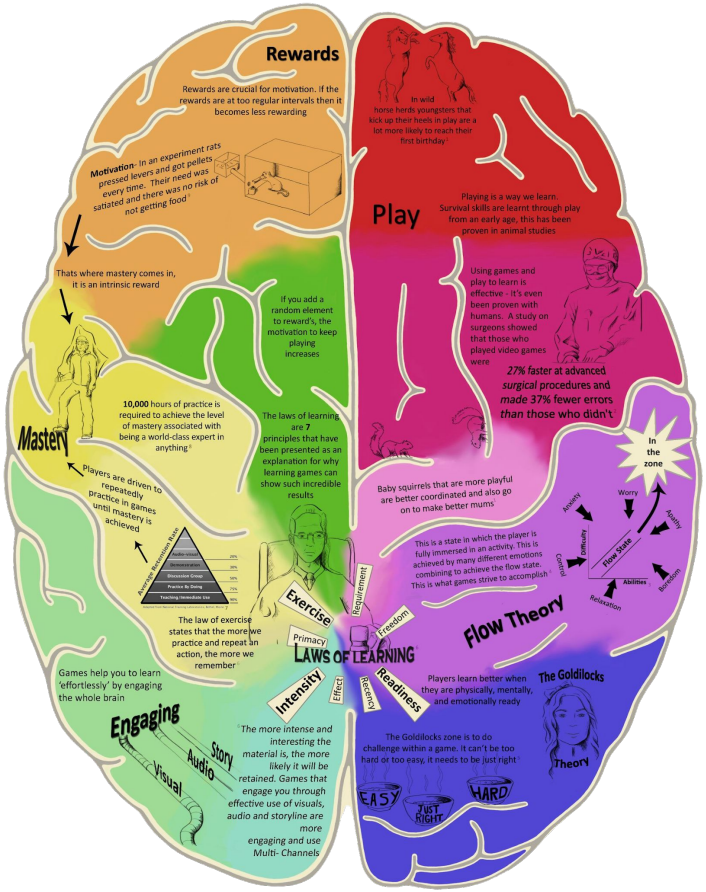

Take: All kinds of games can be viewed as learning processes

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Assessment over designing: Assessment of game-based outcomes is could be very crucial.

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- **Application-centered frameworks**: Game Object Models (GOM and GOM-II), Educational Games Design Framework (EGDF), Mechanics-Dynamics-Aesthetics (MDA) model, …

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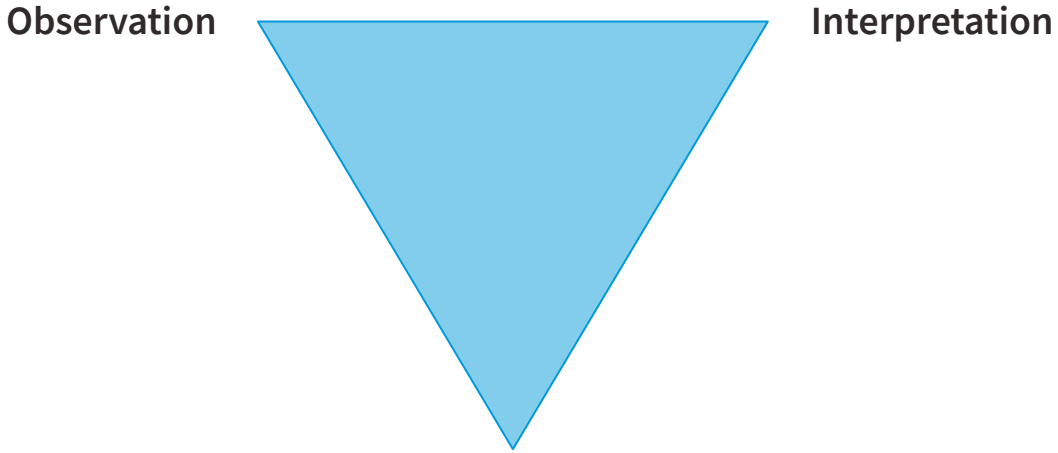

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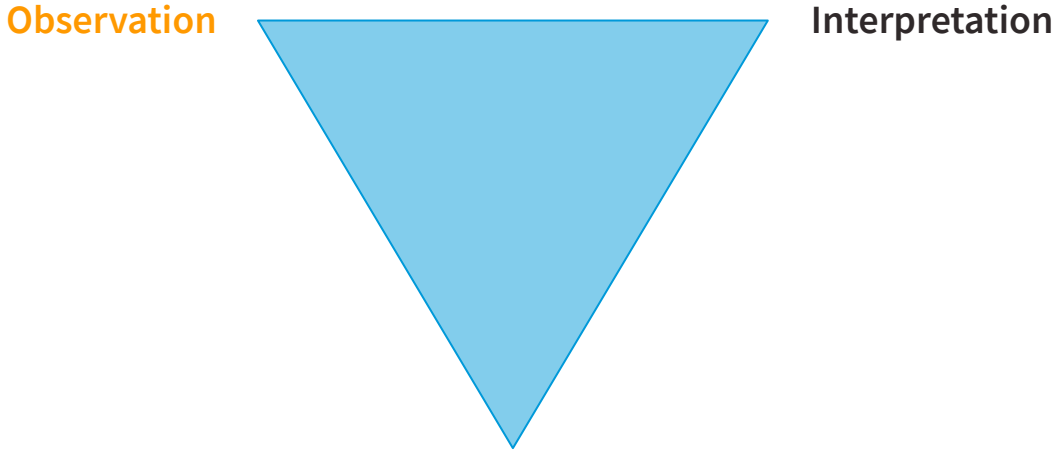

A model of *student learning and cognition* in the assessment domain

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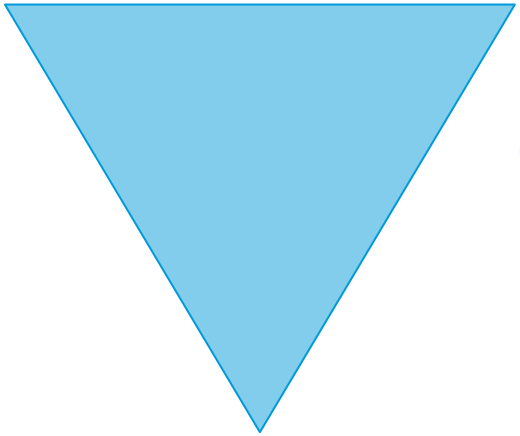

Interpretation

The process of *understanding the evidence* with respect to assessment goals

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Cognition

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Evidence-centered Game Designing [Mislevy et al. 2003]

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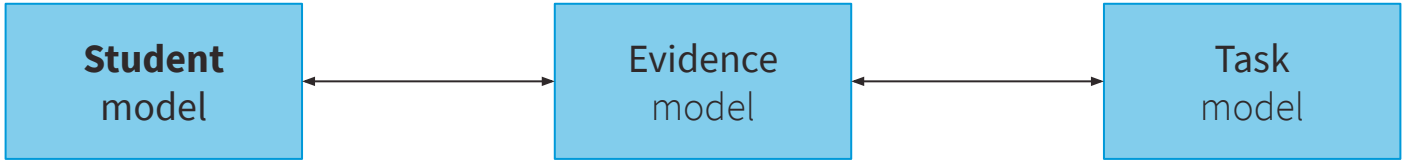

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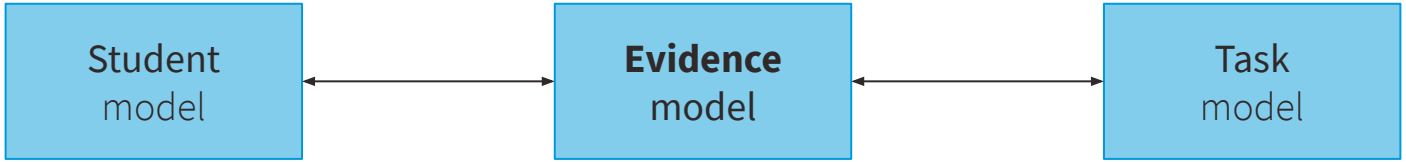

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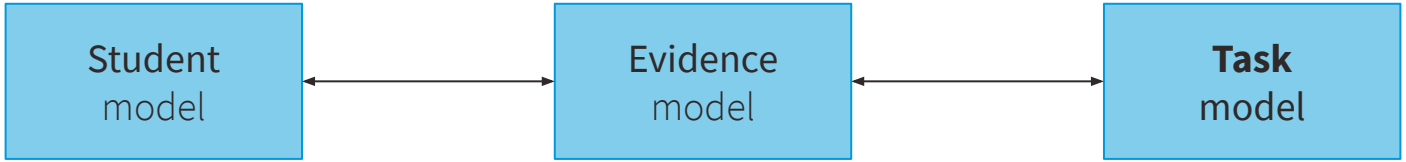

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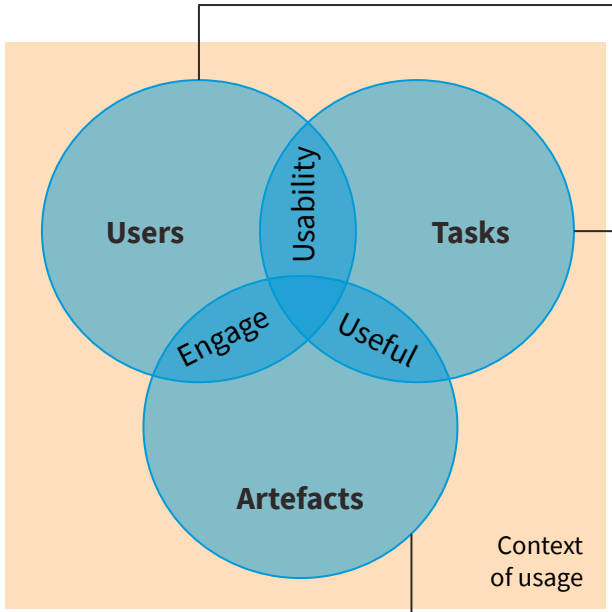

Three base pillars of any *game designing and assessment*. User experience emerges from the interplay between these elements

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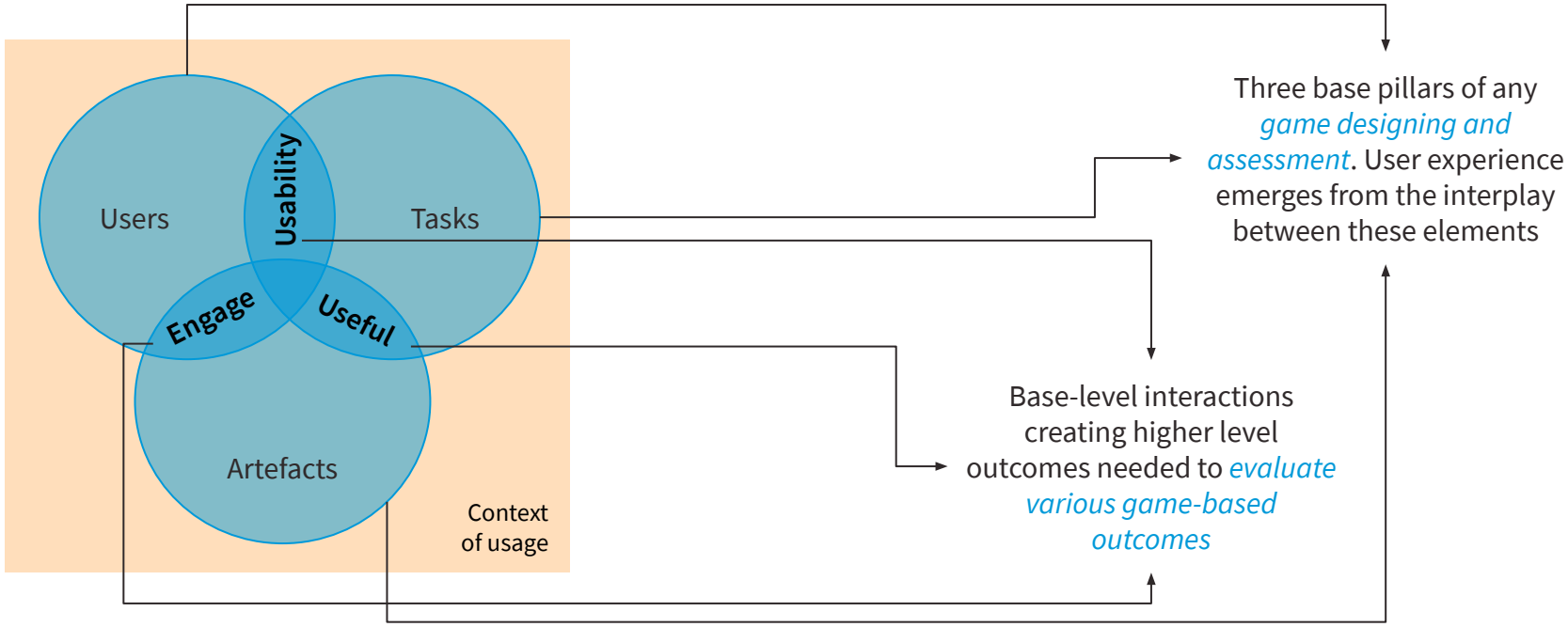

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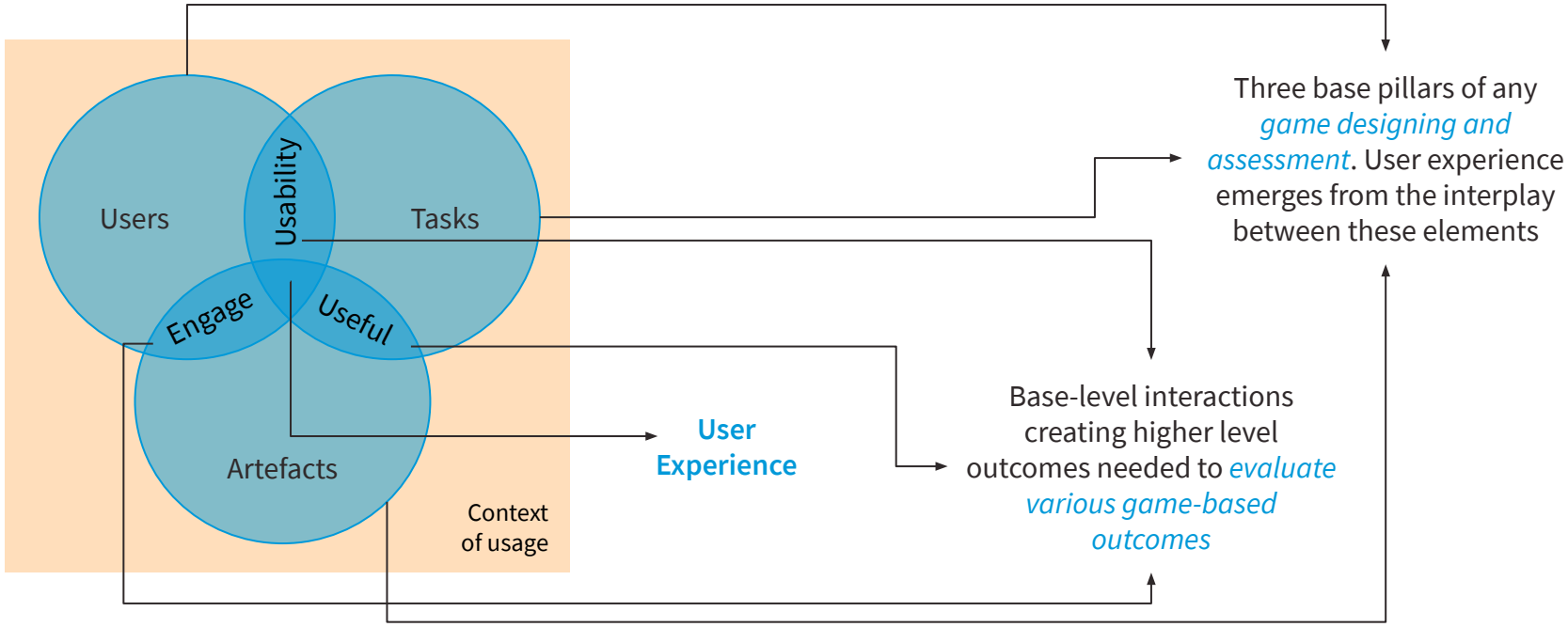

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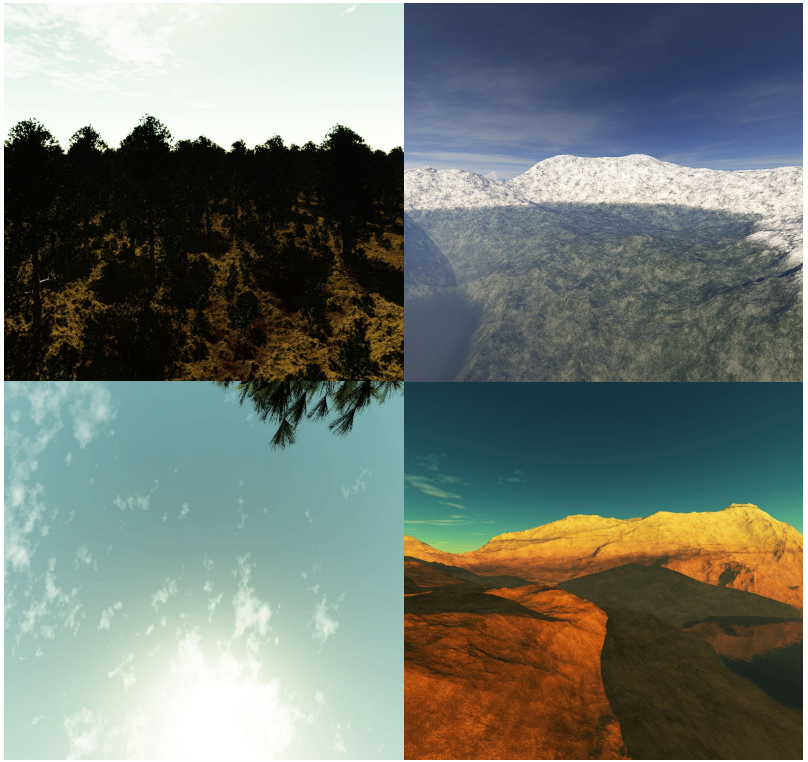

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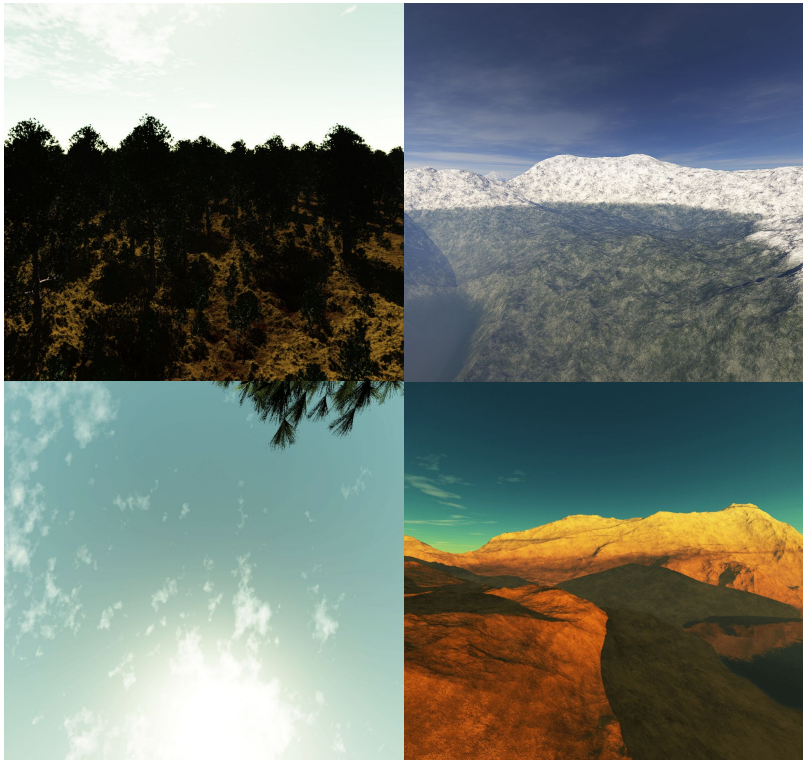

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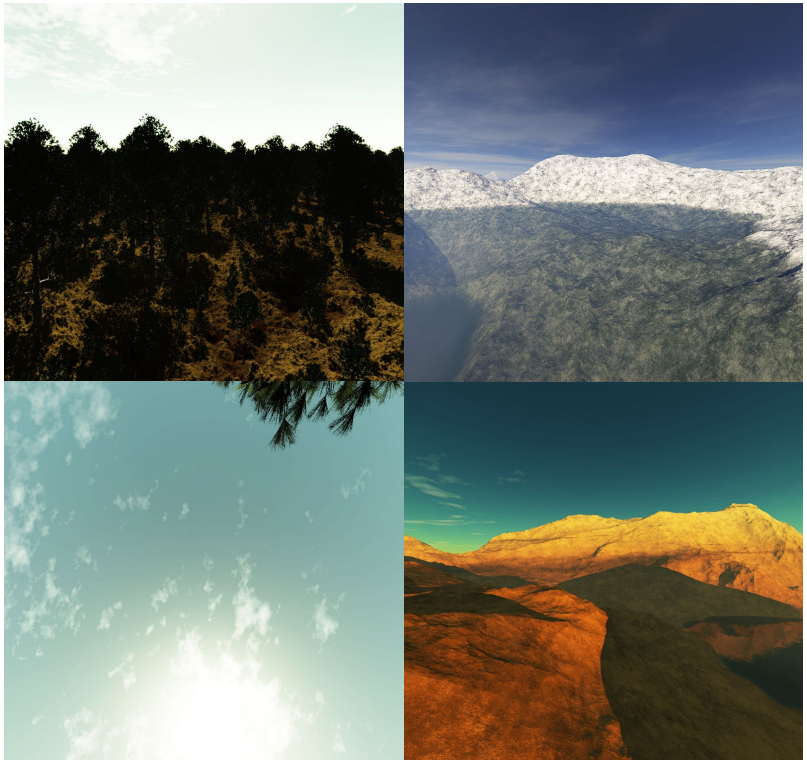

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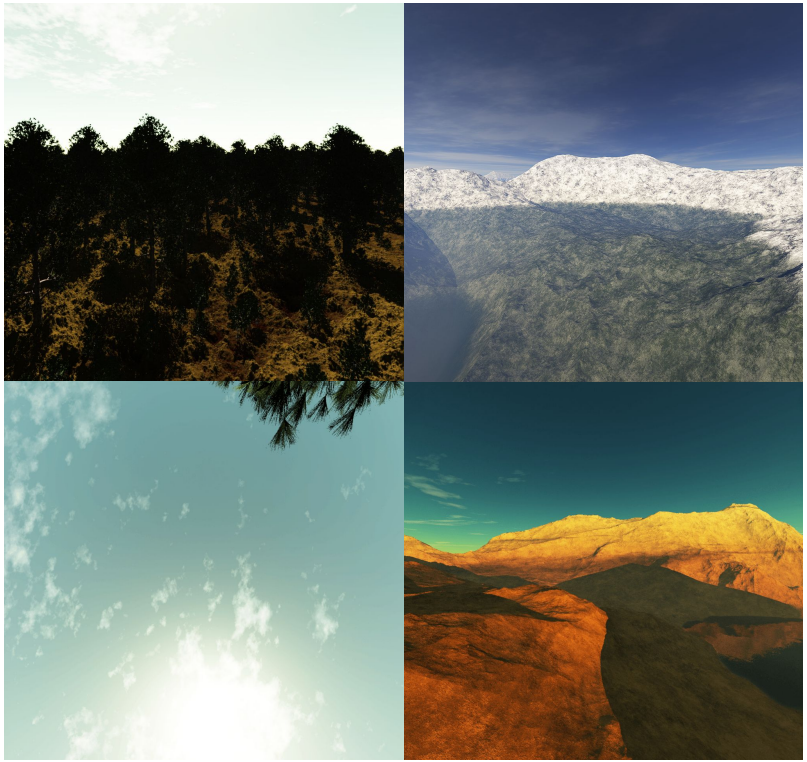

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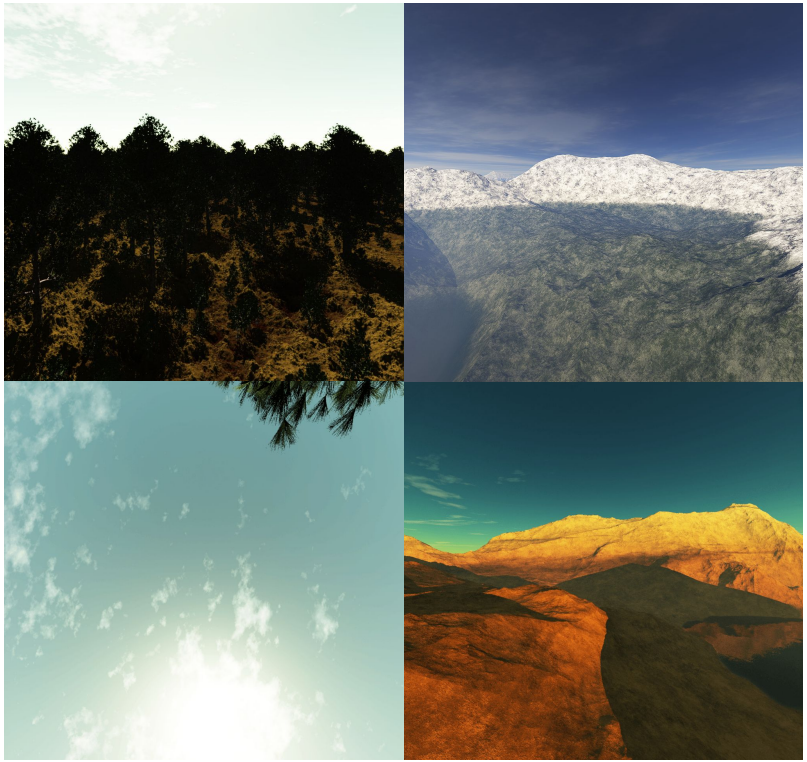

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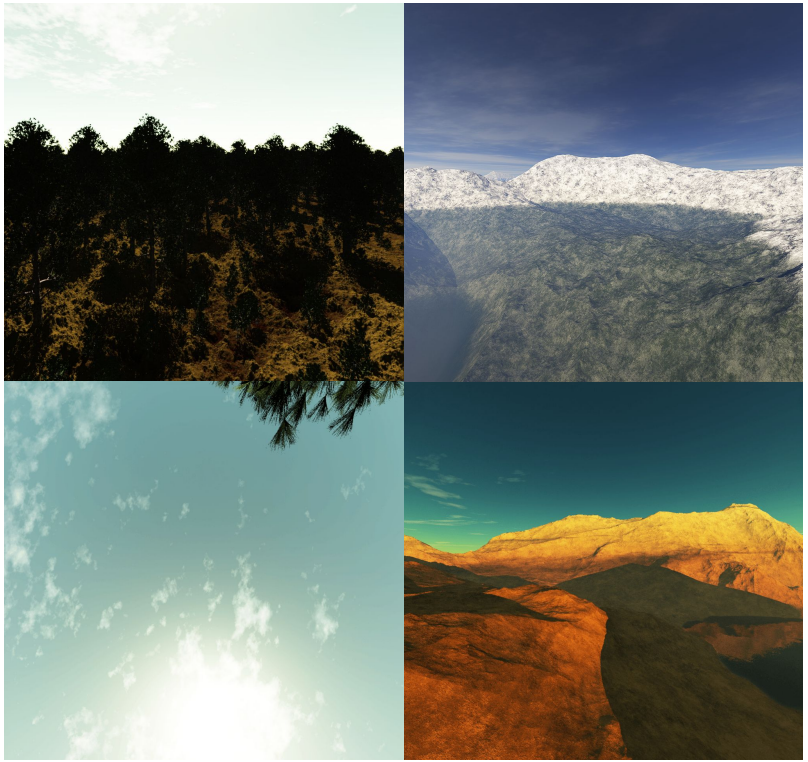

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- **One game in one assessment context** – is this sufficient to establish the credibility of the proposed system (framework and assessment)?

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Further Reading

[1] T. Gangavarapu, T.S. Ashwin, and G.R.M. Reddy. *Evaluating Affective and Cognitive Outcomes of a Mobile-VR Game-based Learning Approach for Basic Mathematics.* IEEE Transactions on Learning Technologies. 2020.

[2] Pellegrino, James W., Louis V. DiBello, and Susan R. Goldman. *A framework for conceptualizing and evaluating the validity of instructionally relevant assessments.* Educational Psychologist 51.1: 59-81. 2016.

[3] Alysson, Diniz Dos Santos, and Fraternali Piero. *A comparison of methodological frameworks for digital learning game design.* GALA Conference. 2015.

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[7] Kiili, K., Lainema, T., de Freitas, S., and Arnab, S. *Flow framework for analyzing the quality of educational games.* Entertainment computing, 5(4), 367-377. 2014.

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Thank you ~