Maze Commander: A Collaborative Asynchronous Game Using the Oculus Rift & the Sifteo Cubes

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Adaptive Serious Games

Adaptation’s Basis
- Performance
- Knowledge

Adapted Output
- Dynamic Difficulty Adjustment
- Learning Content Adjustment
Conceptual Model - Learning Style

- Personality Traits
- Knowledge
- Performance
- Player's Behavior

Player's Profile

Learning Style

Game

Adaptation Rules

FLOW

Adapts

Online

Real-time
Offline Adaptation Factors – Learning Style

- Visual
- Aural
- Read-Write
- Kinesthetic

VARK
Research Question

- Relationship between
  - learning style
  - preferred interaction modality
- Effect on game experience and learning outcome
The **Game**

![Diagram showing relationships between Personality Traits, Player's Profile, Learning Style, Knowledge, Performance, Player's Behavior, and Game flow](image-url)
Learning Style – Game Interaction
Maze Commander

- Highly Collaborative
- Oculus Rift: Visual
- Sifteo Cubes: Kinesthetic
Design Principles

- **Common goal/success**
  - Escaping the maze!

- **Heterogeneous resources**
  - Oculus Rift
  - Sifteo Cubes

- **Collaborative tasks**
  - Impossible to finish the game using one player

- **Communication**
  - Different ways including verbal and physical gestures.
Maze Commander - Visual
Maze Commander - Kinesthetic
Methodology

- **Survey**
  - game experience and collaboration

- **Observation metrics**
  - collaboration and communication

- **Semi-structured interview**

- **16** participants between 19 and 36 years (av. 23.62)
Evaluation Factors

Survey
- Competence
- Immersion
- Flow
- Tension
- Challenge
- Negative Affect
- Positive Affect
- Empathy
- Negative Feelings
- Behavioural Involvement

Observation Metrics
- Excitement together
- Worked out strategies
- Helping
- Global strategies
- Waited for each other
- Got in each other’s way
Procedure

Session 1

IGQ 1.1
Play → Play → Play → IGQ 1.2 → Play → Play → GQ + SQ

Session 2

IGQ 2.1
Play → Play → Play → IGQ 2.2 → Play → Play → GQ + SQ

Switching modalities
Game Experience of 1st Session
Collaboration Observations

- Positive empathy score
- Step by step strategy
- Waiting for each other was not frustrating
- Helping was not observed
- No use of prior knowledge in second session
Preferences

4 participants

6 participants

6 participants
Lessons Learned

- Explicit control for the Oculus Rift
- Communication via different channels
- Importance of strategizing moments
- Skills and personality adaptations
- Interacting with the Sifteo Cubes
Conclusion

- Maze Commander
- Oculus Rift and Sifteo Cubes
  - Visual and kinestetic learning styles
- Good game experience
- Promising interaction modalities
Future Work

- Improving communication
- Adaptation to learning styles
- Evaluation of influence on learning outcome
Take-Away Message

- Users communicate via various channels
- Fun and promising interaction modalities
- Sifteo Cubes “hidden” actions
- Come and play our demo tonight!

https://www.youtube.com/watch?v=55TaHKHgFDU